The Second International Razavi Epilepsy Congress
7-9 September 2016

دومین کنگره بین‌المللی صرع رضوی
17-19 شهریور 1395
Dear Friends and Colleagues,

On behalf of the scientific and executive committees, it is our pleasure to invite you to attend The Second International Epilepsy Congress that will be held from 7 - 9 September, 2016 in Razavi Hospital, Mashhad, Iran. This congress will provide an opportunity for the delegates from all over the world to come together for a discussion on the latest developments and current challenges of the treatment of epilepsy.

The program will address a broad range of topics that health care providers usually face in their daily practice, including practical and social issues of epilepsy, epilepsy across different ages, pharmacotherapy of intractable epilepsy, psychological aspects of epilepsy, and epilepsy surgery.

We are looking forward to welcoming you here in Mashhad.

Dr. Ghassem Soltani
CEO of Razavi Hospital
دومین کنگره بین‌المللی صرع رضوی
About the City of Mashhad:

Mashhad is the capital of Khorasan Razavi province located in the North East of Iran. It originated from a small village called Sanabad, 24 km away from Tous. After the martyrdom of Imam Ali Ibn Musa Al-Reza and his burial here in 203 A.H., the place came to be known as Mashhad Al-Reza (meaning the place of martyrdom of Imam Reza). Gradually and for the sake of making the pilgrimage more comfortable, some buildings were erected around the place of burial and it is said that Sultan Muhammad Khudabandeh Iljaitu, the Mongol ruler of Iran who converted to shi’ism renovated the holy shrine on a grand scale. It is mentioned that the elegant tile decorated building of the Shrine and a silver burial chamber over the tomb were built in Iljaitu period. It also seems that the complete construction of the present dome is one of Iljaitu’s services. It was not until the 16th century that Mashhad received the attention it now enjoys.

At the time the Safavid dynasty was established, Shi’ite Islam was recognized as the dominant religion for the whole territory. The shrine was restored, enlarged, and Goharshad mosque was built. The rulers themselves made pilgrimages to the site and since then it has become the most holy city in Iran. Along with all the beautiful religious attractions, the big, beautiful Astan Quds Meuseum along with one of the biggest libraries in the region, has added to the cultural aspects of the pilgrimage.

Although the holy shrine is the main landmark of the city of Mashhad, the city’s attractions are certainly not limited to it. The tomb of Nader Shah is a reminder of the city’s historical significance at the time of his reign.

In case one is willing to leave the city for another pilgrimage, there are many other historical sites including the tomb of Khajeh Morad and tomb of Khajeh Abasalt.

Furthermore, Ferdowsi’s tomb is the perfect symbol of the city’s literary and cultural identity.

Among other sights, there are the summer resorts in Torghabeh, Shandiz, Torogh, Akhlamad and Zoshk with their many traditional restaurants offering Persian cuisines, making your visit to Mashhad almost unforgettable.
دومین کنگره بین‌المللی صربع رضوی
Board of Directors:

President of the Congress: Dr. Ghassem Soltani

Scientific Chairmen: Dr. Ali Gorji, Dr. Mohsen Foroughipour

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Dr. Christoph Kellinghaus
Department of Neurology
Klinikum, Osnabruck
Germany

Dr. Gabriel Moeddel
Department of Neurology
Universitätsklinikum Münster
Germany

Dr. Hubertus Lohmann
Herz-Jesu-Krankenhaus
Münster
Germany

Dr. Frank Bösebeck
Epilepsy Center Rotenburg
Germany

Dr. Andreas van Baalen
Department of Neuropaediatrics
University of Kiel
Germany

Dr. Heiko Luhmann
Institute of Physiology & Pathophysiology
Johannes-Gutenberg University
Germany

Dr. Mehrnoush Zobeiri
Institute of Physiology
Münster University
Germany

Dr. Gilles van Luijtenaar
Biological Psychology Department
Donders Centre for Cognition
Radboud University
Netherlands
Dr. Maryam Khaleghi Ghadiri
Department of Neurosurgery
Münster University Hospital
Germany

Dr. Marec von Lehe
Department of Neurosurgery
University Hospital Bochum
Germany

Zoya Bastany
The Electrical and Computer Engineering Department
The University Of British Columbia
Vancouver
Canada

Shahbaz Askari
The Electrical and Computer Engineering Department
The University Of British Columbia
Vancouver
Canada
National Faculty:

Bita Abbasi, M.D.
Radiology Specialist, Assistant Professor, Mashhad University of Medical Sciences, Mashhad, Iran

Mohsen Aghaei Hakak, M.D.
Neurology Specialist, Razavi Hospital, Mashhad, Iran

Seyed Ataollah Aghilian, M.D.
Psychiatrist, Razavi Hospital, Mashhad, Iran

Hossein Amiri, M.D.
Neurology Specialist, Razavi Hospital, Mashhad, Iran

Farah Ashrafzadeh, M.D.
Pediatric Neurologist, Department of Pediatrics, Mashhad University of Medical Sciences, Mashhad, Iran

Gholamreza Bahador Khan, M.D.
Neurosurgery Specialist, Razavi Hospital, Mashhad University of Medical Sciences Mashhad, Iran

Mehran Beiraghi Toosi, M.D.
Pediatric Neurologist, Assistant Professor, Mashhad University of Medical Sciences, Mashhad, Iran

Yasmin Davoudi, M.D.
Radiology Specialist, Assistant Professor of Radiology, Imam Reza Hospital, Mashhad, Iran

Mohammadreza Ehsaei, M.D.
Neurosurgery Specialist, Mashhad University of Medical Sciences, Mashhad, Iran

Mohammad Mehdi Etemadi, M.D.
Neurology Specialist, Mashhad, Iran

Maryam Jafarian, Ph.D.
Department of Neuroscience, Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran

Fariba Karimzadeh, Ph.D.
Department of Neuroscience, Shefa Neuroscience Research Centre, Tehran, Iran
National Faculty:

Ali Moghimi, Ph.D.
Ph.D. in Physiology, Assistant Professor, Ferdowsi University of Mashhad, Dean of the Faculty of Science, Mashhad, Iran

Karim Nikkhah, M.D.
Neurology Specialist, Associate Professor of Neurology, Mashhad University of Medical Sciences, Mashhad, Iran

Abbas Nourian, M.D.
Head of the Association of Neurology, Mashhad, Iran

Elham Rahimian, M.D.
Neurology Specialist, Haghhighat Imaging Center, Shefa Neuroscience Research Centre, Tehran, Iran

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Neurology Specialist, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

Mohammad Rezvani, M.D.
Neurology Specialist, Khatam Alanbia Hospital, Tehran, Iran

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Neurology Specialist, Associate Professor of Neurology Mashhad University of Medical Sciences, Department of Neurology, Qaem Hospital, Mashhad, Iran

Payam Sasannezhad, M.D.
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Reza Sadr Nabavi, M.D.
Neurologist, Psychiatrist Neuropathologist, Mashhad University of Medical Sciences, Mashhad, Iran

Ghassem Soltani, M.D.
Department of Anaesthesia, Razavi Hospital, Mashhad, Iran

Seyed Motahar Kamal Shojaei, M.D.
Department of Anaesthesia, Razavi Hospital, Mashhad, Iran

Samira Zabihiyan, M.D.
Neurosurgery Specialist, Assistant Professor, Mashhad University of Medical Sciences, Mashhad, Iran

Reza Zare, M.D.
Neurosurgery Specialist, Razavi Hospital, Mashhad, Iran
Congress Venue:

One of the most important purposes for the construction of Razavi sub-specialty hospital, the most equipped therapeutic center in the region, was to provide the best services available to the pilgrims coming to Mashhad. This project was implemented in 1993, first in a 5-story building, called the first phase, and then in another building, the so called second phase of the hospital. The aim was and still is to continue the cultural and social services of Astan Quds Razavi and to provide the proper therapeutic facilities for the pilgrims and lovers of Imam Reza.

Various parts of the hospital such as emergency, policlinics etc. have been equipped under the supervision of great consultants and the technical views of Iranian and foreign supervisors have been taken into account for this project. This hospital was also built based on the highest national and international standards and has been the first hospital in Iran and one of the few in the region to achieve the diamond level of ACI (Accreditation Canada International) certification. Razavi hospital has also managed to achieve TEMOS certificate issued by Germany as well; the fact that made it a fine destination for many international patients.

Being a general hospital, Razavi hospital can offer numerous medical services, from PET scan (the radiodrugs of which are produced by a state of the art cyclotron at the nuclear departmentsite) to radiotherapy and oncology (mostlyd one with the assistance of the newly established Mehr Cancer Center) and many more para-clinical services, not to mention Endoscopy, IVF, Obstetrics and Gynecology, NICU, etc.

Located on the third floor of the second phase, Razavi Hospital's Neurology ward also offers its subspecialty services to many patients annually. Having been offered by some of the most prominent specialists and sub-specialists, the services at this department have given life back to many patients and have brought hope to the lives of their family members.
The Second International Razavi Epilepsy Congress

Program
## First Day:
### Wednesday, 7 September 2016

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>08:30 - 09:30</td>
<td>Opening Ceremony</td>
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<td>08:30 - 08:35</td>
<td>Quran and National Anthem</td>
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<td>08:35 - 08:40</td>
<td>Video Clip</td>
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<tr>
<td>08:40 - 08:55</td>
<td>Welcome Speech Dr. Ghassem Soltani, Iran CEO of Razavi Hospital</td>
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<tr>
<td>08:55 - 09:05</td>
<td>Welcome Speech Dr. Christoph Kellinghaus, Germany Münster-Osnabrück Epilepsy Center</td>
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<tr>
<td>09:05 - 09:10</td>
<td>Commendation of Epilepsy Pioneer in Mashhad Dr. Sadr Nabavi, Iran</td>
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<tr>
<td>09:10 - 09:30</td>
<td>DC-recording EEG in Epilepsy Dr. Ali Gorji, Germany</td>
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<tr>
<td>09:30 - 10:00</td>
<td>Break</td>
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**First Session:**

**Experimental Epilepsy Research**

**Chairmen:**
Dr. Mohammad Mehdi Etemadi, Dr. Heiko Luhmann, Dr. Ali Moghimi, Dr. Gilles van Luijtelaar, Dr. Hubertus Lohmann

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>10:00 - 10:30</td>
<td>Development and Maldevelopment of The Cerebral Cortex - of Mice and (Wo)Men</td>
<td>Dr. Heiko Luhmann, Germany</td>
<td>Germany</td>
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<tr>
<td>10:30 - 11:00</td>
<td>Animal Models in Epilepsy Research</td>
<td>Dr. Gilles van Luijtelaar, Germany</td>
<td>Germany</td>
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<tr>
<td>11:00 - 11:20</td>
<td>Dysregulation of Hyperpolarization-activated Inward Cation Current (Ih) Affects the Thalamocortical Oscillations: the Role of Auxiliary Subunit TRIP8b on HCN Channel Function in Thalamic and Cortical Neurons</td>
<td>Dr. Mehrnoush Zobeiri, Germany</td>
<td>Germany</td>
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<tr>
<td>11:20 - 11:40</td>
<td>Non-invasive Recording of Spreading Depression (DC- EEG)</td>
<td>Zoya Bastany, Canada</td>
<td>Canada</td>
</tr>
<tr>
<td>11:40 - 12:00</td>
<td>Dual Mode Brain Near Infrared Spectroscopy and Electroencephalography Monitoring and Signal Processing</td>
<td>Shahbaz Askari, Canada</td>
<td>Canada</td>
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<tr>
<td>12:00 - 12:20</td>
<td>Changes of Notch Signaling Pathway in Absence Epilepsy</td>
<td>Dr. Fariba Karimzadeh, Iran</td>
<td>Iran</td>
</tr>
<tr>
<td>12:20 - 12:40</td>
<td>Modulatory Effect of Inhibitory and Excitatory Systems in Absence Seizure</td>
<td>Dr. Maryam Jafarian, Iran</td>
<td>Iran</td>
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<tr>
<td>12:40 - 14:00</td>
<td>Lunch</td>
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<tr>
<td>13:30 - 14:00</td>
<td>Poster Session</td>
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<tr>
<td>Workshop (1):</td>
<td>EEG and LTM Workshop</td>
<td>Wednesday, 7th September 2016</td>
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<td><strong>Cardiology School Hall</strong></td>
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<td><strong>Moderators:</strong></td>
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<td></td>
<td>Dr. Christoph Kellinghaus, Dr. Gabriel Möddel, Dr. Frank Bösebeck</td>
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<td>10:00 - 12:45</td>
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<td>14:00 - 16:15</td>
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<tr>
<th>Workshop (2):</th>
<th>Patch Clamp Technique</th>
<th>Wednesday, 7th September 2016</th>
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<td><strong>Main Hall</strong></td>
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<td><strong>Moderators:</strong></td>
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<td></td>
<td>Dr. Mehrnoush Zobeiri</td>
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<td><strong>Chairmen:</strong></td>
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<td>Dr. Heiko Luhmann, Dr. Gilles van Luijeltaar, Dr. Ali Moghimi</td>
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<td><strong>Time Slots:</strong></td>
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<td></td>
<td>14:00 - 16:15</td>
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### The Second International Razavi Epilepsy Congress
7-9 September 2016, Razavi Hospital, Mashhad, Iran

#### Second Day:
Thursday, 8 September 2016

#### First Session:
General Aspects of Epilepsy

**Chairmen:**
Dr. Gilles van Luijtelaar, Dr. Marec Von Lehe, Dr. Mohsen Aghaee Hakak, Dr. Seyed Motahar Kamal Shojaei, Dr. Payam Sasannezhad

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
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</thead>
<tbody>
<tr>
<td>08:30</td>
<td>Epidemiology and Semiology of Epilepsy</td>
<td>Dr. Christoph Kellinghaus, Germany</td>
</tr>
<tr>
<td>09:00</td>
<td>Pharmacotherapy in Epilepsy</td>
<td>Dr. Gabriel Möddel, Germany</td>
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<tr>
<td>09:30</td>
<td>Report of Intractable Epilepsy Surgery in Razavi Hospital, Mashhad, Iran</td>
<td>Dr. Mohsen Aghaee Hakak, Iran</td>
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<tr>
<td>09:50</td>
<td>Status Epilepticus in Adults</td>
<td>Dr. Fariborz Rezaetaleb, Iran</td>
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<tr>
<td>10:10</td>
<td>Management of Intractable Epilepsy</td>
<td>Dr. Karim Nikkhah, Iran</td>
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<tr>
<td>10:30</td>
<td>Break</td>
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</tbody>
</table>
### Second Session:
**Imaging and Epilepsy**

**Chairmen:**
Dr. Karim Nikkhah, Dr. Maryam Khaleghi Ghadiri, Dr. Frank Bösebeck, Dr. Andreas van Baalen, Dr. Hubertus Lohmann, Dr. Morteza Saeedi

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker &amp; Location</th>
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<tbody>
<tr>
<td>11:00 - 11:30</td>
<td>MRI in Epilepsy</td>
<td>Dr. Gabriel Möddel, Germany</td>
</tr>
<tr>
<td>11:30 - 12:00</td>
<td>Imaging in Intractable Epilepsy: Case Presentation</td>
<td>Dr. Elham Rahimian, Iran</td>
</tr>
<tr>
<td>12:00 - 12:20</td>
<td>MRI Spectroscopy Findings in Epilepsy</td>
<td>Dr. Bita Abbasi, Iran</td>
</tr>
<tr>
<td>12:20 - 12:40</td>
<td>Brain Image in Epilepsy</td>
<td>Dr. Yasmin Davoudi, Iran</td>
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<tr>
<td>12:40 - 14:00</td>
<td>Lunch</td>
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<tr>
<td>13:30 - 14:00</td>
<td>Poster Session</td>
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<tr>
<td>14:00 – 16:15</td>
<td>Case Reports Temporal Epilepsy</td>
<td>Dr. Mohsen Aghaee Hakak, Iran Dr. Christoph Kellinghaus, Germany Dr. Gabriel Möddel, Germany Dr. Andreas van Baalen, Germany Dr. Elham Rahimian, Iran</td>
</tr>
</tbody>
</table>
Workshop (3):
EEG Recording in Animal Model
Thursday, 8th September 2016
Cardiology School Hall

Moderators:
Dr. Maryam Jafarian, Dr. Fariba Karimzadeh, Dr. Mehrnoush Zobeiri

11:00 - 12:40
## Third Day:
**Friday, 9 September 2016**

### First Session:
**Children Epilepsy**
Chairmen:
Dr. Hubertus Lohmann, Dr. Hosein Amiri, Dr. Fariborz Rezaietalab, Dr. Mohammad Reza Ehsaie, Dr. Gabriel Möddel, Dr. Abbas Nourian

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
<th>Country</th>
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<tbody>
<tr>
<td>08:30 - 08:55</td>
<td>Autoimmune Encephalopathies in Children</td>
<td>Dr. Andreas van Baalen, Germany</td>
<td>Germany</td>
</tr>
<tr>
<td>08:55 - 09:20</td>
<td>Herbal Medicine in Treatment of Epileptic Children</td>
<td>Dr. Farah Ashrafzadeh, Iran</td>
<td>Iran</td>
</tr>
<tr>
<td>09:20 - 09:40</td>
<td>Seizure Mimics in Children</td>
<td>Dr. Mehran Beiraghi Toosi, Iran</td>
<td>Iran</td>
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<tr>
<td>09:40 - 10:00</td>
<td>Is Seizure Control Possible? on Automated Absence Seizure Detection and Interference in a Genetic Absence Model</td>
<td>Dr. Gilles van Luijtelaar, Germany</td>
<td>Germany</td>
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<tr>
<td>10:00 - 10:20</td>
<td>Mental Retardation and Epilepsy</td>
<td>Dr. Frank Bösebeck, Germany</td>
<td>Germany</td>
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<tr>
<td>10:20 - 10:50</td>
<td><strong>Break</strong></td>
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</table>
## Second Session:
Cognition and Epilepsy Surgery

**Chairmen:**
Dr. Mohsen Foroughipour, Dr. Gholamreza Bahadorkhan  
Dr. Frank Bösebeck, Dr. Samira Zabihyan, Dr. Farah Ashrafzadeh

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker(s)</th>
</tr>
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<tbody>
<tr>
<td>10:50 - 11:15</td>
<td>Neuropsychological Aspects of Epilepsy</td>
<td>Dr. Hubertus Lohmann, Germany</td>
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<tr>
<td>11:15 - 11:35</td>
<td>Hemispherotomy: Indication, Technique and Outcome</td>
<td>Dr. Marec Von Lehe, Germany</td>
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<tr>
<td>11:35 - 11:55</td>
<td>Surgery on Temporal Lobe Epilepsy</td>
<td>Dr. Maryam Khaleghi Ghadiri, Germany</td>
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<tr>
<td>11:55 - 12:15</td>
<td>Corpus Callosotomy on Epilepsy</td>
<td>Dr. Mohammad Reza Ehsaie, Iran</td>
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<tr>
<td>12:15 - 12:35</td>
<td>Management of Anesthesia in Awake Craniotomy</td>
<td>Dr. Seyed Motahar Kamal Shojaei, Iran</td>
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<tr>
<td>12:35 - 12:55</td>
<td>Awake Neurosurgery in Epilepsy</td>
<td>Dr. Ghassem Soltani, Iran</td>
</tr>
<tr>
<td>12:55 - 13:15</td>
<td>Psychiatric and Neuropsychologic Alterations Following Temporal Lobe Resection in Epilepsy</td>
<td>Dr. Seyed Ataollah Aghilian, Iran</td>
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<tr>
<td>13:15 - 14:30</td>
<td>Lunch</td>
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<tr>
<td>14:00 - 14:30</td>
<td>Poster Session</td>
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<tr>
<td>14:30 - 16:30</td>
<td>Case Report</td>
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<td>Extra-Temporal Epilepsy</td>
<td>Dr. Christoph Kellinghaus, Germany</td>
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<td>Dr. Marec Von Lehe, Germany</td>
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<td>Dr. Mohammad Rezvani, Iran</td>
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<td>Dr. Hubertus Lohmann, Germany</td>
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<td>Dr. Reza Zare, Iran</td>
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<td>Dr. Mohsen Aghaee Hakak, Iran</td>
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<tr>
<td>16:30-16:45</td>
<td>Closing Ceremony</td>
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The Second International Razavi Epilepsy Congress

Abstracts
Direct current (DC) recording refers to a signal value that is not changing during continuous EEG. DC-EEG enables us to record very slowly changing EEG signal. DC-EEG is not only considered to exhibit the general state of neuronal network and to contribute to the explanation of the mechanisms of surface EEG, but may play a crucial role in diagnosis of different neurological disorders and physiological states of the brain. Spreading depression (SD), a depolarization wave of the neurons and neuroglia, propagates across the gray matter at a velocity of 2–5 mm/min and play an important role in several neurological disorders, such as migraine with aura, stroke, and epilepsy. Recordings of SD via DC-EEG in patients with intractable epilepsy indicate the pathophysiological role of SD in seizure attacks as well as aura symptoms. This novel aspect of epilepsy will be presented and discussed.
Development and Maldevelopment of the Cerebral Cortex - Of Mice and (Wo) Men

Heiko J. Luhmann
Institute of Physiology, University of Mainz Medical Center, Mainz, Germany

This presentation will give an overview on early developmental processes in the cerebral cortex from proliferation to differentiation and programmed cell death. The focus will be on neuronal migration and migration disorders, which have a strong impact on the further development of the cortex and may lead to long-term neurological dysfunction such as epilepsy. The molecular, cellular and network mechanisms leading to epilepsy in an animal model of focal cortical dysplasia will be presented.
Animal Models in Epilepsy Research

Gilles van Luijtelaar

Donders Centre for Cognition, Radboud University, Nijmegen, the Netherlands

Understanding the complex mechanisms of the various types of epilepsy and seizure generation and establishing safety and efficacy on antiepileptic treatment cannot be accomplished by studying only the clinical population. Therefore the use of appropriate animal models remains necessary. Mechanisms can be studied at various levels: genetic one by using modified or mutated animals, cellular level by various molecular and neurophysiological techniques, often in the most vulnerable samples from the immature brain, or at a system level by using intact animals. The latter models are also commonly used for efficacy and safety studies. While some of the intact seizure and epilepsy models use otherwise healthy animals which receive either chemoconvulsants, electrical stimulation, or environmental stimulation (sound, trauma, temperature stress), other intact models use genetic epileptic rats or mice. Most popular are the post-status epilepticus with recurrent seizure models and the genetic absence models. Both models allow to study the process of epileptogenesis. Major uses, limitations, similarities and differences between the model and the human equivalent will be critically discussed.
Dysregulation of Hyperpolarization-Activated Inward Cation Current ($I_h$) Affects the Thalamocortical Oscillations: The Role of Auxiliary Subunit TRIP8b on HCN Channel Function in Thalamic and Cortical Neurons

Mehrnoush Zobeiri¹, Annika Lütjohann¹, Parick Mueth², Hans-Christian Pape¹, Dane M. Chetkovich³, Thomas Budde¹

1. Institute für Physiologie I, Westfälische Wilhelms-Universität, Münster, Germany
2. Department of Neurology, Universitätsklinikum Münster, Germany
3. Davee Department of Neurology and Clinical Neurosciences and Department of Physiology, Northwestern University, Chicago, USA

The hyperpolarization-activated cyclic nucleotide-gated cation (HCN) channels have a major role in controlling neuronal excitability and rhythmic oscillatory activity in individual neurons and neuronal networks and abnormal regulation of HCN channels has been implicated in different types of epilepsy including absence epilepsy. The aim of the present study was to determine how dysregulation of HCN channels due to the lack of expression of auxiliary subunit TRIP8b, alters the basic properties of hyperpolarization-activated current ($I_h$) in thalamic and cortical neurons and consequently affects the thalamocortical oscillations.

$I_h$ was measured in whole cell patch clamp recordings from thalamocortical (TC) neurons of different thalamic nuclei, as well as pyramidal neurons in layer V and VI of the somatosensory cortex of TRIP8b-deficient (TRIP8b⁻/-) and control (C57Bl/6J) mice (p15 – p30). Effects of $I_h$ dysregulation on thalamocortical oscillations was monitored by local field potential (LFP) recordings from ventro-posterior thalamic nucleus (VPM), somatosensory cortex and motor cortex (p 90 – p120).

In all investigated brain regions, $I_h$ amplitude was significantly lower in TRIP8b⁻/- as compared with control mice. Analysis of the half-maximal activation ($V_{1/2}$) of $I_h$ revealed that steady states activation curves were significantly shifted towards more hyperpolarized values in TRIP8b⁻/- mice. Analysis of cAMP dose-response curves showed a significant increase in the sensitivity of TC neurons for cAMP in TRIP8b⁻/- mice in comparison to control group. This higher sensitivity was shown by a stronger maximal shift of $V_{1/2}$, induced by cAMP in TRIP8b⁻/-. Reduction of $I_h$ also increased the probability of burst activity in TC neurons with lower depolarizing current injection and altered the cortical neuronal oscillations towards more slow activities.

In all, the results of this study shows that alterations in $I_h$ properties due to the lack of TRIP8b auxiliary subunit may contribute to the generation of abnormal thalamocortical oscillations.
Non-invasive Recording of Spreading Depression (DC-EEG)

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The University Of British Columbia, Vancouver, Canada

Abstract:
Electrical activities of the brain include the regular electroencephalogram (AC-EEG, typically 0.5Hz<f<70 Hz) as well as slow potentials (DC-EEG, f < 0.1Hz). Slow or DC potential displacements lead to the high electrical activity in the brain. This valuable data is usually neglected due to physiological (e.g., eye movement and respiration) and non-physiological (electrode movement and characteristics) artifacts during the data recordings. Spreading depression (SD) is a negative DC potential, and remains one of the most significant EEG patterns in the DC-EEG. SD is a major, transient, and localized relocation of ions between the extracellular and intracellular spaces, and is associated with the pathophysiology of various neurological disorders, as well as the conduct of many voluntary tasks in healthy human subjects. This wave has been recorded during ECoG, and technical barriers relevant to the invasive technique have hampered the study of SD-related disorders in human subjects. Therefore, we have proposed a novel method to non-invasively record the negative DC potential. The method consists of a newly designed ultra-low noise AC/DC-EEG amplifier and a specific electrode-electrolyte combination. Further, using our new system, we successfully captured SD waves with simultaneous non-invasive EEG and invasive ECoG recordings in rats. We compared the invasive and non-invasive recorded SD to obtain further insight into the SD structures. The comparison revealed that the SD recorded from the scalp surface indeed reflects the SD recorded invasively from the neocortex. We utilized a variety of signal processing techniques to analyze the resulting data, including spectrogram analysis, bi-spectral analysis, negative DC pattern distribution, relative spectral power, and multivariable Gaussian fit analysis. The results demonstrate that cortical SD induced by KCl injection can be measured on the intact skin surface overlying the neocortex. The DC potentials at the cortical surface revealed a highly correlated homogeneity with the SD measured at the surface of the scalp. Non-invasive monitoring of SD would allow early intervention and improve outcome in SD-related neurological disorders.
Dual Mode Brain Near Infrared Spectroscopy and Electroencephalography Monitoring and Signal Processing

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The Faculty of Graduate and Postdoctoral Studies
The Electrical and Computer Engineering Department,
The University Of British Columbia, Vancouver, Canada

Abstract:

Electroencephalography (EEG) and cerebral near-infrared spectroscopy (NIRS) are both well-known monitoring methods for analyzing cerebral neurophysiology and hemodynamics. Neuronal activity in the gray matter of the brain requires energy and thus a high metabolic rate, which is related to oxygen consumption. The blood regulatory system operates to ensure sufficient spatial and temporal distribution of oxygen and energy substrates to supply neuronal activity. In this study, we designed and developed a prototype NIRS/EEG instrument for recording electrophysiological activity and hemodynamic changes in the human forehead. This novel probe, combining both EEG and NIRS technologies, consists of Ag/AgCl EEG electrodes positioned between NIRS optodes. As ambient light is capable of contaminating the NIRS signal, a novel amplitude modulation methodology was incorporated into the NIRS/EEG device for multiplexing NIRS light sources and eliminating the interfering noise signal produced by ambient light. This method is based on the modulation of each specific NIR source by its specific carrier frequency. The summation of all sources and ambient interference is measured at the receiver site. A bandpass filter separates each source based on the carrier frequency. Three experiments were conducted using the aforementioned NIRS/EEG instrument. The experiments were performed on five healthy human subjects. The initial experiment was conducted to evaluate the functionality of the developed NIRS/EEG prototype. The association between gamma-band oscillations and total hemoglobin during subjective pain (Cold Pressor Test, CPT) was demonstrated. The increase in gamma-band oscillations, as measured by EEG electrodes on the forehead, and the increase of total hemoglobin, as measured by NIRS optodes on the forehead, have been recorded and reported accordingly.
Conventional EEG recording is conducted in the 0.16 to 70 Hz frequency range. However, ultra-low-frequency EEG, found in the range of 0.015 to 4 Hz, is highly informative and allows discovery of the general state of neurons. The genesis of low-frequency EEG signals may be non-neuronal. In the last experiment, the changes of pCO2 and low-frequency EEG are measured concurrently and the results are presented accordingly. The slow shifts of EEG signals and changes in oxygenation due to the hypoxic breathing are demonstrated in the results of this experiment.
Changes of Notch Signaling Pathway in Absence Epilepsy

Fariba Karimzadeh1,2, Sayed Mostafa Modares Mousavi1, Fatemeh Alipoor1, Hassan Hosseini Ravandi1, Ali Gorji1

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Typical absence seizures appear in children with 67- years of age and may associate with developmental delays/intellectual deficits. Notch signaling is involved in the pathogenesis of some neurological disorders including cortical dysplasia, schizophrenia, brain tumors, and Alzheimer’s disease. This study was aimed to investigate the role of notch signaling in the pathogenesis of absence seizures. Experimental groups were divided into six groups of both WAG/Rij and Wistar strains with new born, two and six months of age. The gene expression of Notch1, NLE1, NeuN, and GFAP as well as the levels of their proteins was assessed in the somatosensory cortex and different thalamic nuclei. In addition, the effect of cortical microinjection of Notch1 agonist and antagonist was investigated on the spike and wave discharges (SWDs). In cortical assessment, a significant reduction was shown in Notch 1, NLE 1 and GFAP (the marker for astrocytes) expression in two- and six- month old WAG/Rij compared to age-matched Wistar rats. The expression of NeuN as a neural marker decreased significantly in two-month-old WAG/Rij compared to the same age Wistar rats. In thalamic assessment, the expression of GFAP significantly decreased in two-month-old WAG/Rij rats compared to age-matched Wistar rats. NeuN expression significantly increased in six-month-old WAG/Rij rats compared to newborns. Distribution of Notch1 receptor decreased significantly in 4th and 6th layers of somatosensory cortex as well as in the dorsal thalamic nuclei of six-month-old compared to two-month-old in WAG/Rij rats. In 4th and 6th cortical layer, distribution of NLE1 in six-month-old WAG/Rij rats significantly decreased compared to two-month-old WAG/Rij and six-month-old Wistar rats. In the dorsal thalamic nuclei of WAG/Rij rats, GFAP-positive cells significantly decreased in six-month olds compared to two-month olds. In addition, a significant increase of GFAP-positive cells was indicated in two-month-old WAG/Rij compared to age-matched Wistars. Microinjection of Notch1 antagonist exacerbated the absence seizures in contrast with notch1 agonist. Our findings showed the changes of notch1 signaling pathway during the development of WAG/Rij rats. These findings suggest notch1 signaling pathway as a potential therapeutic target for absence epilepsy.
Modulatory Effect of Inhibitory and Excitatory Systems in Absence Seizure

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Absence epilepsy is nonconvulsive recurrent seizures accompanied by a sudden drop in consciousness and amnesia, accounts for approximately 8% of epileptic patients among school-aged children. This study focuses on the modulatory effect of inhibitory and excitatory system in absence epilepsy. Experimental groups were divided into four groups of six rats of both WAG/Rij and Wistar strains with 2 and 6 months of age. GABA and mGluR1 expression levels of different genes and distribution of receptor in the somatosensory cortex and the dorsal-lateral nucleus of the thalamus were studied. The laterodorsal nucleus of the thalamus (LD) and somatosensory cortex (SC) were evaluated with a single unit recording technique and electrocorticography. Data showed that gene expression levels of G-αalpha1, G-αGama2 and G-βB2 in the LD in four groups were not significantly different. G-αBeta3 gene expression levels in six months of WAG/Rij significantly higher than the other groups. Distribution of G-αalpha1 and G-βB2 receptors in six months WAG/Rij was significantly lower than the other groups. Distribution of G-αBeta3 and G-αGama2 receptors in six months WAG/Rij was significantly higher than the other groups. The expression of all genes in the SC into two groups of two and six months WAG/Rij was significantly lower than six and two month-old wistar groups. Distribution G-αalpha1, G-αGama2 and G-αBeta3 receptors in the cortex of six months WAG/Rij was considerably less than in groups of two and six months old wistar, and distribution and gene expression of mGlu1α receptors in different thalamic nuclei was lower in the 6-month-old WAG/Rij. Neuronal discharge of LD neurons with correlated spike-wave discharges (SWDs) in the cortex, showed activity which precedes the spike component of the SWD. The microiontophoretic injection of mGlu1α receptors agonist and antagonist in the LD reduced the duration of SWDs and increased the amplitude and duration of SWDs, respectively, in 6-month-old WAG/Rij rats. Injection of GABAa antagonist showed a significant increase in the duration and the number of SWDs during and after injection compared to preinjection period. However, the number of SWDs after GABAb antagonist injection has been significantly reduced compared to preinjection period. These findings indicate the crucial role of LD in epileptiform discharges in an absence seizure model.
Epidemiology and Semiology of Epilepsy

Christoph Kellinghaus
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Germany Epilepsy is defined as the occurrence of an unprovoked epileptic seizure and a recurrence risk of approx. 70%. Incidence has a first peak in the first years of life (80,000/100,000/year) and increases again with increasing age to more than 150,000/100,000/year in the 9th decade of life. Prevalence is estimated as 0.51% of the general population. In most cases, etiology is multifactorial. Genetic disposition, acquired brain lesions and additional provocating factors contribute to the occurrence of a seizure. Seizure semiology can be classified into aura, simple motor and complex motor movements, dyscognitive features and negative neurological symptoms that occur together or sequentially. The semiological seizure classification as developed by Hans Lüders and his coworkers at the Cleveland Clinic helps categorizing clinical features of seizures. It has been incorporated into the current epilepsy and seizure classification efforts of the International League against Epilepsy (ILAE).
Most patients with epilepsy are treated with antiepileptic drugs for decades, if not for life. This lecture presents an overview summarizing the antiepileptic drugs available and presents a rationale of which drugs to use for which indication, including results of the SANAD trial. Some new antiepileptic drugs approved after 2005 are reviewed in detail. Implications of antiepileptic drug treatment during pregnancy and in elderly patients are presented in detail. Finally, treatment strategies for common clinical constellations and comorbidity such as dementia, diabetes, kidney failure, hepatopathy or anticoagulation are discussed.
Status Epilepticus in Adults

Fariborz Rezaeitalab
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Status epilepticus (SE) is a neurologic emergency that requires immediate management. The clinical features, diagnosis and treatment of status epilepticus in adults is discussed here. Historically, more than 30 minutes epileptic activity was defined as status epilepticus. However, contemporary consensus indicates that when generalized convulsive seizures have continued for more than a few minutes, prompt treatment should be commenced, because of the life-threatening condition.

Acute structural brain injury (eg, stroke, head trauma, subarachnoid hemorrhage, cerebral anoxia or hypoxia), infection (encephalitis, meningitis, abscess) are the most common causes of status epilepticus.

Initial management begins with a rapid assessment of airway patency, circulatory status and blood glucose level. Patients should receive parenteral thiamine before or concurrent with glucose. Intravenous enzodiazepines, like midazolam, lorazepam or diazepam are the first-line treatment for SE. Moreover, a nonbenzodiazepine antiepileptic drug, such as phosphenytoin, valproate or levethyracetam is recommended to prevent recurrence. In rare cases, autoimmune etiologies such as anti-N-methyl-D-aspartate (NMDA) receptor encephalitis should be considered in patients with new-onset refractory status with no initial identifiable etiology, as early institution of immunomodulatory therapies may improve outcomes.

Long term EEG monitoring is a vital tool during the management of refractory status epilepticus in order to assess the adequacy of treatment, a guidance for antiepileptic drugs usage, and monitor for recurrence when intravenous medications are tapered.

The prognosis depends most strongly on the underlying disease, but there is evidence that status epilepticus is independently linked with high risk of mortality and morbidity.
Imaging in Pediatric Epilepsy

Yasmin Davoudi
Associate Professor of Radiology, Neonatal Research center, Emam Reza Hospital, School of Medicine, Mashhad University of Medical Sciences

Pediatric patients with intractable epilepsy represent a challenging clinical population. Each year approximately 30,000 new cases of pediatric epilepsy are reported. Approximately 25% of these cases are refractory to medical therapy, and patients are often severely debilitated by this disease. In patients with refractory epilepsy, neuroimaging is crucial for precisely identifying epileptogenic foci that are potentially amenable to surgical resection for possible cure. Some, but not all, causes of pediatric epilepsy are detectable with conventional magnetic resonance (MR) imaging. Advances in neuroimaging with use of diffusion tensor images, MR images fused with fluorine 18 fluorodeoxyglucose (FDG) positron emission tomographic (PET) images, and magnetic source images have recently improved lesion detection and localization. In this article, we review the latest imaging techniques in pediatric epilepsy and their capacity to help detect various pathologic entities, including focal cortical dysplasia (FCD), tuberous sclerosis, hemimegalencephaly, mesial temporal sclerosis (MTS), neoplasms, Rasmussen encephalitis, perinatal infarction, and Sturge-Weber syndrome.

The aims of this presentation are:

1- Discuss the role of multimodality imaging in pediatric epilepsy.

2- Emphasize the importance of focal cortical dysplasias as a cause of intractable pediatric epilepsy.

3- Briefly review clinical and imaging findings of various pathologic conditions seen in patients with pediatric epilepsy.
Autoimmune Encephalopathies in Children

Andreas van Baalen
Department of Neuropaediatrics, University of Kiel, Germany

Over the last years, an increasing number of antibodies against neuronal surface antigens have been discovered that cause different autoimmune encephalopathies with difficult-to-treat epilepsy in children and adults. The recognition that post- or para-infectious seizures and status epilepticus previously attributed to viral etiologies can be immune-mediated (or genetic) has led to a paradigm shift in the diagnostic approach. The importance of auto-immune encephalopathies is reinforced by their relative frequency surpassing that of any viral encephalitis and because their frequent response to early immunotherapy. In contrast, although febrile infection-related epilepsy syndrome (FIRES) seems to be immune-mediated, no neuronal antibodies have been found up to now nor immunotherapy seems to have profound effect on the prognosis. Therefore, FIRES is one of the most severe epileptic encephalopathies in children. Due to rarity, multinational collaboration is necessary, e.g., to identify cases in Iran.
Iranian Medicinal Plants and Intractable Epilepsy in Childhood: What All Pediatric Neurologists Should Know

Farah Ashrafzadeh
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Pediatrics Department, Ghaem Hospital, Ahmadabad BLVD, Mashhad, Iran.

Abstract:
Epilepsy is one of the major neurological disorders still awaiting safer drugs with improved antiepileptic effect and lesser side effect. Traditional medicine is a fertile ground for the source of modern medicine. One such medicine is herbal therapy. Some plants have been shown to ameliorate or even prevent further progression of seizure. The present review attempts to discuss the efficacy of some medicinal plants on children with intractable epilepsy. Online literature review was conducted using Medline, Iran Medex, Scopus, and Google Scholar to identify studies about intractable epilepsy in children and plants. Searches were also done by going through the authors’ files and bibliographies of all identified papers. Overall researches have shown, herbal therapies potentially yield new treatment options for children with intractable epilepsy and may represent inexpensive, culturally acceptable treatment for their families.

Key words:
Intractable epilepsy, Children, Medicinal plants
Is Seizure Control Possible?
On Automated Absence Seizure Detection and Interference in a Genetic Absence Model

Gilles van Luijtelaar
Donders Centre for Cognition, Radboud University, Nijmegen, the Netherlands

Genetic rat models for childhood absence epilepsy have become instrumental in developing theories on the origin of absence epilepsy, the evaluation of new and experimental treatments, as well as in developing new methods for automatic seizure detection, prediction and or interference of seizures. A series of experiments with various types of intervention by electrical stimulation will be presented in WAG/Rij rats, from which it can be concluded that some forms of electrical deep brain stimulation are rather effective in interrupting the ongoing and for absence epilepsy typical spike-wave discharges (SWDs). Together with the availability of automated on-line analyses of ECoGs this offers an excellent possibility to intervene automatically by a closed-loop system. Progress in time frequency and network analyses has revealed that there might be preictal activity preceding SWD onset. This opens a possibility to predict SWDs and is another option for SWD control. Whether or not this might be feasible, the data presented already show that spike-wave discharges are not sudden and abrupt transitions but that there are preceded by detectable network dynamic interactions and by preictal precursors. These dynamics in time-space-frequency characteristics might yield new options for seizure prediction and seizure control.
Mental retardation (MR) is the most frequent developmental disorder. The prevalence of MR in the western world is assumed to be 0.4 to 0.6%. Along with spasticity and autistic disorders, epilepsy belongs to the most common comorbidities of MR. The incidence of epilepsy is highly correlated to the degree of MR. Determining the underlying etiology is the major basis for the choice of a suitable therapy regime, particularly in syndromal (e.g. genetically determined) epilepsies, as certain anticonvulsants can lead to a significant deterioration in some of those syndromes. This presentation will focus on theoretical and practical aspects of the treatment of epilepsy in patients with MR, both based on the current study situation and a series of case studies.
Neuropsychological Aspects of Epilepsy

Hubertus Lohmann
Clinical Neuropsychologist, Herz-Jesu-Krankenhaus Münster, Germany

Patients suffering from epilepsy frequently complain about cognitive deficits and psychological distress related to the disease. The etiology of cognitive deficits is widespread and caused by static and dynamic factors. Static factors relate to the presence of cerebral lesions causing epilepsy and cognitive deterioration. Dynamic factors encompass on-going epileptic activity, antiepileptic drugs (AEDs), and psychiatric comorbidities. Therefore, the spectrum of cognitive impairment is multifactorial and dependent on the individual exposure of static and dynamic factors.

The impact of cerebral lesions on neuropsychological functioning has been most extensively examined in patients with frontal or temporal lobe epilepsy, the former leading to executive and complex attentional dysfunction, the latter causing hemispheric-specific deteriorations like language or memory deficits. Assessing the specific problems helps in localizing the epileptogenic zone and is an invaluable tool in presurgical work-up in patients who are thought to be candidates for epilepsy surgery. Epilepsy surgery itself can result in decrease of memory or other cognitive functions, but may also improve cognition by abolishing epileptogenic disturbances of the cognitive networks.

A targeted neuropsychological assessment of possible cognitive dysfunction due to AED is another important aspect in the management of epilepsy patients. Any substance may cause tiredness, slowing and decrease of attention in up to 20% of the patients. These symptoms are mild and/or transient in most cases and usually disappear after dose reduction. However, some substances such as phenobarbitone, carbamazepine, valproate and topiramate seem to have a more prominent effect. These deficits may go undetected in clinical practice but may have severe impact on everyday functioning of the patients. Neuropsychological testing helps assessing the need for special treatment or switch of drug regimen.
The Second International Razavi Epilepsy Congress

Hemispherotomy: Indication, Technique and Outcome

Marec von Lehe
Department of Neurosurgery, University Hospital Bochum, Germany

The evolution of hemispheric surgery is a fascinating chapter of epilepsy surgery. From the 1930s, a complete anatomical resection of a hemisphere was considered in case of severe epilepsy and infantile hemiplegia. Due to late sequelae with high mortality (hydrocephalus, hemosiderosis) the procedure was abandoned despite good seizure outcome initially after surgery. Over the last decades, different techniques evolved from the concept of interrupting the epileptic discharge-spreading pathway by isolating the large epileptogenic zone and leaving the brain tissue in place.

Most patients with unilateral hemispheric epilepsy suffer from severe seizures, beginning from early childhood. In selected patients hemispheric deafferentiation is an effective option to treat refractory epilepsy. Depending on the aetiology, the chance for seizure freedom after surgery can be more than 90%.

The author focuses on indications and different surgical techniques for hemispherotomy and discusses different outcome parameters (seizure outcome, functional outcome, and neuropsychology).
Temporal Lobe Epilepsy Surgery

Maryam Khaleghi Ghadiri
Department of Neurosurgery, Westfälische Wilhelms-Universität Münster, Germany

Temporal lobe epilepsy is usually divided into two different categories, depending on from which part of the temporal lobe the seizures actually originate; mesial temporal lobe epilepsy (MTLE) and neocortical temporal lobe epilepsy (NTLE). Each of these epilepsy types requires a distinct surgical strategy.

In lateral epilepsy, the seizure focus is localized to the six-layered cortex of the temporal lobe found lateral to the collateral fissure. In comparison with MTLE in which the seizure origin is rather circumscribed and essentially confined to the mesial structures, seizures in NTLE may arise from many different foci. Therefore, NTLE resembles other neocortical extra-temporal focal epilepsies. The distinction between MTLE and NTLE has been made possible via the availability of detailed analyses of seizure symptoms stored on video, together with surface and invasive long-term EEG recordings, as well as the increasingly higher resolution of structural imaging techniques. The most convincing proof of the existence of lateral temporal lobe epilepsy is the successful resection of a neocortical temporal focus leading to seizure freedom. The two major modalities of temporal lobe surgery are the cortico-amygdalo-hippocampectomy as well as the selective amygdalo-hippocampectomy. These surgical techniques will be discussed in details.
Corpus Callosotomy in Epilepsy Surgery

Mohammad Reza Ehsaei

Department of Neurosurgery, Faculty of Medicine, Mashhad University of Medical Sciences (MUMS)

The corpus callosum is a band of nerve fibers located deep in the brain that connects the two halves (hemispheres) of the brain. It helps the hemispheres share information, but it also contributes to the spread of seizure impulses from one side of the brain to the other.

A corpus callosotomy is an operation that severs (cuts) the corpus callosum, interrupting the spread of seizures from hemisphere to hemisphere. Seizures generally do not completely stop after this procedure (they continue on the side of the brain in which they originate). However, the seizures usually become less severe, as they cannot spread to the opposite side of the brain.

A corpus callosotomy, sometimes called split-brain surgery, may be performed in people with the most extreme and uncontrollable forms of epilepsy, when frequent seizures affect both sides of the brain.

People considered for corpus callosotomy are typically those who do not respond to treatment with antiseizure medications.

Corpus callosotomy is successful in stopping drop attacks, or atonic seizures in which a person suddenly loses muscle tone and falls to the ground, in about 50% to 75% of cases. This can decrease the risk of injury and improve the person's quality of life.
Management of Anesthesia in Awake Craniotomy

Seyed Motahar Kamal Shojaei
Department of Anesthesiology, Razavi Hospital

Abstract:
The awake craniotomy technique in neurosurgery was originally introduced for the surgical treatment of epilepsy and has subsequently been used in patients undergoing some other procedures like AV malformations, brain aneurysms, tumors, and deep brain stimulation. Awake craniotomy offers great advantages for patients. For example, we can talk with the patient while operation is being done. So, we have less complications and better outcome, especially in tumors near the vital areas of the brain. In this type of procedures, the anesthesiologist’s goal is to make the operation safe and effective and reduce the stress and discomfort of the patient. There are different techniques of anesthesia, but the most common is MAC with sedation. We must have standard monitorings like usual conditions. The most commonly used drugs for awake craniotomies are dexmedetomidine, propofol, and remifentanil. Personal experience, advanced possibility, suitable team cooperation, careful planning are the basis for reaching the best results and less complications.
Psychiatric and Neuropsychologic Alterations Following Temporal Lobe Resection in Epilepsy

Seyed Ataollah Aghilian
M.D. Psychiatrist, Razavi Hospital

Abstract:
Epidemiological data support an increased risk for psychiatric comorbidity among epilepsy patients as compared to nonepileptic patients. There are several potential organic causes of psychiatric disturbances in epilepsy. Epilepsy surgery is a 4th treatment consideration and is limited to patients with medically intractable seizures. Removal of the amygdala and most of the hippocampus may have postoperative behavioral effects. Some patients have an anoma or a verbal memory deficit after resection of the dominant hemisphere, and patients occasionally develop a transient postoperative affective disorder. Epileptic patients may continue to develop interictal psychosis, personality changes, and suicidal behavior even long after the temporal lobectomy.
The Second International Razavi Epilepsy Congress

Posters
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<tbody>
<tr>
<td>1</td>
<td>Is Acupuncture Effective for Treating epilepsy?</td>
<td>Faezeh Jahanpour, Associate Professor, School of Nursing &amp; Midwifery, Bushehr University of Medical Sciences, Iran Parviz Azodi, MSc, Paramedical Faculty, Bushehr University of Medical Sciences, Iran Farzan Azodi, Medical student, students’ research committee of Bushehr University of Medical Sciences, Iran</td>
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<td>2</td>
<td>Are Vitamins Controlling Seizures?</td>
<td>Farzan Azodi, Medical student, students’ research committee of Bushehr University of Medical Sciences, Iran Faezeh Jahanpour, Associate Professor, School of Nursing &amp; Midwifery, Bushehr University of Medical Sciences, Iran</td>
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<td>Wednesday 07 September 2016 13:30 - 14:00</td>
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<td>3</td>
<td>Effect of Yoga for Controlling Seizures in Epileptic Patient</td>
<td>Nahid Sadat Jahanpour, MSc in physiology, Fars educational department, Shiraz, Iran. Faezeh Jahanpour, Associate Professor, School of Nursing &amp; Midwifery, Bushehr University of Medical Sciences, Iran Parviz Azodi, MSc, Paramedical Faculty, Bushehr University of Medical Sciences, Iran Farzan Azodi, Medical student, students’ research committee of Bushehr University of Medical Sciences, Iran</td>
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<td>4</td>
<td>The Effects of Acut and Chronic Administrations of Nepeta Menthoodes Hydroalcoholic Extract on Maximal Electroshock Seizures Induced in Male Mice</td>
<td>Fatemeh Zaeri 1; Batool Rahmati 2; Fatemeh Zaeri 1</td>
<td>1- Physiology Research Center, Kashan University of Medical Science, Kashan. Iran 2- Neurophysiology Research Center, Shahed University, Tehran, Iran.</td>
<td>Wednesday 07 September 2016 13:30 - 14:00</td>
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<tr>
<td>5</td>
<td>A Meta-Analysis of the Efficacy of Psychological Interventions (Focusing on Cognitive Interventions) in Reducing the Psychological Problems of People with Epilepsy</td>
<td>Mitra Moslehi Jouybari, Seyedeh Olia Emadian, Saeed Moslehi Jouybari</td>
<td>Department of Psychology, Roudehen Branch-Department of Psychology, Sari Branch, Islamic Azad University, Sari, Iran Department of Psychology, Electronic Branch, Islamic Azad University, Tehran, Iran.</td>
<td>Wednesday 07 September 2016 13:30 - 14:00</td>
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<td>6</td>
<td>The Help of Cognitive Hypnotherapy to a Patient with Epilepsy (a case study)</td>
<td>Saeed Moslehi Jouybari, Mitra Moslehi Jouybari, Meysam Kord, Masoumeh Hosseinpour</td>
<td>Department of Psychology, Electronic Branch, Islamic Azad University, Tehran, Iran. Department of Psychology, Sari Branch, Islamic Azad University, Sari, Iran. Department of Psychology, Sari Branch, Islamic Azad University, Sari, Iran.</td>
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<td>7</td>
<td>Effect of an Empowerment Program on Regulating Mood, Obtaining Support and Gathering Information Related Self-efficacy of Epileptic Child’s Mother</td>
<td>Sepidh Gholami</td>
<td>Tayebeh Reyhani, Mehran Beiraghi Toosi, Hamid Reza Behnam Vashani, Mahdi Haresabadi, Sepideh Gholami</td>
<td>1. Department of Pediatric And Infant, School of Nursing and Midwifery, Mashhad university of Medical Sciences, Mashhad, Iran. 2. Department of Pediatric And Infant, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran. 3. Department of Pediatric And Infant, School of Nursing and Midwifery, Mashhad university of Medical Sciences, Mashhad, Iran. 4. Department of Nursing, School of Nursing and Midwifery, Bojnurd university of Medical Sciences, Bojnurd, Iran. 5. Department of Nursing, School of Nursing and Midwifery, Bojnurd university of Medical Sciences, Bojnurd, Iran (Corresponding Author) Email: <a href="mailto:Gholamis921@mums.ac.ir">Gholamis921@mums.ac.ir</a></td>
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<tr>
<td>8</td>
<td>Ketogenic Diet and Epilepsy in Children: An Up-date Review</td>
<td>Bahareh Imani</td>
<td>Dr. Bahareh Imani</td>
<td>Mashhad university of medical sciences</td>
</tr>
<tr>
<td>9</td>
<td>Neuroprotective Effect of Citrus Aurantium Peel and Seed Extracts on Glutamate-induced Cytotoxicity in PC12 Cell Line</td>
<td>Arezoo Rajabian</td>
<td>Azar Hosseini, Arezoo Rajabian, Hamid Reza Sadeghnia</td>
<td>1) Pharmacological Research Center of Medicinal Plants, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran. 2) Department of Pharmacology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran</td>
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<td>10</td>
<td>Rheum Turkestanicum Reduced Glutamate Toxicity in PC12 and N2a Cell Lines</td>
<td>Azar Hosseini</td>
<td>Azar Hosseini, Arezoo Rajabian, Malihe Moradzadeh, Hamid-Reza Sadeghnia</td>
<td>1) Pharmacological Research Center of Medicinal Plants, Mashhad University of Medical Sciences, Mashhad, Iran. 2) Department of Pharmacology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran. 3) Neurocognitive Research Center, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran</td>
</tr>
<tr>
<td>11</td>
<td>Epilepsy in Women and Men</td>
<td>Beheshteh Azhdari</td>
<td>Robabeh Jafari, Maryam Jafari, Beheshteh Azhdari, Arezou Eshaghabadi</td>
<td>1) Shefa Neuroscience Research Center, Khatam-al-Anbia Hospital, Tehran, Iran. 2) Department of Parasitology and Mycology, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran. 3) Department of Marine Chemistry, Faculty of Basic Sciences, University of Chabahar Maritime and Marine Sciences, Chabahar, Iran</td>
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<td>12</td>
<td>Epilepsy Disorder and Sodium Channel Mutation</td>
<td>Beheshteh Azhdari</td>
<td>Robabeh Jafari(^1), Maryam Jafari(^2), Beheshteh Azhdari(^3), Zahra aeini(^4)</td>
<td>1. Shefa Neuroscience Research Center, Khatam al-Anbia Hospital, Tehran, Iran 2. Department of Parasitology and Mycology, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran 3. Department of Marine Chemistry, Faculty of Basic Sciences, University of Chabahar Maritime and Marine Sciences, Chabahar, Iran 4. Corresponding Author</td>
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<td>13</td>
<td>Berberine Reduces Duration of Seizure Trains in EEG in 4-aminopyridine Treated Rats</td>
<td>Ensiyeh Sajjadian</td>
<td>1. Ensiyeh Sajjadian(^1), 2. Hamid R. Sadeghnia(^2), 3. Hossein Kazemi Mehrjerdi(^3), 4. Mohammad Azizzadeh(^4), 5. Parichehreh Hayatdavoudi(^5), 6. Amir Afkhami(^6)</td>
<td>1. Student of Veterinary Medicine, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran 2. Neurocognitive Research Center, Department of Pharmacology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran 3. Department of Clinical Sciences, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran 4. Neurocognitive Research Center, Department of Physiology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran 5. Department of Basic Sciences, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran</td>
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<td>14</td>
<td>Reduction of NMDA Receptor NR2B Subunit in Animal Model of Absence Epilepsy</td>
<td>Fariba Karimzadeh</td>
<td>Fariba Karimzadeh(^1), Maryam Jafarian(^1)</td>
<td>1. Shefa Neuroscience Research Center, Khatam Alania Hospital, Tehran, Iran 2. Cellular and Molecular Research Center, Iran University of Medical Science, Tehran, Iran</td>
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<td>15</td>
<td>Discrepancy of Notch signaling in the Absence Epilepsy as a Neurodevelopmental Disorder</td>
<td>Fariba Karimzadeh</td>
<td>Fariba Karimzadeh(^1), 2. Sayed Mostafa Modarres Mousavi(^1), Fatemeh Alipoor(^1)</td>
<td>1. Shefa Neuroscience Research Center, Khatam Alania Hospital, Tehran, Iran 2. Cellular and Molecular Research Center, Iran University of Medical Sciences, Tehran, Iran</td>
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<td>16</td>
<td>Discrepancy of Type-1 AMPA Receptors in the Absence Epilepsy as a Neurodevelopmental Disorder</td>
<td>Fariba Karimzadeh</td>
<td>Fariba Karimzadeh(^1), 2. Sayed Mostafa Modarres Mousavi(^1), Hassan Hosseini Ravandi(^1)</td>
<td>1. Shefa Neuroscience Research Center, Khatam Alania Hospital, Tehran, Iran 2. Cellular and Molecular Research Center, Iran University of Medical Sciences, Tehran, Iran</td>
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<td>17</td>
<td>Use of the Ketogenic Diet in Childhood Epilepsy</td>
<td>Fatemeh Nasimi</td>
<td>Fatemeh Nasimi(^1), Maryam Ghorbanzade(^1), Hossein Zeraati(^2)</td>
<td>1. Instructor Pediatric, School of Nursing and Allied Health, Jahrom University of Medical Sciences, Jahrom, Iran 2. Instructor Pediatric, School of Nursing and Midwifery, Khorsan Shamail University of Medical Sciences, Bojnord, Iran</td>
</tr>
<tr>
<td>18</td>
<td>The Investigation of TRPV1 Activity in Basal Synaptic Transmission and LTP in CA1 Area of Epileptic Animals</td>
<td>Fatemeh Saffarzade</td>
<td>Fatemeh Saffarzade(^1), 2. Mohammad J. Eslamizade(^1), Ali Gorji(^2)</td>
<td>1. Department of Neuroscience, Faculty of Advanced Technologies in Medicine, Iran University of Medical Sciences, Tehran, Iran 2. Shefa Neuroscience Research Center, Khatam Alania Hospital, Tehran, Iran</td>
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</table>
| 19  | Immunohistochemical and Electro-Physiological Assessment of TRPV1 Activity in CA3 Area of Epileptic Rats | Fatemeh Saffarzadeh  | Fatemeh Saffarzadeh¹,², Mohammad J. Esalamizade¹,², Ali Gorji² | 1. Department of Neuroscience, Faculty of Advanced Technologies in Medicine, Iran University of Medical Sciences, Tehran, Iran  
2. Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran Corresponding | Wednesday  
07 August 2016  
13:30 - 14:00 |
| 20  | Seizure Prediction Based on Analysis of Extracting and Selecting EEG Features using Dominant Amplitude and Frequency Components | Mandana Sadat Ghafoorian | Mandana Sadat Ghafoorian , Mohammad Teshnehlab | Electrical Engineering Faculty, Bioelectric Department, K. N. Toosi University of Technology, Tehran, Iran Electrical Engineering Faculty, Control Department, K. N. Toosi University of Technology, Tehran, Iran | Wednesday  
07 August 2016  
13:30 - 14:00 |
| 21  | The Effect of Anxiety on the Number of Seizures                                 | Maryam Ahmadi Toosi  | Maryam Ahmadi Toosi, Arezu Nasri, Atefeh Miri | Medical student at Islamic Azad University, Mashhad Branch, Mashhad, Iran Mashhad Neuroscience Research group, Mashhad, Iran | Wednesday  
07 August 2016  
13:30 - 14:00 |
| 22  | Evaluation of the Role of Inflammation in Epilepsy                             | Maryam Borhani Haghighi | Maryam Borhani-Haghighi¹,², Sara Abdolahi¹, Sedighe Ghasemi¹, Fatemeh Alipour¹ | 1Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran 2 Department of Anatomy, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran | Wednesday  
07 August 2016  
13:30 - 14:00 |
| 23  | The Status of Erythropoietin Therapy in Epilepsy                                | Maryam Borhani Haghighi | Maryam Borhani-Haghighi¹,², Sara Abdolahi¹, Sedighe Ghasemi¹, Hassan Hosseini Ravandi¹ | 1. Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran 2. Department of Anatomy, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran | Wednesday  
07 August 2016  
13:30 - 14:00 |
| 24  | Role of Mesenchymal Stem Cells in the Treatment of Epilepsy; Current Status and Future | Maryam Borhani Haghighi | Maryam Borhani-Haghighi¹,², Iraj Kashani¹, Hadi Aligholi¹, Sara Abdolahi¹, Sedighe Ghasemi¹, Parastoo Barati¹ | 1. Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran 2. Department of Anatomy, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran | Wednesday  
07 August 2016  
13:30 - 14:00 |
| 25  | Epilepsy and Intellectual Disabilities                                         | Maryam Ghorbanzadeh  | Maryam Ghorbanzadeh¹, Fatemeh Nasimi¹, Maryam Aradmehr² | 1. Department of Nursing, School of Nursing and Midwifery, North Khorasan University of Medical Sciences, Bojnurd, Iran 2. Department of Heathrow, School of Nursing and Allied Health, Jahrom University of Medical Sciences, Jahrom, Iran 3. Department of Midwifery, School of Nursing and Midwifery, Islamic Azad University of gonabad, gonabad, Iran | Wednesday  
07 August 2016  
13:30 - 14:00 |
| 26  | Physical exercise in people with epilepsy; Risks and Benefits                   | Maryam Ghorbanzadeh  | Maryam Ghorbanzadeh¹, Fatemeh Nasimi¹, Maryam Aradmehr² | 1. Department of Nursing, School of Nursing and Midwifery, North Khorasan University of Medical Sciences, Bojnurd, Iran 2. Department of Heathrow, School of Nursing and Allied Health, Jahrom University of Medical Sciences, Jahrom, Iran 3. Department of Midwifery, School of Nursing and Midwifery, Islamic Azad University of gonabad, gonabad, Iran | Wednesday  
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</thead>
<tbody>
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<td>27</td>
<td>Brain Damage Induced Epileptic Seizures</td>
<td>Maryam Jafari</td>
<td>Robabeh Jafari1, Beheshteh Azhdari2, Maryam Jafari2, Sara Abdolah1 1,4</td>
<td>1. Shefa Neuroscience Research Center, Khatam-al-Anbia Hospital, Tehran, Iran 2. Department of Marine Chemistry, Faculty of Basic Sciences, University of Chabahar Maritime and Marine Sciences, Chabahar, Iran 3. Department of Parasitology and Mycology, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran 4. department of Pathobiology, School of Veterinary Medicine, Shiraz University, Shiraz, Iran</td>
<td>Thursday 08 September 2016 13:30 - 14:00</td>
</tr>
<tr>
<td>29</td>
<td>Efficacy of the Olive Oil-Based Ketogenic Diet for Intractable Seizure Disorders</td>
<td>Maryam Nabipour</td>
<td>Maryam Nabipour1,2,3, Ali Gorji2,3,4</td>
<td>1. Medical Student of Islamic Azad University, Mashhad Branch, Mashhad, Iran 2. Mashhad Neuroscience Research Group, Mashhad, Iran 3. Razavi Neuroscience Research Center, Mashhad, Iran 4. Muenster University Institute of Neurology, Muenster, German</td>
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<tr>
<td>30</td>
<td>Epilepsy Diagnosis Using Extraction of Linear and Nonlinear Characteristics of Brain Signals</td>
<td>Maryam Naghavizadeh</td>
<td>Maryam Naghavizadeh1, Elias Mazrooei Rad2</td>
<td>1. Biomedical engineering Department, Payame Noor University of Mashhad 2. Computer and Science Department, Khavaran Institute of Higher Education, Mashhad</td>
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</tr>
<tr>
<td>31</td>
<td>Melatonin Treatment does not Influence Hypoexcitability but Enhances Ih Currents in CA1 Pyramidal Neurons in an AD Model</td>
<td>Mohammad Javad Eslamizade</td>
<td>Mohammad Javad Eslamizade</td>
<td>1. Department of Neuroscience, School of Advanced Technologies in Medicine, Iran University of Medical Sciences, Hemmat Highway, Tehran, Iran. 2. Shefa Neuroscience Research Center, Khatam Alania Hospital, Tehran, Iran.</td>
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<tr>
<td>32</td>
<td>Risk Factors of Epilepsy, from the Perspective of the Most Famous Scholars in Traditional Iranian Medicine</td>
<td>Mojdeh Khodabakhsh</td>
<td>Mojdeh Khodabakhsh1, Hamideh khorrampajouhi1, Zohre Feyzabadi</td>
<td>1. Department of Persian Medicine, School of Persian and Complementary Medicine, Mashhad University of Medical Sciences, Mashhad, Iran</td>
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<tr>
<td>33</td>
<td>Administration of Intra-hippocampal orexin-A Receptor Antagonist (SB-334867) Attenuated EEG and Behavioral Changes in Urethane Anesthetized Rats with 4-aminopyridine Induced Seizures</td>
<td>Parichehr Hayat davoudi</td>
<td>Parichehr Hayat davoudi1, Mousa Al-Reza Hadjzadeh1, Hamid-Reza Sadeghnia2, Nema Mohammadian Roshan3, Mohammad-Naser Shafei4</td>
<td>1. Neurocognitive Research Center, Department of Physiology, Mashhad University of Medical Sciences 2. Department of Pharmacology, Mashhad University of Medical Sciences 3. Department of Pathology, Mashhad University of Medical Sciences 4. Neurogenic Inflammation Research Center,Department of Physiology, Mashhad University of Medical Sciences</td>
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**Footnotes:**
1. Shefa Neuroscience Research Center, Khatam-al-Anbia Hospital, Tehran, Iran
2. Department of Marine Chemistry, Faculty of Basic Sciences, University of Chabahar Maritime and Marine Sciences, Chabahar, Iran
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4. department of Pathobiology, School of Veterinary Medicine, Shiraz University, Shiraz, Iran

**References:**
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<th>Time / Date</th>
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<td>34</td>
<td>The Effect of Zonisamide on Lamotrigine Resistant Kindled Rats during Pregnancy</td>
<td>Reza Narenji Sani</td>
<td>Niloufar Saberi1, Reza Narenji Sani1, Keyvan Keramati1, Melika Moezifar2, Ali Mahdavi4</td>
<td>1. Department of Clinical Sciences, Faculty of Veterinary Medicine, Semnan University, Semnan, Iran 2. Department of Basic Sciences, Faculty of Veterinary Medicine, Semnan University, Semnan, Iran 3. Department of Basic Sciences, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran. 4. Department of Animal Sciences, Faculty of Veterinary Medicine, Semnan University, Semnan, Iran.</td>
<td>Thursday 08 September 2016 13:30 - 14:00</td>
</tr>
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<td>35</td>
<td>Extracellular Matrix: a New Sight for Epilepsy</td>
<td>Sajad Sahab Negh</td>
<td>Sajad Sahab Negh, Leyla Bayan, Arefzah Eshaghahabadi</td>
<td>Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran</td>
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<td>36</td>
<td>Depression Treatment in Patients with Epilepsy</td>
<td>Sara Abdolahi</td>
<td>Sara Abdolahi1,2, Arezo Eshaghahabadi1, Zahra Aeini1, Hassan Hosseri1.2.</td>
<td>1. Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran 2. Department of Pathobiology, School of Veterinary Medicine, Shiraz University, Shiraz, Iran.</td>
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<tr>
<td>37</td>
<td>Epidemiology and Classification of Epilepsy</td>
<td>Sara Abdolahi</td>
<td>Sara Abdolahi1,2, Robabeh Jafari1, Sedigheh Ghasemi1, Maryam Borhami Haghighi1.2.</td>
<td>1. Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran 2. Department of Pathobiology, School of Veterinary Medicine, Shiraz University, Shiraz, Iran 3. Department of Anatomy, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran.</td>
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<td>38</td>
<td>Stem Cells as a Potential Therapy for Temporal Lobe Epilepsy</td>
<td>Sara Abdolahi</td>
<td>Sara Abdolahi1,2, Arezo Eshaghahabadi1, Hassan Hosseri1.2, Zahra Aeini1</td>
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<td>The Effect of Probiotic on Constipation Epilepsy Patients</td>
<td>Sara Jahangiri</td>
<td>Sara Jahangiri, Musa al-Reza Tadayonfar, Mohammad Hassan Rakshani</td>
<td>1. Master of Science in Nursing, School of Nursing and Midwifery, Sabzevar University of Medical Sciences. Sabzevar University of Medical Sciences, Building Number Two. Educational Assistant. com. 2. Master of Science in Nursing, Lecturer. School of Nursing and Midwifery, Sabzevar University of Medical Sciences, 3. PhD in Statistics, Assistant Professor. Department of Biostatistics. School of Public Health. Sabzevar University of Medical Sciences.</td>
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<td>The Evaluation of Serum Level of 25-Hydroxy Vitamin D in Patients Under Sodium Valproate Medication</td>
<td>Sepideh Mansoori Majooefardi</td>
<td>Sepideh Mansoori Majooefardi1,2, Zahra Behrooznia1,2, Rana Rahimi kakhkhi1,2, Melika Velayati Asgari1, Hediye Imannejad1</td>
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<td>Effectiveness of Cognitive Behavior Therapy on Quality of Life in Epileptic Patients a Review Article</td>
<td>Shakiba Rahimi Kakhki</td>
<td>Shakiba Rahimi Kakhki ¹, Rana Rahimi Kakhki ²</td>
<td>1. student research committee, school of medicine, gonabad university of medical science, iran. 2. student research committee, school of medicine, mashhad Islamic azad university, mashhad, iran.</td>
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<td>42</td>
<td>The Effects of Different Fractions of Ocimum Basilicum on Pentylenetetrazole-induced Seizures in Mice</td>
<td>Somaye Mansouri</td>
<td>Somaye Mansouri¹, Tayebeh Khodabakhshi² Farimah Beheshti³, Mahmoud Hosseini³ Hassan Rakhshandeh⁴, Hamid Reza Sadeghnia⁴ Azita Aghaei⁴, Abbas Mohammadipour⁴</td>
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<td>43</td>
<td>Pediatric Temporal Lobe Epilepsy Surgery: a Review</td>
<td>Atefeh Ghorbanzadeh</td>
<td>Atefeh Ghorbanzadeh¹, Samira Zabihiyan² Fatemeh Arab¹</td>
<td>1. Student Research Committee, Faculty of medicine, Mashhad University of Medical Sciences, Mashhad, Iran. 2. Department of Neurological Surgery, Quaem Hospital, Mashhad University of Medical Sciences, Mashhad, Iran.</td>
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<tr>
<td>44</td>
<td>The Presumptive Role of BDNF in Temporal Lobe Epilepsy</td>
<td>Mohammad Hossein Ghalibaf</td>
<td>Mohammad Hossein Ghalibaf⁵ Saman Abbaspoor⁶</td>
<td>1. Bsc of anesthesiology, Student Research Committee, Mashhad University of Medical Sciences, Mashhad, Iran. 2. Department of Biology, Faculty of Science, Ferdowsi University of Mashhad, Mashhad, Iran. Corresponding author</td>
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<tr>
<td>45</td>
<td>A Review of Different Treatments for Adult Status Epilepticus</td>
<td>Mohamma Moein Vakilzadeh</td>
<td>Mohamma Moein Vakilzadeh¹ Amir Hossein Heidari¹, Ali Mehri¹, Ali Gorji²</td>
<td>1. Neuroscience Department, Mashhad University of Medical Since, Mashhad, Iran 2. Institute for Physiology, University Münster, Münster, Germany</td>
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<td>46</td>
<td>The effect of Rosmarinic Acid on Apoptosis Following Intrahippocampal Kainate in the Rat</td>
<td>Narges Marefati</td>
<td>Narges Marefati¹, Safoura Khamse² Mehrdad Roghani², Soheila seddighi²</td>
<td>1. Department of Physiology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran. 2. Department of Physiology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran. 3. Neurophysiology Research Center, Shahed University, Tehran, Iran. 4. Student Research Committee, Faculty of Medicine, Mashhad University of Medical Sciences (MUMS), Mashhad, Iran</td>
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<td>47</td>
<td>Marijuana (Cannabis) for Epilepsy?</td>
<td>Reyhane barabadi</td>
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<td>Student Research Committee, Faculty of Medicine, Mashhad University of Medical Sciences (MUMS), Mashhad, Iran</td>
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<td>48</td>
<td>What Is Vagus Nerve Stimulation Therapy?</td>
<td>Saeed Davaryar</td>
<td>Saeed Davaryar</td>
<td>Student Research Committee, Faculty of Medicine, Mashhad University of Medical Sciences (MUMS), Mashhad, Iran</td>
<td></td>
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<tr>
<td>49</td>
<td>Treatment of Epilepsy, Surgery or Medication?</td>
<td>Samira Soltanian</td>
<td>Samira Soltanian</td>
<td>Student Research Committee, Faculty of Medicine, Mashhad University of Medical Sciences (MUMS), Mashhad, Iran</td>
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<td>50</td>
<td>The Effect of Antiepileptic Drugs on Cardiovascular Disease</td>
<td>Yeganeh Azhdari Moghaddam</td>
<td>Yeganeh Azhdari Moghaddam, Saeedeh Sanchouli</td>
<td>1. Student Research Committee, Faculty of Medicine, Mashhad University of Medical Sciences (MUMS), Mashhad, Iran. 2. Student Research Committee, Faculty of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran</td>
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<td>51</td>
<td>Ketogenic Diet and Epilepsy</td>
<td>Zahra Yavari</td>
<td>ZAHRA YAVARI</td>
<td>Student Research Committee, Faculty of Medicine, Mashhad University of Medical Sciences (MUMS), Mashhad, Iran</td>
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<td>52</td>
<td>Herbal Treatment as a Candidate for Epilepsy</td>
<td>Sajad Sahab Negah</td>
<td>ArezouEshaghabadi, SajadSahabNegah</td>
<td>Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran</td>
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<td>53</td>
<td>Health Tourism and Epilepsy Surgery</td>
<td>Leyla Bayan</td>
<td>Leyla Bayan, SajadSahabNegah</td>
<td>Shefa Neuroscience Research Center</td>
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</tr>
<tr>
<td>54</td>
<td>Chemical Models of Absence Epilepsy (A Review Article)</td>
<td>Maryam Jafarian</td>
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<td>1. Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran. 2. Cellular and Molecular Research Center, Iran. 3. University of Medical Sciences, Tehran, Iran. 4. School of Medicine, Mashhad Islamic Azad University, Mashhad, Iran Mashhad Neuroscience Research Group, Mashhad, Iran. 5. Institut für Physiologie I, Klinik und Poliklinik für Neurochirurgie, Klinik und Poliklinik für Neurologie, Epilepsy Research Center, Westfälische Wilhelms-Universität Münster, Germany</td>
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<td>55</td>
<td>Genetic Models of Absence Epilepsy</td>
<td>Pouya Ghaderi</td>
<td>Maryam Jafarian¹, Fariba Karimzadeh² Pouya Ghaderi ³, Mohammad Mahdi Abohasani ³ Ali Gorji¹</td>
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<td>Friday 09 September 2016 14:00 - 14:30</td>
</tr>
<tr>
<td>56</td>
<td>The Anticonvulsant Effect of Vitamine C on Seizures Induced by PentyleneTetrazol Kindling in Rat</td>
<td>Samad Nazemi</td>
<td>Hassan Azhdari Zarmehri¹ Batool Kamali manesh², Ehsan Mohebii² Ali Shamsizadeh² Mohammad Mohammad Zadeh³</td>
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<td></td>
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<tr>
<td>57</td>
<td>&quot;The Role of 5-HT and Their Receptors on Inhibitory Effect of Curcumin in Seizure Induced by PTZ in Mice&quot;</td>
<td>Samad Nazemi</td>
<td>Ahmad Arbabi Jahan Mohammad Mohammad Zadeh, Abolfazl Rad</td>
<td>Department of Physiology &amp; Pharmacology, Sabzevar University of Medical Sciences, Sabzevar, IRAN.</td>
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</tr>
<tr>
<td>58</td>
<td>&quot;Spontaneous Arrest of Tonic-Clonic Seizures: The Role of Hypoxia, Hypercapnia and Acidosis &quot;</td>
<td>Shaghayegh Gorji</td>
<td>Shaghayegh Gorji¹, Manuela Cerina² Erwin Josef Speckmann³</td>
<td>1. Epilepsy Research Center, Westfälische Wilhelms-Universität Münster, Germany. 2. Neurology Department, Westfälische Wilhelms-Universität Münster, Germany. 3. Institute of Neurophysiology, Westfälische Wilhelms-Universität Münster, Germany.</td>
<td></td>
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<tr>
<td>59</td>
<td>Transgenic Bt Corn Can Provokes Epilepsy in Susceptibles: a Hypothesis</td>
<td>Mohammad Ali Emrani</td>
<td>Mohammad Ali Emrani</td>
<td>Student Research Committee, Faculty of Medicine Mashhad University of Medical Sciences (MUMS) Mashhad, Iran.</td>
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Is Acupuncture Effective for Treating Epilepsy?

Faezeh Jahanpour
Associate Professor, School of Nursing & Midwifery, Bushehr University of Medical Sciences, Iran. Parviz Azodi, MSc, Paramedical Faculty, Bushehr University of Medical Sciences, Iran. Farzan Azodi, Medical student, students’ research committee of Bushehr University of Medical Sciences, Iran.

Background:
Epilepsy is a common neurological disorder with annual incidence of 50 per 100,000 prevalence. Using epileptic medication can have adverse effects, Due to it many patient are turning to alternative complementary therapy for treatment and acupuncture is one of these. The gold of this review article is to determine the effectiveness of acupuncture in patient with epilepsy.

Patients and Methods:
In this review article we used search engines Cochrane, MEDLINE, EMBASE, CINAHL and EBSCO. Search terms were epilepsy, acupuncture, seizure and complementary therapy. Inclusion Criteria were: all article included studies comparing acupuncture in epileptic patient with other treatment since 2000-20015.

Results:
About 2% to 3% of all population will be given a diagnosis of epilepsy. Acupuncture is a procedure in which specific body areas, the meridian points, are pierced with fine needles for therapeutic purposes. Reports on the effects of acupuncture is unclear. Compared with Chinese herbs, valproate, phenytoin, antiepileptic drugs, acupuncture was not effective in achieving seizure freedom but may have been effective in achieving reduction in seizure frequency and better QOL after treatment. Based on the current review literature acupuncture is not without risks. Infections and inappropriate needle placement causing inadvertent damage do occur occasionally. Acupuncture should, therefore, be performed by a well-trained therapist who is experienced, understands the theories behind it, and takes the necessary precautions.

Conclusions:
The current evidence does not support the use of acupuncture as a treatment for epilepsy.
Are Vitamins Controlling Seizures?

Farzan Azodi

Medical student, students' research committee of Bushehr University of Medical Sciences, Iran. Faezeh Jahanpour, Associate Professor, School of Nursing & Midwifery, Bushehr University of Medical Sciences, Iran

**Background:**
Vitamins have been reported to be effective in controlling certain types of seizures and to prevent some of the harmful effects of antiepileptic drugs (AEDs). The gold of this review article is determining the vitamins’ effect on controlling the seizures.

**Patients and Methods:**
In this review article we used search engines Cochrane, MEDLINE, EMBASE, CINAHL and EBSCOhos. Search terms were epilepsy, vitamin, and seizure. Inclusion Criteria were: all article included studies using vitamin in epileptic patient since 2000-20015.

**Results:**
Commonly used anti-epileptic drug have several adverse effects such as gingival hyperplasia, gastrointestinal disturbances, osteoporosis, osteomalacia, bone marrow toxicity, teratogenicity, hepatotoxicity, renal toxicity, neurological symptoms, cognitive, mood and behavioral effects, endocrine dysfunction as well as allergic skin rashes, including toxic epidermal necrolysis or Steven Johnson syndrome. No evidence that folic acid, thiamine, vitamin D or vitamin E improve seizure control or prevent side effects for people with epilepsy. Vitamins may prevent harmful effects of antiepileptic drugs such as teratogenicity, anemia, osteomalacia, bleeding tendencies and peripheral neuropathies. Neural tube defects have been specifically associated with sodium valproate and carbamazepine. Periconceptional supplementation with folate and/or multivitamins, has been found useful for preventing neural tube defects in women without epilepsy and is likely to prevent neural tube defects in pregnant women on antiepileptic drugs.

**Conclusions:**
No reliable evidence to support the routine use of vitamins in patients with epilepsy. No reliable evidence to indicate that vitamins improve seizure control, reduces side effects of AEDs, improve cognitive function or improve quality of life.
Effect of Yoga for Controlling Seizures in Epileptic Patient

Nahid sadat Jahanpour
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Background:
Background Yoga may controlling seizures by induce relaxation and stress reduction, and influence the electroencephalogram and the autonomic nervous system. Yoga would be an attractive therapeutic option for epileptic patients. the gold of this article is review on the effect of yoga in epileptic patients.

Patients and Methods:
Methods In this systematic review, we searched the Cochrane, MEDLINE, SCOPUS and PubMed since 2000-2016- by key words (yoga, epilepsy, seizure).inclusion criteria were: all randomized controlled trials (RCT) of treatment of epilepsy with yoga, search after year 2000, participants were adults with uncontrolled epilepsy comparing yoga with no treatment or different behavioral treatments.

Results:
Results show that yoga treatment was better when compared with no intervention or interventions other than yoga (postural exercises ). However no reliable conclusions can be drawn regarding the efficacy of yoga as a treatment for uncontrolled epilepsy. The effect of meditation was attributed to a reduction in the level of stress as evidenced by changes in skin resistance and levels of blood lactate and urinary vanillylmandelic acid.

Conclusions:
No reliable conclusions can be drawn regarding the efficacy of yoga as a treatment for uncontrolled epilepsy. Significant improvement seen in their quality of life in patient with epilepsy after using yoga.
The Effects of Acut and Chronic Administrations of Nepeta Menthoides Hydroalcoholic Extract on Maximal Electroshock Seizures Induced in Male Mice

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2. Neurophysiology Research Center, Shahed University, Tehran, Iran.

Background:
Repeated application of Ustukhuddoos has been recommended for a long time in Iranian traditional medicine for some of nervous disorders like epilepsy. But in Iran, both imported Lavandula officinalis and endemic Nepeta menthoides commonly known as Ustukhuddoos. Despite of some reports about antiepileptic effects of Lavandula officinalis, there is no available report about the effects of Nepeta menthoides on epilepsy. Therefore, this study was designed to investigate the anti-epileptic and antioxidant activity of Nepeta menthoides extract on maximal electroshock (MES) induced seizures in mice model.

Patients and Methods:
Nepeta menthoides was tested for its ability (1) to increase HLTE (hind limb tonic extension) phase threshold (anti-seizure activity), (2) to decrease the MES-induced oxidative injury in the brain tissue (antioxidant effect) when given as an acute or chronic pretreatment before MES induction. Phenytoin (Phen), a major antiepileptic drug, was also tested for comparison.

Results:
In both models, Nepeta menthoides didn’t show antiepileptic properties as they didn’t increase HLTE phase threshold of MES induced. Also some results show that, Nepeta augments some seizure factores. On the other hand, while Nepeta didn’t change significantly brain MDA level in both models, it increased brain NO level in comparison with control group.

Conclusions:
This is the first report to demonstrate that, Nepeta menthoides not only didn’t inhibit seizures intensity But also, increased susceptibility to seizures. It seems that, enhancement of brain NO levels may be involved. In this regard, Nepeta menthoides properties is the opposite of Lavandula officinalis.
A Meta-Analysis of the Efficacy of Psychological Interventions (Focusing on Cognitive Interventions) in Reducing the Psychological Problems of People with Epilepsy

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Department of Psychology, Electronic Branch, Islamic Azad University, Tehran, Iran

Background:
The unpredictable nature and elongated course of epilepsy affect all dimensions (physical, psychological, and social) of an individual’s life. Thus, people with the diagnosis of epilepsy are a high-risk group for different psychological problems such as stress, anxiety, depression as well as social problems (marriage, education, and daily activities). Nowadays it has been clear that psychological interventions specially those which focus on changing negative attitudes and beliefs may reduce the psychological problems in people with epilepsy meanwhile through affecting their bio-psycho-social dimensions, improve their quality of life. The aim of this study was to investigate the effectiveness of cognitive interventions in reducing the psychological problems of people with epilepsy, by using meta-analysis.

Patients and Methods:
This study used a meta-analysis approach and integrated ten psychological researches (2007-2015) in Iran, Ten of which provided enough outcome information to be included in a meta-analysis. They had a sound methodology and were the results of experimental treatments which focus on cognitive interventions. The research tool was Meta-analysis Checklist.

Results:
Data analysis showed that the amount of effect size of psychological intervention in reducing the psychological problems of people with epilepsy was higher than average (p<0.001).

Conclusions:
As psychological distress often accompanies epilepsy and it badly affects the disease and the treatment outcome, according to our findings
psychological interventions can be effective in reducing the psychological problems and improving the performance of people with epilepsy. Therefore this kind of interventions is proposed for these people for increasing their quality of life and well-being.
The Help of Cognitive Hypnotherapy to a Patient with Epilepsy (a Case Study)

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Department of Psychology, Sari Branch, Islamic Azad University, Sari, Iran.

Background:
There has long been a consensus among certain clinicians that hypnosis enhances cognitive and behavioral interventions, specifically, by raising response expectancy, facilitating autonomic relaxation, and improving the client’s degree of imaginal absorption, etc. Nowadays the use of hypnotherapy is becoming increasingly mainstream. For example, many dentists now use hypnotherapy in order to reduce the anxiety of their patients. Also, it is used by some doctors in connection with certain medical procedures. Likewise, cognitive hypnotherapy is becoming more and more widely used and evidence for the effectiveness of hypnotherapy continues to build up. The present study sets out to consider the status of psychological interventions for dealing with psychological disturbances associated with epilepsy, and for the reduction of occurrence of seizures.

Patients and Methods:
A 13-year-old female student who was suffering from Epilepsy was referred for counseling because of many psychological problems such as poor academic performance, social isolation, and low self-esteem. Six cognitive hypnotherapy sessions were conducted for patient’s psychological status, improving her social interactional skills and self-esteem primarily and the reduction of occurrence of seizures, as well. In treatment method some techniques such as progressive muscles relaxation (PMR), guided imagery, cognitive suggestions and autohypnosis education method were used.

Results:
According to her and her family, the patient gained more social confidence and started sharing her experience with other patients with the same condition. Her teachers’ and school manager also confirmed improving her academic performance and academic achievement as well. Her attitude about Epilepsy also changed positively; so by accepting it, she felt more control over it.
Conclusions:

Cognitive hypnotherapy is usually a relatively short form of therapy, often only requiring a few sessions, and helps people to change their mindset, attitude and style of thinking. This case illustrates that cognitive hypnotherapy may prove beneficial for patients with epilepsy, facilitating their interaction and improving their skills. It's useful for both specialists and patients, with a secondary important impact on the patient’s social perception of herself.
Effect of an Empowerment Program on Regulating Mood, Obtaining Support and Gathering Information Related Self-Efficacy of Epileptic Child's Mother

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Background:
Epilepsy is a common neurological disorder in childhood. Epileptic children are more dependent on their mother. However, the mothers faced with problems such as Low levels of Regulating Mood Related (negative thoughts control), Obtaining support and Gathering information self-efficacy. The aim of this study was to determine the effect of an Empowerment program on Regulating Mood Related, Obtaining support and Gathering information self-efficacy of epileptic child's mother.

Patients and Methods: This clinical trial study was conducted on 100 Mother's of epileptic children who hospitalized in Neurology Department of Ghaem Hospital in 1393. Eligible mothers were selected via convenience sampling and randomly assigned to experimental and control group. After measuring the Regulating Mood Related, Obtaining support and Gathering information self-efficacy, in experimental group Empowerment care was performed and the control group received no intervention. 1.5 months after the last Session of program implementation, Regulating Mood Related, Obtaining support and Gathering information self-efficacy was evaluated in both experimental and control groups again. Using SPSS version 11.5, we analyzed the data.

Results:
The results showed that the two groups were the same considering population variables and the mean scores of Regulating Mood Related, Obtaining support and Gathering information self-efficacy. Independent t tests showed significant differences of Regulating Mood Related self-efficacy in experimental (663/18;#177&9/) and control groups (468/22;#177&8/) after the intervention (p&lt;0001/).
Independent t tests showed significant differences of Obtaining support self-efficacy in experimental (477/18;#177&3/) and control groups (282/20;#177&7/) after the intervention (p&lt;0001/). Independent t tests showed significant differences of Gathering information self-efficacy in experimental (651/19;#177&9/) and control groups (377/22;#177&1/) after the intervention (p&lt;0001/). Conclusions: In regard with the results, Epileptic child's Care giving Empowerment program can be helpful in improving Regulating Mood Related, Obtaining support and Gathering information self-efficacy of epileptic child's mother.
Ketogenic Diet and Epilepsy in Children: An Up-date Review

Bahareh Imani
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Background:
Background and Aims: Ketogenic diet is currently a therapeutic option for the treatment of epilepsy other than anticonvulsant drugs, for which there is a growing interest in worldwide, mainly due to the persisting number of refractory patients and the adverse side effects of antiepileptic old and new drugs. Aim of the present article is to review literature data regarding the use of the diet in the different types of epilepsies and epilepsy syndromes, trying to better understand the main evidence-based indications for its use.

Patients and Methods:
A literature search was based on a Medline search of published retrospective, not-controlled prospective and randomized controlled trials on the use of the ketogenic diet for the treatment of epilepsies and antiepileptic encephalopathies in children. A search on standard textbooks and review articles on the use of the ketogenic diet was considered as well. A summary and a critical appraisal of what emerged from the literature for each epileptic syndrome will be discussed in this review.

Results:
The ketogenic diet (KD) is a special high fat, low carbohydrate, controlled protein diet that has been used since the 1920s for the treatment of epilepsy. Children are usually admitted to a hospital or epilepsy center when starting the diet so that they can be monitored. The ketogenic diet should always be given under the supervision of a doctor and a dietitian. A fasting period is not necessary to start the diet according to recent studies. The diet is generally used for a period of 23- years if it is helpful in reducing or eliminating seizures. If the diet is not helpful, it will be stopped within a few months. This diet is one treatment option for children with epilepsy whose seizures are not controlled with AEDs. Ketogenic diet is also considered as the primary treatment of GLUT-1 deficiency syndrome and pyruvate-dehydrogenase deficiency. It is so far included as secondary option for the so called “catastrophic epileptic encephalopathies of childhood”, and should be a potential treatment against a wide variety of other seizure types and epilepsy syndromes as well as many symptomatic localization-related epilepsies. The best evidence of its efficacy regards refractory infantile spasms, Dravet syndrome and myoclonic-astatic epilepsy as well as epileptic
encephalopathies due to cortical migration disorders and Lennox-Gastaut syndrome, myoclonic jerks and generalised seizures. There is also a growing interest for dietary...

**Conclusions:**

A review of the results from many studies of children on the diet for long periods reveal that 13% of children treated with the ketogenic diet have greater than 90% seizure control with half of these children becoming seizure free. An additional 13% gain a 50% reduction in seizures. The remaining 13% discontinue the diet due to its ineffectiveness or its difficulty. Presently, some authors prefer to use the ketogenic diet in infants and younger children, leaving the other two diets for the treatment of older children, adolescents and young adults. The ketogenic diet may cause side effects in some children. The most common adverse effect of the diet is constipation. A less common adverse effect is kidney stones. Dehydration, Vomiting, High cholesterol level, Behavior changes, Slower growth rates in children.
Neuroprotective Effect of Citrus Aurantium Peel and Seed Extracts on Glutamate-Induced Cytotoxicity in PC12 Cell Line

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Background:
Glutamate is a major excitatory neurotransmitter in the mammalian central nervous system (CNS), and an important neurotransmitter for neural development, synaptic plasticity, and learning and memory under physiological conditions. However, excitotoxicity, excessive stimulation of glutamate receptors, is considered to be a major mechanism of cell death in a number of central nervous system diseases including stroke, brain trauma, epilepsy and chronic neurodegenerative disorders. In clinical trials studies, glutamate receptor antagonists would logically prevent the effects of excessive receptor activation. But they have been associated with untoward side effects or little clinical benefit. Therefore, discovering molecular pathways involved in excitotoxic neuronal death is of critical importance to future development of clinical treatment of many neurodegenerative disorders where excitotoxicity has been implicated. Reactive oxygen species (ROS) production is thought to be involved in glutamate-induced apoptosis process. In this study, the neuroprotective effects of Citrus aurantium in the glutamate-induced rat’s adrenal pheochromocytoma cell line (PC12 cells) were investigated

Patients and Methods:
The cells were pretreated with different concentrations of the extracts, followed by exposure to glutamate for 24 h. The cell viability and apoptotic cell death were measured using MTT and propidium iodine (PI)-staining methods, respectively. In addition, intracellular ROS and MDA levels were determined by fluorimetric methods.

Results:
The results showed that glutamate cytotoxicity in PC12 cells was accompanied by an increment of malondialdehyde (MDA) content, ROS generation, and apoptotic induction. However, pretreatment with peel and seed extracts of C. aurantium significantly reduced
MDA content, ROS generation, and apoptotic cells.

**Conclusions:**

All these findings indicated that C. aurantium protected PC12 cells against glutamate-induced apoptosis by inhibiting ROS production. Therefore, the present study provides experimental evidence supporting C. aurantium extracts as a potential therapeutic agent for use in the treatment of neurodegenerative diseases.
Rheum Turkestanicum Reduced Glutamate Toxicity in PC12 and N2a Cell Lines

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3. Neurocognitive Research Center, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

Background:
Glutamate is one of the major endogenous excitatory neurotransmitter, which plays an important physiological role in the central nervous system. However, in a variety of pathologic conditions, accumulation of glutamate can lead to neuronal injury and cell death through different mechanisms. Since, anti-oxidant compounds have been reduced glutamate toxicity, therefore oxidative stress and reactive oxygen species (ROS) production play role in glutamate-induced toxicity. In this study, we investigated the neuroprotective effects of Rheum turkestanicum in the glutamate-induced rat’s adrenal pheochromocytoma cell line (PC12 cells) and N2a cell line. Recent studies have shown rheum species are containing anti-oxidant compounds. Rhapontigenin and rhaponticin are isolated from R. undulatum scavenge ROS, the 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical, and hydrogen peroxide (H2O2). Also, these compounds decrease membrane lipid peroxidation and cellular DNA damage, which are the main targets of oxidative stress-induced cellular damage.

Patients and Methods:
Method The cells were maintained at 37 °C in a humidified atmosphere containing 5% CO2. The cells were cultured in Dulbecco’s Modified Eagles Medium (DMEM) supplemented with 10% fetal bovine serum, 100 units/ml penicillin and 100 &181;g/ml streptomycin. For the experiments, they were seeded in 96-well and 24-well culture plates for MTT/ROS and MDA assays, respectively. For apoptosis assay, cells were seeded at 100,000 cell/well in a 24-well plate. All treatments were carried out in triplicate. The cells were pretreated with extract alone (6 to 200 &181;g/ml) for 2 h and then incubation was continued in the presence of the extract with or without 8 mM glutamate for 24 h.

Results:
Results Glutamate cytotoxicity in these cells was accompanied by an increment of malondialdehyde (MDA) content, ROS generation and
apoptotic induction. However, pretreatment with root extract of Rheum turkestanicum significantly reduced MDA content, ROS generation and apoptotic cells.

**Conclusions:**

Conclusion All these findings indicated that Rheum turkestanicum protected PC12 and N2a cells against glutamate-induced apoptosis by inhibiting ROS production. Therefore, the present study supports that Rheum turkestanicum may be a promising neuroprotective agent for the treatment of cerebral ischemia disease.
Epilepsy in Women and Men

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2. Department of Parasitology and Mycology, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran
3. Department of Marine Chemistry, Faculty of Basic Sciences, University of Chabahar Maritime and Marine Sciences, Chabahar, Iran

Background:
An epileptic seizure is a transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain. In terms of mechanism an epileptic seizure is defined as "a state produced by an abnormal excessive neuronal discharge within the central nervous system." The seizure may originate in any part of the brain and may or may not spread to other areas. Gender can be a factor in how epilepsy will affect the particular person. Over the past number of decades, a pattern has emerged in relation to gender difference in the epidemiology of epilepsy worldwide. Within this there is a growing appreciation of gender differences in the epidemiology of epilepsy and of specific epilepsy syndromes. Certain epilepsy syndromes have a greater association with females, and sometimes the same epilepsy syndrome may behave differently in women than in men. In many ways, epilepsy is different for a woman than a man. The differences arise because of biological differences between women and men, and also because of the different social roles of each gender. The behavior of some common epilepsy syndromes such as mesial temporal sclerosis may differ between genders with isolated auras more common among females and secondary seizure spread more likely in males.

Conclusions:
While epidemiological studies do not indicate any differences in the incidence of epilepsy in males and females, there may be significant differences in the impact and effect the condition may have between males and females across all ages. There is broad agreement between studies that females have a marginally lower incidence of epilepsy and unprovoked seizures than males. This difference is usually attributed to males' greater exposure to risk factors for lesional epilepsy and acute symptomatic seizures. While the small overall preponderance of epilepsy in males seems well established, it has recently been realized that the group of idiopathic generalized epilepsies (IGEs) is more common in females.
Epilepsy Disorder and Sodium Channel Mutation

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3. Department of Marine Chemistry, Faculty of Basic Sciences, University of Chabahar Maritime and Marine Sciences, Chabahar, Iran

Background:

Epilepsy is a common disease affecting 0.5 – 1% of the world population. A central theme in the quest to unravel the genetic basis of epilepsy has been the effort to elucidate the roles played by inherited defects in ion channels. Mutations in sodium channels are responsible for genetic epilepsy syndromes with a wide range of a severity. more than 150 mutations have been described in patients with epilepsy. Voltage-gated sodium channels initiate action potentials in brain neurons, and sodium channel blockers are used in therapy of epilepsy. Expression, molecular characteristics, and functions of Na have been found in a variety of experimental preparations, including human epileptic brain tissue from epilepsy surgery, which suggest that altered sodium-channel expression or function may be one of the intimate processes underlying epileptogenesis. Animal experiments, and particularly functional investigations on human chronically epileptic tissue as well as genetic studies in epilepsy patients and their families strongly suggest that some forms of epilepsy may share a pathogenetic mechanism: an alteration of voltage-gated sodium channels.

Conclusions:

The rapid pace of discoveries suggests that sodium channel mutations are significant factors in the etiology of neurological disease and may contribute to epilepsy as well. Although it remains to be determined precisely how and to what extent altered sodium-channel functions play a role in different epilepsy syndromes. Understanding the molecular and cellular mechanisms that underlie genetic epilepsies is yielding much information about non-genetic epilepsy syndromes as well.
Berberine Reduces Duration of Seizure Trains in EEG in 4-Aminopyridine Treated Rats


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Background:
Epilepsy is the most common neurological problem in the world. Despite various treatment options available, there are many difficulties involved with the epilepsy treatment. Berberine is a potential herbal drug extract. It has several pharmacological actions on central nervous system including anxiolytic, anticonvulsant, and neuroprotective properties. 4-Aminopyridine (AP) is a voltage-sensitive K+-channel blocker. It stimulates the release of glutamate from nerve terminals and induces seizures. In the present study we studied protective effects of berberine on electroencephalography (EEG) changes in 4-aminopyridine- induced seizures in rat.

Patients and Methods:
The rats were given saline, diazepam (18nmol, intracerebroventricular (ICV)) or berberine (2.5, 5 and 10 nmol, ICV) by stereotaxic surgery 20 min before administration of 4-AP (7 mg/kg, ip) and EEG was recorded until 1hr after AP injection. Parameters such as duration of train of sharp spikes and slow waves with an amplitude 2-fold or higher than baseline were determined using lab chart reader 8.

Results:
Berberine had no effect on baseline EEG recording. The duration of trains, 40 - 60 min after 4-AP injection was as follows: 1) AP = 99.75 sec. 2) (Diazepam+ AP) = 10.1 sec. 3) (Berberine 2.5nmol+ AP) = 7.65 sec. 4) (Berberine 5nmol+ AP) = 0.5 sec. 5) (berberine 10nmol+ AP) = No train.

Conclusions:
In this study intracerebroventricular injection of berberine (5, 10 nmol) decreased the duration of seizure trains induced by AP in EEG. With regards to our results and previous studies we suggest that berberine could prevent AP-induced seizures partially via decrease of aspartate and glutamate release. This study may provide further understanding of the mode of berberine action in the brain, we could not ignore the therapeutic potential of berberine to treat neurological and neurodegenerative disorders.
Reduction of NMDA Receptor NR2B Subunit in Animal Model of Absence Epilepsy

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Background:
The NMDA receptors alternation affects the absence seizure generation in WAG/Rij rats, a valid genetic animal model of absence epilepsy. This study was aimed to investigate the alteration of NR2B subunit of NMDA receptors expression in WAG/Rij rats in different somatosensory cortical layers as well as in hippocampal CA1 area. Experimental groups were divided into four groups of six rats of both WAG/Rij and Wistar strains with two and six months of age. The distribution of NR2B receptors was assessed by immunohistochemical staining in WAG/Rij and compared to age-matched Wistar rats. The expression of NR2B subunit was significantly decreased in different somatosensory cortical layers in two- and six-month-old WAG/Rij rats. In addition, the distribution of NR2B in hippocampal CA1 area was lower in six-month-old WAG/Rij compared to age-matched Wistar rats. The reduction of NR2B receptors in different brain areas points to disturbance of glutamate receptors expression in cortical and subcortical areas in WAG/Rij rats. An altered subunit assembly of NMDA receptors may underlie cortical hyperexcitability in absence epilepsy.
Discrepancy of Notch Signaling in the Absence Epilepsy as a Neurodevelopmental Disorder

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Background:
Typical absence seizures appear in children with 6-7 years of age and may associate with developmental delays/intellectual deficits. Notch signaling is involved in the pathogenesis of some neurological disorders including cortical dysplasia, schizophrenia, brain tumors and Alzheimer’s disease. This study was aimed to investigate the role of notch signaling in the pathogenesis of absence seizures.

Patients and Methods:
Experimental groups were divided into six groups of both WAG/Rij and Wistar strains with new born, two and six months of age. The gene expression level of NLE1 receptors was assessed by Real-time PCR. In addition, the effect of cortical microinjection of NLE1 agonist and antagonist was investigated on the spike and wave discharges (SWDs).

Results:
The SWDs amplitude was significantly decreased after infusion of Jagged 1. There was no difference in the amplitude of SWDs after vehicle or DAPT administration. SWDs durations significantly decreased after Jagged 1 application and increased after DATP application. There were no significant changes in the SWDs duration after vehicle administration. The gene expression of NLE1 receptor in the somatosensory cortex increased more than 9 folds in the two- and six-month old rats compared to new born Wistar rats. There was no significant difference in the NLE1 gene expression during the WAG/Rij rats’ life span. In addition, the gene expression of NLE1 receptor was compared in the new born, two- and six-month old Wistar rats to aged-matched WAG/Rij rats. The NLE1 expression was more in new born WAG/Rij rats compared to aged-matched Wistar rats. Furthermore, the NLE1 expression was more in two- and six-month old Wistar rats compared to aged-matched WAG/Rij rats.
Conclusions:
Our findings suggest that activation of notch patch way reduce seizure severity in the most valid animal model of absence epilepsy. In addition, decrease of gene expression of NLE1 receptor may involve in SWDs occurrences in adult WAG/Rij rats.
Discrepancy of Type-1 AMPA Receptors in the Absence Epilepsy as a Neurodevelopmental Disorder

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Background:
Typical absence seizures appear in children with 6-7 years of age and may associate with developmental delays/intellectual deficits. AMPA receptors play an important role in the pathogenesis of seizures. This study was aimed to evaluate the critical discrepancies of AMPA receptors during development of absence epilepsy.

Patients and Methods:
Experimental groups were divided into four groups of both WAG/Rij (epileptic) and Wistar (non-epileptic) rats in two- and six- months of age. The expression level of GluR1 receptors was assessed by Real-time PCR. In addition, the effect of cortical microinjection of GluR1 agonist and antagonist was investigated on the spike and wave discharges (SWDs).

Results:
The expression level of GluR1 decreased significantly in two- and six-month-old WAG/Rij rats compared to age-matched Wistar rats (p < 0.01 and p < 0.001, respectively). The expression level of GluR1 decreased significantly in six-month-old Wistar rats compared to two-month-old Wistar rats (p < 0.001). There was no significant difference between two- and six-month-old WAG/Rij rats. In addition, cortical microinjection of GluR1 agonist increased the amplitude and duration of SWDs. Microinjection of GluR1 antagonist decreased the amplitude and duration of SWDs.

Conclusions:
Our findings suggest that activation of GluR1 receptors exacerbated absence seizure severity in the most valid animal model of absence epilepsy. In addition, the inhibition of GluR1 receptors may help to reduce absence seizure severity.
Use of the Ketogenic Diet in Childhood Epilepsy

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Background:
The ketogenic diet (KD) is a nonpharmacologic treatment used worldwide for children with epilepsy. It has been used to treat epilepsy in children since 1921 with little variation until recent years. The original protocol using a high fat, low protein and carbohydrate diet

Patients and Methods:
Method: This study is a reviewed article that is provided by internet resources and books.

Results:
Results: The results of studies showed that some children benefit from the ketogenic diet, demonstrated by a significant reduction in seizure frequency. Estimates of the rates of improvement by combined analysis are complete cessation of all seizures in 16% of children; a greater than 90% reduction in seizures in 32% and a greater than 50% reduction in seizures in 56% . The most important effect is that these diets cause changes in available food energy cells and may reduce blood glucose levels to the normal range; thus using it reduced the rate of seizures. Also, results showed that diet KD that contain neutral triglycerides absorbed from the gastrointestinal tract and also rapidly through the bloodstream to the liver; This material was converted to carbon dioxide and fatty acids and reduces seizures. Of course, this type of diet does not increase serum cholesterol levels. Efficacy and overall tolerability for children are maintained after prolonged use of the ketogenic diet. However, side effects, such as slowed growth, kidney stones, and fractures, should be monitored closely

Conclusions:
Ketogenic diet have significant beneficial effects in controlling seizures in children with epilepsy and can be used as part of a therapy program for these children. In fact, this diet considered to be as a replacement therapy in children with epilepsy.
The Investigation of TRPV1 Activity in Basal Synaptic Transmission and LTP in CA1 Area of Epileptic Animals

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Background:
Temporal lobe epilepsy is presented by medically intractable recurrent seizures due to dysfunction of temporal lobe structures, mostly the hippocampus. Changes in synaptic activity might be causally related to the alterations during epileptogenesis. Transient receptor potential vanilloid 1 (TRPV1), as a cation permeable ion channel (especially Ca2+), has been shown to be involved in synaptic activity. However, the potential role of this receptor in synaptic function in the epileptic brain needs to be elucidated. In this study, we used field potential recording to investigate basal synaptic transmission and long term potential (LTP) in the presence of TRPV1 agonist and antagonist in an epilepsy model in CA1.

Patients and Methods:
Rats were received a single dose of pilocarpine hydrochloride (380 mg/kg) intraperitoneally. Rats experienced status epilepticus (SE) within 2 h following pilocarpine injection were included as epileptic animals. Control rats were age-matched with them. We investigated the role of TRPV1 activity after 3 months. The field excitatory postsynaptic potentials (fEPSPs) generated at the shaffercollateral-CA1 pyramidal cells in response to electrical stimulation. The effects of pharmacologic activation and inhibition of TRPV1 receptors on fEPSPs were analyzed in CA1

Results:
Application of tetanic stimulation decreased the slope of fEPSPs in epileptic group (129.6% & 177.7%) compared to control animals (168.12% & 177.1%, P<0.05). TRPV1 activation enhanced LTP induction in CA1 region in non-epileptic rats (236.1% & 177.18%, P<0.05). Furthermore, blocking of TRPV1 enhanced induction of LTP (154.4% & #177.9%, P<0.05) in epileptic rats. Activation and inhibition of TRPV1 receptors did not influence basal synaptic transmission, however, agonist increased (121.1 & 177; 5%; P<0.01) and antagonist decreased (93.9 & 177; 1%; P<0.01) synaptic transmission in tissues from epileptic animals.
Conclusions:
These results show that following seizure activity in the brain, TRPV1 activity caused changes in basal synaptic transmission and LTP in the CA1. This suggests that TRPV1 receptors may have a potential role in transmitter release in epilepsy.
Immunohistochemical and Electrophysiological Assessment of TRPV1 Activity in CA3 Area of Epileptic Rats

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Background:
Temporal lobe epilepsy is a particularly devastating form of human epilepsy. Elucidating the mechanisms of eileptogenesis could provide novel therapeutic approaches aimed at the prevention or management of the disease. Transient receptor potential vanilloid 1 (TRPV1) belongs to ligand gated cation channels. We investigated changes to immunoreactivity and electrophysiological of TRPV1 channels in an epilepsy model in CA3.

Patients and Methods:
Rats were received methylscopolamine intraperitoneally (i.p.) 30 min prior to injection of pilocarpine to reduce the peripheral cholinergic effects of the pilocarpine. Rats were then recieve a single dose of pilocarpine hydrochloride (380 mg/kg, i.p.). Rats experienced status epilepticus (SE) within 2 h following pilocarpine injection were included as epileptic animals. Control rats were age-matched with them. We investigated the role of TRPV1 after 3 months

Results:
Immunoreactivity assessment revealed that TRPV1 protein expression up regulated in CA3 region of epileptic animals (22.3 ± 2%; p<0.001). Electrophysiological assessment showed inhibition of TRPV1 activity can compensate (243.9 ± 14 %; p < 0.05) LTP reduction in CA3 region of epileptic rats (149.6 ± 16 %, n = 4).

Conclusions:
These findings indicate that a higher distribution of TRPV1 in epileptic conditions is accompanied by a function impact on the synaptic plasticity in the CA3 area. This suggests TRPV1 as a potential target in treatment of seizure attacks in the future.
Seizure Prediction Based on Analysis of Extracting and Selecting EEG Features Using Dominant Amplitude and Frequency Components

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Background:

The aim of this paper is to develop a method based seizure prediction.

Patients and Methods:

This paper consider eight patients that suffer from focal epilepsy and record EEG database from LTM pars Hospital in Tehran. studies on rhythmic features EEG for seizure distinction with extracting signal energy and magnitude. Two consecutive 10-second long EEG segments After observe .

The first EEG signal in each channel segmented into non-overlapping 5-second epochs.

48th ordered finite impulse response (FIR) filter-bank employed to divide each epoch into $K = 5$. applied to obtain instantaneous envelope (IE) sequence $|A(n)|$ and instantaneous angular frequency (IF) $\Omega(n)$ one epoch by another for each sub band signal. we used 21-point median filter applied to remove abrupt impulses in IE and IF sequences.in matlab by concatenating 5-second AIE and AIF sets sequentially together and we use SVM-based classification.

Results:

We have ended up with perfect sensitivity for seven out of all the eight patients. The feature extraction method leads to a sensitivity 87.5%. We have conducted extensive comparative studies with other recently published competing approaches, It is better result than another algorithms, in which the advantages of our method are highlighted. Timely and accurate predictions of impending seizures are crucial for epilepsy patients and others caring for them.
Conclusions:

Many ways to predict epileptic provided that the method used is based on amplitude and frequency modulation. In order to diminish potential redundancy within the amplitude and frequency components, we execute a parameter screening process on them. The investigation on combining the feature vectors proposed here with other conventional multivariate features might be one of the future directions.
The Effect of Anxiety on the Number of Seizures

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Introduction:
From of 2013 about 22 million people have epilepsy. Almost 80% of cases occur in the developing world. In 2013 it resulted in 116000 deaths up from 112000 deaths in 1990. Epilepsy is more common as people age. In the developed world, onset of new cases happens most frequently in people. In the developing world onset is more common in older children and young adult, by reason differences in the frequency of the underlying causes. About 510% of people will have an undue seizure by the age of 80, and the chance of experiencing a second seizure is between 40 and 50%.

Objective:
This cross sectional study will determine the association between number of seizure and anxiety.

Method:
200 epileptics are chosen from Razavi hospital in Mashhad. We follow these patients for three months. Three rounds of questionnaires are filled out by the patients.
Three questionnaire are: 1.first day questionnaire 2. Questionnaires after seizure 3.last day questionnaire

Conclusion:
Then we analyze information is obtained from the questionnaires. It will be detected if there is a relationship between number of seizure and anxiety.
Role of Mesenchymal Stem Cells in the Treatment of Epilepsy; Current Status and Future Prospects

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Background:
Epilepsy as one of the most common neurological disease influences more than 50 million people in the word. Medications to control epileptic seizures are practically restricted to the application of antiepileptic drugs. Furthermore, epileptic seizure has been proposed as an inflammatory event, and that inflammatory mediators may contribute to the onset and recurrence of seizures. The detection and application of stem cells to treat central nervous system disorders represent an impressive evolution into the fields of neuroregeneration. Mesenchymal stem cells (MSCs) derived from bone marrow and other sources have received important attention for treating various neurological disorders due to their robust neuroprotective and anti-inflammatory effects. MSCs may have therapeutic potential in comparison to medicines on induced epileptogenesis. Because of their potential for providing neuroprotection, diminishing inflammation and restricting epileptogenesis, early intervention with MSCs appears attractive for curing status epilepticus and learning and memory impairments. Mice treated with bone marrow MSCS lysates after status epilepticus displayed diminished neuronal loss, reduced expression of genes encoding proinflammatory cytokines, and increased expression of genes encoding anti-inflammatory cytokines in the hippocampus. MSCs can be use as intravenous or intra-hippocampal transplantation. Several studies have also examined the..
Evaluation of the Role of Inflammation in Epilepsy

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Background:
Epilepsy is a neurological disorder which affects around 55 million people in the world. Seizures are caused by high-frequency discharge of groups of neurons. The fundamental neurochemical mechanisms of this disorder are unknown. Inflammation is now recognized as a main contributor to various, acute and chronic central nervous system disorders such as epilepsy. Molecules of both innate and adaptive immunity have been revealed in brain specimens of epilepsy disorder. Seizures and epilepsy can develop following events which induce a central nervous system inflammatory response, and expression of IL-1, TNF\textalpha{} and IL-6 are increased by seizure activity. Cytokines affect neuronal excitability directly by operating on ionic currents, and indirectly by inducing gene transcription in glia and neurons. Recent evidence suggests that TNF\textalpha{} is protective against experimental seizures in mice.
Transgenic mice that overexpress TNF\textalpha{} are less susceptible to seizure induction. Even though IL-6 levels raise after seizures, suggesting that IL-6 may be protective. Actually, animal model lacking IL-6 are more susceptible to seizure. Immunoreactive cells were 3 times more numerous in epileptic and these cells had the morphologic characteristics of activated microglia. Multiple pro-inflammatory mechanisms are initiated by seizures and may also contribute to the cellular damage and inherent epileptogenicity of brain lesions, pathogenic or otherwise....
Background:
Epilepsy is a disorder characterized by recurrent seizures. Epilepsy leads to changes in neuronal death and neurogenesis. Recently the search for new targets in the therapy of epilepsy has focused on brain inflammation because brain inflammation and the associated blood brain barrier damage seems to be a basic part of epilepsy pathophysiology. Erythropoietin (EPO) regulates biological processes including neuroprotection and neurogenesis in many diseases, such as epilepsy. Erythropoietin is a glycoprotein hormone and cytokine that controls erythropoiesis also it has non-hematopoietic roles. Exogenous erythropoietin, or recombinant human erythropoietin, is produced by recombinant DNA technology in cell culture. Erythropoietin has neuron and astroglial protective effects through reduction of tissue injuring molecules for example reactive oxygen species, glutamate, inflammatory cytokines, and other damaging molecules. It was proposed that erythropoietin can trigger neuroprotective mechanisms mediated by erythropoietin receptor (Epo-R) activation. Epo-R was found to be increased in the hippocampus after status epilepticus. Administered EPO prevented, during the latent period following status epilepticus blood brain barrier leakage, neuronal death, and microglia activation in the dentate hilus, CA1, and CA3 of hippocampus. Moreover, EPO decrease the risk of spontaneous recurrent seizures development. Also it has been shown that...
Epilepsy and Intellectual Disabilities

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Background:
Epilepsy is one of the most common serious brain disorders, affecting over 50 million people worldwide. Epilepsy is more common in people with intellectual disabilities than the general population and seems to increase with the severity of disability. This systematic review aimed to provide a summary of studies in relation to epilepsy in among people with intellectual disabilities.

Patients and Methods:
This study is a review article in the period between 2000 and 2016 performed by searching the databases Pubmed, Sciencedirect, Google scholar using key words Epilepsy, Disability, Intellectual Disabilities.

Results:
Prevalence rates of epilepsy rise from 15% in people with moderate intellectual disabilities to 30% in people with severe and profound intellectual disabilities. Epilepsy among this population is also associated with the presence of other lifelong conditions including psychiatric disorder and autism spectrum disorder. Learning disability are more frequent among children with epilepsy than in the general population. The misdiagnosis of epilepsy may lead to human costs such as distress to patients and carers, unnecessary lifestyle changes, social stigma, social and financial deprivation. People may receive inappropriate treatment for a condition they do not have, whilst their true condition is not being treated.

Conclusions:
Epilepsy is highly prevalent in people with intellectual disabilities. Despite the high prevalence of epilepsy in people with intellectual disability, a healthy family, and environment condition can help reduce its impact on the patient quality of life. Services must be equipped with the skills and information needed to manage this condition in this population.
Physical Exercise in People with Epilepsy; Risks and Benefits

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Background:
Epilepsy is one of the commonest neurologic diseases and has always been associated with stigma. In the interest of safety, the activities of persons with epilepsy (PWE) are often restricted. This systematic review aimed to provide a summary of studies about benefits of exercise activity in people with epilepsy.

Patients and Methods:
This study is a review article in the period between 2005 and 2016 performed by searching the databases Pubmed, Sciencedirect, Google scholar using key words Epilepsy, Physical exercise, Risks and Benefits of Physical exercise and Quality of life.

Results:
The results indicated that the exercise benefits are related to improvement of physical and mental health parameters and social integration and reduction in markers of stress, epileptiform activity and the number of seizures. studies did not specifically address injuries occurring during physical exercise, they concluded that person with epilepsy should not be forbidden from participating in sports simply to avoid possible injuries, and should instead be stimulated to do. So nowadays, the general consensus is that there should be no restrictions to the practice of physical exercise in people with controlled epilepsy, except for scuba diving, skydiving and other sports at heights.

Conclusions:
Even though the role of physical activity in preventing and controlling epilepsy and its comorbidities is not always clear, exercise programs should be encouraged as a complementary therapy for person with epilepsy due to its proven benefits. General physicians, neurologists and pediatricians should support the practice of regular physical exercise and inform patients and caregivers about the benefits associated with physical activity and the necessary precautions, like protective gear. So, quality of life of people with epilepsy can continue improving.
Brain Damage Induced Epileptic Seizures

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Background:

Epilepsy is the fourth most common neurological disorder and affects people of all ages. Approximately 1 to 2 percent of the general populations suffer from some form of epilepsy. The human brain is the source of human epilepsy. The symptoms of a seizure may affect any part of the body. Epilepsy is a spectrum with a wide range of seizure types and the control of epilepsy varying from person-to-person. Epilepsy is a chronic disorder, with the hallmark of recurrent, unprovoked seizures. The cause of most cases of epilepsy is unknown, although some people develop epilepsy as the result of brain injury, stroke, brain tumors, infections of the brain, and birth defects. For some epilepsy patients, the condition’s side effects can be as troubling as the seizures. A great deal of epilepsy research in humans and animals has focused on the question of whether seizures cause brain damage. Gray matter volume has been negatively correlated with seizure duration, suggesting that neocortical changes may be a consequence of seizures. Severe or prolonged seizures can cause brain cell death, leading to anatomic damage visible on brain scans. But in some cases the cognitive impairments caused by seizures cannot be linked to discernible brain damage. Prior studies have suggested that seizures may damage dendrites, treelike branches that extend from a nerve cell to receive signals. Histologic studies from both humans and animal models have...

Conclusions:

There is now abundant evidence that status epilepticus is detrimental to brain tissue, but several questions remain. Does abnormal diffusion always cause subsequent neuronal death?
Efficacy of the Olive Oil-Based Ketogenic Diet for Intractable Seizure Disorders

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Ketogenic diet (KD) is one of the most effective therapies for intractable epilepsy. Previous studies indicate that a classic ketogenic diet in children with refractory seizures is effective in seizure reduction, but leads to development of hypercholesterolemia and hypertriglyceridemia. Olive oil is rich in monounsaturated fatty acids and antioxidant molecules and has some beneficial effects on lipid profile, inflammation and oxidant status. The aim of our study is to evaluate the effect of olive oil-based diet on frequency of epileptic attacks and serum lipid profile in children with refractory epilepsy.
Epilepsy Diagnosis Using Extraction of Linear and Nonlinear Characteristics of Brain Signals

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Background:
The aim of this research is introducing a system design to diagnose epilepsy using linear and nonlinear characteristics of brain signals. Generally repetitive and recurring seizures are called epilepsy. Transient disruption in brain function caused by abnormal electrical discharges in brain nerve cells is the reason and brain signal characteristics extraction is one of methods used to diagnose it.

Patients and Method:
Patients are divided in three main groups: Healthy, mild disease and severe disease. In this research a healthy, a mild and a severe disease case with data length of 4097 are studied and discussed.

Result:
Statistical features such as average, mean, mode, max and min, range, standard deviation and variance are calculated and separated into five EEG (Delta, Theta, Alpha, Beta and Gamma) frequency spectrums using band pass filter. Then Linear and nonlinear characteristics are extracted using brain neural network.

Conclusion:
Accuracy of neural networks for healthy people in the band Delta 82% and 87.5% for patients with mild disease in Theta band and 89.1% for gamma-band in severe diseases examined.
Melatonin Treatment Does not Influence Hypoexcitability but Enhances Ih Currents in CA1 Pyramidal Neurons in an AD Model

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Background:
The excitability of CA1 pyramidal neurons and the neuromodulation by melatonin in an AD model have been brought under scrutiny.

Patients and Methods:
Amyloid β peptides (Aβ) were injected into the frontal cortices of rats and intraperitoneal administration of melatonin 30 mg/kg/day was done for 10 consecutive days.

Results:
Patch clamp recordings in the current clamp mode evaluating excitability of CA1 pyramidal neurons, in the presence of synaptic transmission blockers, showed a reduced number of spikes during 1s, 0.2 nA depolarizing current pulse in Aβ treated rats. This implies that neurons became hypoexcitable compared to control rats. In contrary to the pyramidal neurons from control rats in which treatment with melatonin decreased excitability, however, it did not affect the excitability in Aβ treated animals. Our further study during current clamp showed that sag ratio has been increased in Aβ treated rats and treatment with melatonin further increases sag ratio in this group. Consistent with the findings in sag ratio, voltage clamp recording showed that Ih currents have been augmented in pyramidal neurons from Aβ treated animals. Interestingly, treatment with melatonin further enhanced Ih currents in Aβ treated animals, but not in control rats.

Conclusions:
This study showed that melatonin treatment is not effective to normalize hypoexcitability of the CA1 pyramidal neurons in AD model. Furthermore, for the first time we showed that melatonin enhances Ih currents in the hippocampal cells.
Risk Factors of Epilepsy, from the Perspective of the Most Famous Scholars in Traditional Iranian Medicine

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Introduction:
Epilepsy is one of the most serious neurological disorders that often it requires long-term treatment. Despite existence of many anti-epileptic drugs, in some cases this disease is not well controlled. In traditional Iranian medicine (TIM) epilepsy is a known disease and several agents can aggravate it. According to TIM scholars, recognition of these risk factors can help to treatment of epilepsy.

Patients and Methods:
This study is a review article, based on reliable sources of traditional medicine, such as The Canon of medicine by Avicenna, Al-Hawi by Razes, Ferdos-Al-Hekmah by Tabari, etc. Triggers and risk factors for epilepsy extracted from TIM resources and collected.

Results:
TIM scholars believed that one of the causes of epilepsy is filling in the brain ventricles. Some organs, including the stomach, uterine and limbs can involve in its pathogenesis. Avicenna, the greatest philosopher and physician Orient, in The Canon of medicine, describes pregnancy and amenorrhea in women are of predisposing factors in epilepsy. Also he believes that if after delivery the baby’s nose does not drain well, the baby will be prone to epilepsy. After a short period of high fever in children under seven years, epilepsy may occur. Razi believes that intestinal parasites that can cause seizures. Tabari also believes that, since the onset of epileptic seizures, hearing and vision, and facial muscles appear involvement, anterior ventricular damage the brain, is effective in epileptic seizure. Based on TIM Pharmacopoeia, celery has the property that will stimulate and create or exacerbate epileptic seizures. Milk of all animals, and anything spicy, like peppers and mustard in epilepsy is harmful.

Conclusions:
Identification of risk factors for epilepsy in patients can help to improve the treatment and prevention of seizure recurrence along with modern medicine.
Administration of Intra-Hippocampal Orexin-A Receptor Antagonist (SB-334867) Attenuated EEG and Behavioral Changes in Urethane Anesthetized Rats with 4-Aminopyridine Induced Seizures

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Background:
Orexin (hypocretin) neurons were initially discovered in 1998. They produce two excitatory neuropeptides, orexin-1(A) and orexin-2 (B). There are 2 hippocampal orexin receptor subtypes, OXR-1 (in CA2) and OXR-2 (in CA3). Orexin-A stimulates both receptors, which leads to in vitro calcium mobilization, locomotor activity increment, awake state induction, sympathetic nervous system trigger and food intake stimulation in rats. Orexin-A increases in different type of seizures and its elevated level is the characteristic feature in the epileptic children with seizure. Orexins increased the penicillin-induced cortical epileptic activity and hippocampal expression of prepro-orexin mRNA in rats; however, the cerebrospinal fluid (CSF) orexin-A level decreases after repetitive seizures in patients. The electroencephalographic (EEG) changes induced by specific orexin-A antagonist (SB-334867) in epilepsy have not been studied. Therefore, we investigated the EEG findings of SB-334867 microinjection into the hippocampus in 4-aminopyridine (4-AP) induced seizures in urethane anesthetized rats.

Patients and Methods:
We used the ip injection of 4-aminopyridine (6 mg/kg) to induce seizure in urethane anesthetized rats. Intra-hippocampal microinjection was used to perfuse two doses of SB-334867. Using video-EEG recording, the effects of SB-334867 on EEG findings and behavioral changes of these animals were compared to those that received diazepam or DMSO.

Results:
SB-334867 increased the first spike latency ($p<0.01$) and reduced theta power compared to DMSO treated rats ($p<0.05$ and $p<0.01$, for SB1mM and SB2mM, respectively), reduced spike amplitude ($p<0.05$) and increased the mean signal duration ($p<0.001$) compared to diazepam and SB2mM. It decreased the raw EEG maximum power ($p<0.001$) and the seizure frequency (Racine scale 4) compared to diazepam ($p<0.05$). Diazepam and SB-334867 reduced delta maximum power ($p<0.001$). Seizure latency tended to increase and seizure duration decreased by SB-334867. These changes, however, were not statistically significant.

**Conclusions:**

Specific orexin-A receptor blocker (SB-334867) attenuated electroencephalographic and behavioral changes in 4-aminopyridine-induced seizure activities in urethane anesthetized rats. Furthermore, the model provided a good tool for investigating motor seizures in anesthetized animals.
The Effect of Zonisamide on Lamotrigine Resistant Kindled Rats During Pregnancy

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Background:
More than 30% of patients with partial epilepsy are resistant to traditional antiepileptic drugs (AEDs). Zonisamide is a sulfonamide antiepilepsy drug with sodium and calcium channel–blocking actions and it is effective and well tolerated as an adjunctive agent for refractory partial seizures. Management of epilepsy where the risks with uncontrolled seizures during pregnancy need to be balanced against potential teratogenic effects of (AEDs). In conjunction with zonisamide teratogenic effects on the fetus during pregnancy, there is not much information available. Therefore, we evaluated the effect of Zonisamide on Lamotrigine Resistant Kindled Rats during pregnancy.

Patients and Methods:
For this purpose, 48 intact Wistar rats weighted 240300- g were used to induce the refractory epilepsy with Lamotrigine Resistant Kindled Rat Model. Drug resistant rats divided in 5 groups. 1) prg-ZNS, rats gavaged with 50 mg/kg ZNS in day 10 to 15 of pregnancy and after 1 hour received ip dose of PTZ. 2) non prg-ZNS, rats were not pregnant but in same days as group 1 gavaged with ZNS and received PTZ. 3) prg-control-ZNS, rats gavaged with ZNS solvent in days 10 to 15 of pregnancy and received PTZ. 4) non prg-control-ZMN, rats were not pregnant but in same days as group 3 gavaged with ZNS solvent and received PTZ. 5) fetus-ZNS, rats gavaged with ZNS in 15 to 20 pregnancy day and received PTZ. 6) prg- control, non-epileptic pregnant rats didn’t receive any drug. After intercourse and observation of vaginal plaque the zero day of pregnancy was determined. For progesterone concentration measuring, blood taken from rat tail in days 5, 10, 15, 20 of pregnancy and measured by IBL-GERMANY ELIZA KIT.

Results:
Epilepsy was significantly controlled by ZNS in groups 1, 2 and 5 vs groups 3 and 4. Abortion rate in control groups was significantly
higher than ZNS groups and was 100% in group 3. Length and weight of newborns in 14 day after birth in group 1 (31.35 gr, 9.30 cm) and 5 (23.02 gr, 8.6 cm) was significantly lower than group 6 (35.02 gr, 9.8 cm).

**Conclusions:**
Zonisamide can control refractory epilepsy during the pregnancy but has negative effect on newborns growth.
Extracellular Matrix: A New Sight for Epilepsy

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Background:
The CNS is characterized by a functional network of neurons and glia. It also contains an extracellular matrix (ECM), which has garnered less attention than the cellular component of the CNS despite the fact that it constitutes 10–20% of brain volume. The functional attributes of the ECM in the adult CNS arise directly from its composition of molecules, which are localized to three principal compartments: the basement membrane (basal lamina), the perineuronal nets and the neural interstitial matrix (a term we use to define ECM molecules that are dispersed in the parenchyma). Perineuronal nets are dense ECM aggregates that form at the close of critical periods in development and are thought to restrict plasticity and stabilize synapses in the adult CNS. Perturbation of stable perineuronal nets in the adult CNS could result in uncontrolled sprouting and synaptogenesis; indeed, changes to perineuronal nets have been observed after prolonged seizure activity and may propagate epileptic activity that is characterized by aberrant synaptogenesis and an imbalance in excitatory–inhibitory firing. Perineuronal nets show decreased structural integrity and a reduction in the expression of the chondroitin sulphate proteoglycans aggrecan core protein (also known as cartilage-specific proteoglycan core protein) in a rodent model of status epilepticus

Conclusions:
Whether excessive firing affects perineuronal nets directly by increasing endogenous proteases or indirectly by altering their support structures remains to be determined
Stem Cells as a Potential Therapy for Temporal Lobe Epilepsy

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Background:
The epilepsies are a spectrum of brain disorders ranging from severe, life-threatening and disabling, to ones that are much more benign. In epilepsy, the normal pattern of neuronal activity becomes disturbed, causing strange sensations, emotions, and behavior or sometimes convulsions, muscle spasms, and loss of consciousness. One of the most common and difficult to treat types of epilepsy is temporal lobe epilepsy (TLE) which results from hippocampal sclerosis. Epilepsy also is a candidate for treatment with different types of stem cells. In the last two decades the transplantation approach, by means of stem cells of different origin, has been suggested for the treatment of neurological diseases in basic and experimental researches, various stem cell types were used for treatment of epilepsy. Two main roles of stem cell therapy in epilepsy are prophylaxis against chronic epilepsy and amelioration cognitive function after the occurrence of TLE. Although stem cell therapy seems like a promising approach for treatment of epilepsy in the future however, there are some serious safety and ethical concerns that are needed to be eliminated before clinical application.
Depression Treatment in Patients with Epilepsy

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Background:
Multiple epidemiological studies have shown that depression is the most frequent comorbid psychiatric disorder in patients with epilepsy. Depressive disorders occur in approximately one-third of people with epilepsy, often requiring antidepressant treatment. Depression can directly increase seizure frequency through the mechanism of sleep deprivation; failure to recognise depression or inadequate treatment can lead to suicide. The clinical presentation of depressive disorders in epilepsy can be identical to that of nonepileptic patients and can include major depression, bipolar and dysthymic disorders, and minor depression. Depression in epilepsy may be iatrogenically induced with various antiepileptic drugs used to treat the seizure disorder or after surgical treatment of intractable epilepsy. Despite its relatively high prevalence, depression remains unrecognized and untreated, and unfortunately its treatment is based on empirical and uncontrolled data. One of the reason for lack of treatment is the belief that antidepressants have proconvulsant effects. Clinical vigilance and routine use of a validated screening tool can improve detection and quality of care. Many antidepressants are known to lower the seizure threshold; however, data indicate that, at low doses, antidepressants possess anticonvulsant properties. Evidence also suggests that when an antidepressant is used within its therapeutic dosage range, the risk of...
Epidemiology and Classification of Epilepsy

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Background:
Epilepsy is a chronic disease experienced by millions and a cause of substantial morbidity and mortality. This disease is recognized as a collection of heterogeneous syndromes characterized by additional conditions that coexist with seizures and impacts over 50 per 1000 population. Epilepsy is not a single disease, but rather a group of disorders that share seizures as one manifestation worldwide. Epilepsy is an important health problem in developing countries. Classification of seizures and epilepsy is more than an academic exercise, as it determines subsequent decisions on evaluation and treatment. Seizures can be divided into those that are provoked and unprovoked. A provoked seizure may be due to structural damage (resulting from traumatic brain injury, brain tumor, stroke, tuberculosis, or neurocysticercosis) or due to metabolic abnormalities (such as alcohol withdrawal and renal or hepatic failure). By definition, provoked seizures occur in close temporal proximity to the inciting event. Acute symptomatic seizures represent \(~40\%\) of all seizures and have an incidence of 29 to 39 per 100,000 person years. Provoked seizures can occur at any age, but are most common in infants and the elderly. Provoked seizures are usually isolated, nonrecurrent events. Treatment is aimed at the underlying cause, and long-term antiepileptic drug (AED) therapy is not indicated. Unprovoked seizures resulting from chronic structural
The Effect of Probiotic on Constipation Epilepsy Patients

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Background:
Constipation is predominant gastric-intestinal problems in epilepsy Patients, which can cause increased intracranial pressure. Currently, the main treatment of constipation is symptomatic treatment; includes taking laxatives and fiber; which this treatment is associated with complications and limitations. Therefore; with regard to the positive effects of probiotics in the treatment of digestive problems; This study aimed to investigate the effect of the synbiotic supplement on constipation epilepsy patients has been done.

Patients and Methods:
In this randomized clinical trial study two groups; subjects were randomly divided into two groups; intervention (n = 33) and control (n = 32); and frequency of their defecation were measured before the study. Patients in the intervention group, in addition to routine treatment, for a week, every 12 hours, received synbiotic supplement and the control group received only conventional treatment. During the one-week study, the frequency of defecation was measured and recorded.

Results:
In the experimental group; the average number of frequency of defecation more than once a day; 1.22 was obtained; while in the control group this value in one day and two days; 0.62, 1.24, respectively; was obtained (p < 0.0001).

Conclusions:
This study showed that a probiotic supplementation in epilepsy patients increased frequency of defecation. Therefore; probiotics can be used as a non-drug therapy in the treatment of constipation in these patients.
The Evaluation of Serum Level of 25-Hydroxy Vitamin D in Patients Under Sodium Valproate Medication

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Background:
Epilepsy is one of the common neurologic disorders in children. Drug side-effects are one of the important problems in treating patients with epilepsy. Using the antiepileptic medication may cause different side effects such as disorder in bone and vitamin D metabolism. Sodium valproate is one of the antiepileptic medications used widely. Some of its side effects include digestive disorder, increasing of level hepatic enzymes, fatal hepatitis, decreasing level of vitamin D, and etc.

Patients and Methods:
This review study is performed by searching valid internal and external scientific databases (Science Direct, Pubmed, Google scholar, SID and etc) by related keywords.

Results:
Recent researches have shown that antiepileptic medications including sodium valproate commonly cause a decrease in vitamin D level. Also, decrease in the measurement of bone marrow density (BMD) in patients treating with sodium valproate for a long time has been proved. Conclusions: So, periodic measurement of the level of 25-hydroxy vitamin D in children with epilepsy who were treated with sodium valproate is suggested. Also, consuming prophylactic vitamin D is necessary for these patients. Considering the mentioned side effects, it is suggested that this drug should not be consumed by children under 2 year old and pregnant women.
Effectiveness of Cognitive Behavior Therapy on Quality of Life in Epileptic Patients a Review Article

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Background:
Epilepsy is one of the most common chronic neurological disorders that affects quality of life and social performance of patients. The worldwide prevalence of epilepsy is variable, estimated at 10/1,000 people, and access to treatment is also variable. Objective: This research was conducted to determine the effectiveness of cognitive behavior therapy on quality of life improvement in epileptic patients.

Patients and Methods:
In this review article, we try to collect the result of researches which are about how effective cognitive behavior therapy is by searching in internal reliable database (google scholar, SID), external reliable database (sciencedirect, pubmed) and by using related key words.

Results:
People with chronic diseases such as epilepsy are at the risk of psychiatric disorders more than others. Collecting the result of researches show us the positive effect of CBT on overall improvement of the quality of life, growth of mental health, decreasing the problems that caused by stressors which are related to epilepsy. In most of articles CBT does not affect cognitive problems and physical health.

Conclusions:
Eventually, it is suggested that it is better to use cognitive behavior therapy as a complementary method beside pharmacotherapy to improve the treatment of epilepsy.
The Effects of Different Fractions of Ocimum Basilicum on Pentylenetetrazole-Induced Seizures in Mice

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Background:
Ocimum basilicum (O. basilicum) has been suggested to have beneficial effects including hypnotic and antioxidant effects. In the present work, the effects of different fractions of O. basilicum, on pentylenetetrazole (PTZ)-induced seizures was investigated in mice.

Patients and Methods:
The mice were divided and injected: (1) PTZ(100 mg/kg), (2) 250, (3) 100, (4) 200 mg/kg hydroethanolic extract of the plant (HE), (5) 5200, (6) 7 mg/kg of etyl acetate fraction (EAF), N-hexane fraction (NHF) and water fraction (WF) of the plant extract for 3 days. A single dose of PTZ was then injected and the first minimal clonic seizure (MCS) and generalized tonic-clonic seizures (GTCS) latencies were recorded.

Results:
The first minimal clonic seizure (MCS) latency in treated groups with 50, 100 and 200 mg/kg of HE were significantly higher than that of PTZ group (P<0.05, P<0.01 and P<0.001 respectively). In addition, the HE at 200 mg/kg significantly prolonged GTCS latency. Among the fractions, EAF and NHF significantly prolonged MCS and GTCS latencies (P<0.001 respectively) but WF was not effective against MCS or GTCS.

Conclusions:
The present study showed that EAF and NHF but not WF of Ocimum basilicum have anticonvulsant effects. It seems that the responsible compounds are not water soluble.
Pediatric Temporal Lobe Epilepsy Surgery: A Review

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Abstract:
Seizures in temporal-lobe epilepsy accounts for about 70% of partial seizures in adults but in the pediatric population, only 20% of patients have epilepsy of a temporal lobe origin. In general, Seizures in temporal-lobe epilepsy, often presented in adolescents in otherwise healthy persons and also, can be occur both as simple partial seizures with preserved awareness of self and surroundings (also known as auras or warnings) and as disabling complex partial seizures in which awareness is impaired.

Despite the development of multiple antiepileptic drugs (AEDs), 20% to 25% of patients of all ages does not adequately controlled with antiseizure medications so, both medical and surgical treatments will be considered for these patients. Temporal lobe surgery in selected patients is one of the most effective means to obtain seizure control. The main purpose of surgery for drug-resistant epilepsy is to remove the hypothetical “epileptogenic zone” in the given cerebral area to eliminate seizures. The most favorable selection of surgical candidates needs to know about the clinical, electrophysiological, neuroimaging, and neuropsychology data by a multidisciplinary, team including pediatric epileptologists, neuroradiologists, neurosurgeons, neurophysiologists, and neuropsychologists. Resection strategies for the treatment of temporal lobe epilepsy (TLE) are a matter of discussion and may influence outcomes. In both studies of Blume et al and Davidson-Falconer were found the best results for temporal lobe surgery.

Conclusion: In temporal-lobe epilepsy, surgery is better than prolonged medical therapy. Children with intractable epilepsies should be assess early at specialized epilepsy surgery centers to prevent the long-term consequences and morbidity associated with epilepsy.
The Presumptive Role of BDNF in Temporal Lobe Epilepsy

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Abstract:

Temporal lobe epilepsy (TLS) is a chronic neurological disorder, characterized by intermittent, unprovoked occurrence of seizures. Synchronized hyperactivity of neuron populations triggered by an imbalance between excitatory and inhibitory synaptic transmissions could consequently result in TLS. A growing body of evidence nominates Brain-derived neurotrophic factor (BDNF) as a potential target for epileptogenesis.

BDNF is a member of the neurotrophin family of growth factors. In vitro studies showed that BDNF participate in regulation of neuronal morphology and synaptogenesis and is involved in Late-LTP. The effects of BDNF are carried out through TrkB-receptors.

Studies have shown that seizures could stimulate the expression of BDNF gene and it’s been shown that BDNF and the receptor, TrkB, are both upregulated after seizures. This subsequent increase of the BDNF may be important for kindling-associated plasticity in specific neuronal systems in the hippocampus, which could promote hyperexcitability and contribute to the development of epileptic syndromes. Furthermore, in a study on Xenopus oocytes containing microtransplanted GABAa receptors derived from the human epileptic brain, it was reported that exposure to BDNF increased the amplitude of the “GABA currents” generated by the epileptic receptors and decreased their run-down. These effects were not mimicked in oocytes that express GABAa-receptors of a non-epileptic control patient.

In another study, the intracerebroventricular infusion of TrkB-receptor body could selectively block neurotrophin-receptors and in result inhibited development of kindling. Also, in a few studies decreased seizure susceptibility and impaired kindling were reported in heterozygous BDNF knock-out mice.

Although contradictory, the findings showed that chronic infusion of BDNF into the adult rat could delay the development of kindling and induce an antiepileptogenic effect. This protective effect could be rooted in the desensitization of the TrkB signaling pathway followed by prolonged BDNF infusion, however, it might also be mediated through the regulation of neuropeptide Y (NPY) expression. It was shown
that BDNF upregulation in the Mossy Fiber pathway is followed by an increase in NPY in the same brain region and that NPY could attenuate the development of kindling.
Based upon former studies, BDNF has a complex role in TLS and further clinical studies on BDNF could elucidate a promising path toward curing epilepsy.
A Review of Different Treatments for Adult Status Epilepticus

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Background:
Status epilepticus (SE) is defined as persistent seizures for at least 5 minutes. If SE doesn’t respond to first or second lines of anti-epileptic drugs, it’s described as refractory status epilepticus (RSE). Also, if SE goes on for at least 24 hours after initiation of common anesthetic medications, it’s named super refractory status epilepticus (SRSE). SE occurs as a result of several molecular and cellular processes, but the general principle is the failure of endogenous mechanisms to terminate seizures. This may happen due to loss of inhibitory mechanisms or immoderate excitation in the course of a seizure. Such changes can lead to transformation of a single seizure into SE. Treatment of SE includes multiple lines that initiate by intravenous or intramuscular injection of Benzodiazepines agents as the first-line, and intravenous administration of anti-epileptic drugs as the second-line afterwards. Lorazepam, Midazolam and Diazepam are common first-line drugs and Phenytoin, Valproate sodium and Levetiracetam are usual drugs used in second-line therapies. Recommendations for RSE therapies consist of constant infusion of AEDs, but these recommendations depend on patient’s condition and vary. Besides, most experts advise using IV anesthetic drugs (IVADs) for treatment. IVADs terminate seizures by neuronal inhibition via the GABA receptors, but after prolonged seizure activity, these receptors are internalized at a rapid rate which leads to mobilization of Glutamate receptors to cell surface. This creates a self-sustaining cycle. As a result, controlling seizures could be difficult.

Method:
A literature review of articles published between the years 2011-2015 was conducted using PubMed and Google scholar databases. Following keywords and their derivations were used during the search: “Status epilepticus”, “Seizures”, “Antiepileptic treatment”, “Refractory status epilepticus”, “Antiepileptic drugs”. Exclusion criteria of articles were the language, except English.

Conclusion:
The main objective of this article is presenting a summary of treatments for SE, almost RSE and SRSE. General emergency management,
current drugs, new treatments and new drugs are discussed. Another considered subject in this study is pregnancy and treatment. The success of treatments and drugs are also compared from different points of view. Additionally, the process of treatment in different age groups is discussed.
The Effect of Rosmarinic Acid on Apoptosis Following Intrahippocampal Kainate in the Rat

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Background:
Kainic acid (KA) is a glutamate analogue inducing neuronal overactivity and excitotoxicity by inducing vigorous depolarizations leading to cell death. KA sometimes used for modeling the temporal lobe epilepsy. Its induction ability of status epilepticus is associated with apoptotic and necrotic cell death.

Labiatae family Plants various beneficial effects on inflammation, enhancement of memory and in traditional medicine. These effects are attributed to their phenolic compounds especially rosmarinic acid (RA). RA has various biological and anti-pathological functions as astringent, anti-oxidant and anti-inflammatory.

Material Methods:
All experiments were performed on adult male Wistar rats (250–300g; n=40).

Rats were randomly assigned to four groups Sham, Sham+ Rosmarinic acid, Kainate, and Kainate+Rosmarinic acid. Kainite solution (5 μL of normal saline containing 4 μg of kainate) was injected into the right side of the hippocampus at a rate of 1 μL/min. Rosmarinic acid at a dose of 10 mg/kg/day was dissolved in propylene glycol and gavaged for 1 week before surgery. The brain was then removed. In order to detect DNA fragmentation and apoptotic cell death, a transferase dUTP nick-end labeling (TUNEL) assay was performed using the in situ cell death detection kit. Statistical analysis of data was carried out using repeated measurement and one-way ANOVA followed by Tukey post-hoc test. A statistical p value less than 0.05 considered significant. Determination of apoptosis using Tunel method indicated that kainate group has a high number of TUNEL-positive neurons apoptotic index relative to sham and RA pretreatment significantly attenuated this versus kainate (p<0.05). RA treatment is able to inhibit the apoptotic cascade by increasing Bel-2 expression induced by KA. RA exerts
a protective effect on astrocytes as shown by their increased viability and decreased apoptosis rate induced by H2O2 through increasing mitochondrial membrane potential and inhibition of caspase-3 activity and attenuation of cellular oxidative stress. In conclusion, this study confirms that rosmarinic acid exerts neuroprotective affect against kainite-induced injury.
Marijuana (Cannabis) for Epilepsy?

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Background:
Epilepsy affects about 65 million people worldwide with an incidence of 2070- new cases per 10,000 individuals that means about 1 % of the world’s population. It is estimated that 20–30 % of epileptics are not adequately controlled by conventional drugs. Almost a third of patients with epilepsy have a treatment-resistant form, which is associated with severe morbidity and increased mortality. There is a large unmet need for novel therapies that provide effective control of drug-resistant or refractory epilepsy and would not interfere with normal function. Recently, Cannabis-based treatments have been suggested as potential therapeutic alternative.

Method:
This literature review discusses the available Databases including PubMed, Medline and Google Scholar. articles were studied to understand whether marijuana would be safe, tolerated, and efficacious for epilepsy.

Results:
Marijuana, has been used since the 19th century for controlling epileptic seizures. The cannabis plant contains over 200 compounds, referred to as cannabinoids. Among these are The psychoactive Δ9-tetrahydrocannabinol (THC) and non-psychoactive cannabidiol (CBD), which can exert a variety of effects in the CNS and the periphery. Their main target is the endocannabinoid system, which is involved in regulating neurotransmitter networks and other peripheral functions.

Several anecdotal reports and clinical trials suggest that in the human population cannabinoids, particularly CBD, has anticonvulsant properties, could be effective in treating partial epilepsies and generalized tonic-clonic seizures, reduce seizure frequency and duration and they are less toxic than tobacco or alcohol as well as most pharmaceutical drugs currently used for the treatment of epilepsy.

Conclusions:
Although it have been legalized various forms of cannabis, there is still concern about its efficacy, relative potency, availability of medication-
grade preparations, dosing, and potential short- and long-term side effects, including those on prenatal and childhood development.

In summary, for those whose seizures remain uncontrolled without alternative conventional interventions available, medical marijuana has received anecdotal support, but only on an empirical basis. Any clinical trial is appropriate only in selected refractory cases and only when strictly monitored by a physician.
What is Vagus Nerve Stimulation Therapy?

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Background:
Vagus nerve stimulation (VNS) is an adjunctive treatment for epilepsy alongside with anti-epileptic drug (AED) therapies. VNS weaken seizure frequency, severity and duration by intermittent stimulation of the Vagus nerve.

Approximately one-third of patients receiving VNS therapy experience at least 50% reduction in seizure frequency with no adverse cognitive or systemic effects. Tolerance does not appear to be a factor with VNS therapy, even after extended period of time. Response to VNS therapy may be delayed for some patients. The VNS therapy system consists of implantable pulse generator, bipolar VNS therapy lead, a programming wand with software, a tunneling tool and a hand-held magnet. The battery of generator depending on device program must change after 710- years of working.

Hand-held magnet is a device for on-demand stimulus. The stimulus created with magnet are stronger than the programmed one, this can give better sense of patient control and increase him/her quality of life. This tool is also used for temporary interruption in programmed pulses, occasionally in use of woodwind instrument, singing or during speaking engagement. However stopping the stimulus should be done sparingly and with care, as doing so creates the potential risk of seizures.

The implant surgery is most often performed as a day surgery under general anesthesia and typically last about 1 hour. Once a generator reaches end of service another surgery is required to replace the generator. Often an increase in seizures frequency or intensity suggests clinical end of service.

The mechanism of action of VNS therapy are not fully understood, but they are believed to be manifold, owing to the diffuse distribution of vagal afferents throughout the central nervous system. Studies suggest that altered vagal afferent activities resulting from VNS are responsible for mediating seizures.

Conclusions:
VNS is well-tolerated and effective adjunctive treatment. With its minimal adverse side effects, lack of interaction with drug therapies, negligible compliance issues, and improvements in quality of life and increase in efficacy over time, VNS may be particularly effective among pediatric patients and patients with comorbid condition, however, must be balanced against the necessity of surgery, although VNS therapy surgery is well tolerated. In case of refractory epilepsy continues to evolve, adjunctive treatments such as VNS therapy will play increasingly larger role in improving the lives of patients with epilepsy.
Treatment of Epilepsy, Surgery or Medication?

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**Background:**
Epilepsy is a disorder characterized by recurrent episodes of paroxysmal brain dysformation due to a sudden, disorderly and excessive neuronal discharge. It has two common treatments: drug therapy and surgery. Lots of studies have been done until now to determine the advantages and disadvantages of each treatment. In the current study these two treatments are compared to know which one is better for a patient.

**Method:**
Current data are obtained from electronic database (Google scholar and PubMed websites). 18 different articles are reviewed and a combination of their data has been gathered in this articles.

**Results:**
Antiepileptic drugs (AEDs) have many side effects such as:
1- AEDs significantly increase the level of lipoprotein (a), which is a major risk factor for atherosclerosis.
2- AEDs decrease the serum level of IgA and IgM so they weaken the immune system.
3- AEDs cause sleep disturbances such as drowsiness. They can deeply modify sleep-architecture and the sleep-wake cycle. Severe somnolence affects patient’s daily activities and it may facilitate the occurrence of seizures.
4- Women who had drug treated epilepsy had children with lower birth weight, length and head circumference than children of women without epilepsy.
5- Using valproic acid as an AED is associated with a frequent occurrence of reproductive endocrine disorders characterized by polycystic ovaries, hyperandrogenism and menstrual disorders in women. It also increases the risk of major congenital malformation.
6- The newer AEDs seem to have less side effects than older drugs but they are the risk factors for low bone density, irrespective to
vitamin D levels.
All of these side effects and the fact that medication hasn’t been shown to be effective for unprovoked (epileptic) seizures causes thinking of surgery as a treatment.
Assessment of long-term outcomes is essential in brain surgery for epilepsy, because of seizure freedom after surgery; it reduces the epilepsy-associated death. Intelligence is unchanged by surgery and according to studies it results in good seizure control in 60% of children with intractable epilepsy due to focal cortical dysplasia. Studies have shown that patients who were operated on at younger age and with epileptic spasms had the most increase in postoperative developmental quotient. In one study the outcome of surgically treated pharmacoresistant epilepsy patients compared with three different nonoperated comparison groups regarding to seizure control, AED usage and health related quality of life (QOL). The surgical patients had a better outcome than all three comparison groups.

**Conclusion:**
It seems that surgery is a better and more effective treatment for epilepsy than drug therapy in a patient whose conditions are suitable for operation. Also, for pharmacoresistant epilepsy, surgery is the best choice. But generally to choose a method of treatment, the patient’s condition and acceptability should be considered.
The Effect of Antiepileptic Drugs on Cardiovascular Disease

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Background:
Epilepsy is a major neurologic disorder which affects about 5 - 10 % of the people worldwide. It is a chronic medical condition which requires long term treatment with antiepileptic drugs (AEDs). Epidemiological studies have shown that in adults with epilepsy, risk of development of atherogenic ischemic heart disease (IHD) increases to 34% and 68%, respectively. Previously data shows that patients with epilepsy receiving AED therapy are more prone than the general population to have hyper-homocysteinemia and low folate levels. Folate and vitamins B6, B2, and B12 are involved in the homocysteine pathway. Elevations in tHcy may be due to AED induced B-vitamin deficiencies, particularly folate and vitamin B6. Elevated tHcy levels can theoretically increase not only the risk of vascular occlusive disease especially with longer period of time, but also the risk of resistance to AEDs and development of refractory epilepsy. AEDs may impair folate absorption and gastrointestinal transport by altering gastrointestinal pH. These drugs may induce folate-catabolizing hepatic enzymes, such as cytochrome P450 and GT. Folate deficiency, may also be a cause of depressive symptoms in patients with chronic epilepsy.

Method:
In this systematic review, we evaluated effects of AEDs on Hcy by pubmed and google scholar until August, 2016.

Result:
This systematic review determinates that the increase level of tHcy could be considered as the underlying cause of atherogenicity and alterations in circulatory markers of vascular risk.

Some studies have shown significant increase in tHcy levels in patients under monotherapy. The percentage of subjects with hyperhomocysteinemia, defined as tHcy concentration more than 12 µmol/L was significantly higher in the AED group (64%) in comparison with non-AED (20%) and control group(27%). Nevertheless, some other researchers have shown lowering Hcy with folate and other vitamins did not provide any appreciate benefit in preventing cardiovascular and cerebrovascular events.
Conclusion:
In conclusion, hyperhomocysteinemia is much more prevalent in the patients using AEDs; which can be lowered with supplementation of its cofactors such as folic acid; vitamin B12 and vitamin B6. Greater effectiveness among supplementation has been attributed to folate, which alone significantly reduces plasma homocysteine levels. Additionally, folate must be administered continuously, otherwise, folate stores would rapidly become depleted, and Hcy would increase again. For all women with childbearing potential who take AEDs, long-term vitamin therapy may be necessary as prophylaxis against the development of fetal neuronal tube defects. Monitoring patients especially patients who have been receiving treatment for many years is also recommended.
Ketogenic Diet and Epilepsy

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Background:
Epilepsy characterized by recurrent episodes of paroxysmal brain dysfunction due to a sudden, disorderly, and excessive neuronal discharge. Nowadays we know that diet is an important factor in health. Ketogenic diet (KD), with high in FATS and low in CARBOHYDRATES, provides sufficient PROTEINS for growth but insufficient amount of carbohydrates for the energy needs of the body. A ketogenic diet generates 80-90% of caloric requirements from fats and the remainder from proteins. This study aimed to establish whether ketogenic diet has an effect on epilepsy or not.

Methods:
This study is a review article that is provided by internet resources. I searched the PubMed and Google Scholar databases using the search terms: ketogenic diet and epilepsy. 16 studies were identified and reviewed.

Results:
After reviewing these articles, I found that ketogenic diet has improving effects on epilepsy. In one article Martin K and et al. reported these results: Rates of seizure freedom reached as high as 55% in a 4:1 KD group after three months and reported rates of seizure reduction reached as high as 85% in a 4:1 KD group after three months. The most commonly reported adverse effects were gastrointestinal syndromes. It was common that adverse effects were the reason for participants dropping out of trials. Other reasons for drop-out included lack of efficacy and non-acceptance of the diet. Although there was some evidence for greater antiepileptic efficacy for a 4:1 KD over lower ratios, the 4:1 KD was consistently associated with more adverse effects. No studies assessed the effect of dietary interventions on quality of life, or cognitive or behavioral functioning. Recent reports indicate that ketone bodies can reduce oxidative stress and that fatty acid-induced mitochondrial uncoupling may also yield similar protective effects. Ketone bodies may attenuate spontaneous firing of ATP-sensitive potassium channels in central neurons, and pharmacological inhibition of glycolysis has been shown to retard epileptogenesis in a rat kindling model.
Conclusions:
This review showed promising results for the use of KDs in epilepsy. The ketogenic diet (KD) has been suggested to reduce seizure frequency. It is currently used mainly for children who continue to have seizures despite treatment with antiepileptic drugs. However, there were adverse effects within all of the studies and for all KD variations, such as short-term gastrointestinal-related disturbances, to longer-term cardiovascular complications. There was a lack of evidence to support the clinical use of KD in adults with epilepsy. Therefore, further research would be of benefit. For people who have medically intractable epilepsy or people who are not suitable for surgical intervention, a KD remains a valid option; however, further research is required. While the mechanisms underlying the broad clinical efficacy of the ketogenic diet remain unclear, there is growing evidence that the ketogenic diet alters the fundamental biochemistry of neurons in a manner that not only inhibits neuronal hyperexcitability but also induces a protective effect. Thus, the ketogenic diet may ultimately be useful in the treatment of a variety of neurological disorders.
Herbal Treatment as a Candidate for Epilepsy

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Introduction:
Approximately one third of people with epilepsy have drug-resistant seizures. Surgery is highly useful and safe for selected patients with treatment-resistant focal epilepsy. Many epileptic patients may not be candidates for surgery because a single site of origin of their seizures cannot be localized or exists within eloquent regions of the cortex. The use of herbal medication and dietary supplementshas increased dramatically in recent times. A significant number of these remedies are used for treating patients with neurologic or psychiatric complaints. Some herbal medicines may have an anticonvulsant effect; however, none has been scientifically tested in randomised blinded controlled studies.

Conclusion:
it is essential to specifically inquire about the use of alternative or complementary medicines. Most patients do not consider these to be “drugs” and therefore will not volunteer information about their use. Further clinical research, vigilance, and reporting of side effects are needed to define the risk associated with the use of various herbal medications and dietary supplements.
Health tourism is the term which has been applied to the industry catering for combined health and tourism motivations. Health is often a motivational factor in individuals’ decisions to purchase holidays, but its significance varies in intensity. In the extreme case it is the determining factor, an example is travel to obtain specialized surgery. Approximately one third of people with epilepsy have drug-resistant seizures. Surgery is highly useful and safe for selected patients with treatment-resistant focal epilepsy. Advances in neurodiagnostic technology and microsurgery have greatly improved the safety and efficacy of surgical treatment for epilepsy in recent years. Regard to this background, there has been a growing interest in better understanding the trends and determinants of health tourism activities. Asthe surgical techniques isprofessional and the cost of the different types of treatments is appropriate in Iran in comparison with another countries, we suggest that the health tourism activities can be increased when the private investments in medical facilities will be increased.
Chemical Models of Absence Epilepsy (A Review Article)

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Introduction:
Childhood absence epilepsy (CAE) is the most common type of childhood-onset epilepsy syndrome with well-defined electrophysiological features but unknown pathological basis.

There are several substances for induced absence seizure that used locally or systemically based on the aim of the study. It should be noted each substances has limited duration of action and specific time for observation of the seizure.

Systemic Penicillin, Low-dose pentylentetrazole (L-PTZ), the 4,5,6,7 tetrahydroisoxazolo [4,5,-c]pyridine-3-ol (THIP) model, and gamma-Hydroxy-butyrate (GHB) model are most common pharmacological animal models for typical absence epilepsy as well as AY-9944 and methylazoxymethanol acetate (MAM)-AY-9944 models administrate for induced atypical absence seizures.

Objective:
This review studies the pharmacological animal models which induce seizure.

Conclusion:
It seems that chemical animal models are less suitable than other models like genetic models. Also the pharmacologic reactivity and the underlying circuits appear very similar to the human pathology.

All of these models had limitation. Given these considerations, epilepsy researchers should be open mind and enthusiastic for new animal models for better understanding of the epileptogenic process.
Genetic Models of Absence Epilepsy

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Introduction:
Absence epilepsy, a disease predominantly of childhood, is characterized as generalized epilepsy that accompanied with abnormal electrical activity in both hemispheres of the brain and each seizure is accompanied by a complete loss of consciousness. Children with childhood absence epilepsy (CAE) suffer from high rate of pretreatment attention deficits that persist despite seizure freedom. Many researchers have still focused on the phenomenon of the absence seizure because of the unclear mechanisms involved in its pathophysiology.
Genetic factors play a critical role in the idiopathic generalized epilepsies, including absence epilepsy. Some evidences emphasize the role of genetic in the pathogenesis of CAE.

Objective:
This paper is going to review several genetic animal models induced seizure and their advantage and disadvantages of every model.

Method:
This study has done by searching related keywords in databases such as Google Scholar, SID, science direct and PubMed.

Conclusion:
Some mutant mice and genetically models of rats were currently used in the most experiments because of close correlation of EEG features and behaviors of genetic animal models to the human condition. There were six mutant mice which were suitable models for absence
epilepsy including tottering, lethargic, stargazer, mocha, slow-wave-epilepsy and ducky.

Among genetic models in mousses and rats the GAERS and the WAG/Rij strains of wistar rats have asserted to be valid and predictive models of human absence epilepsy. The most publication in the absence epilepsy was designed based on the WAG/Rij rats. The advantage of the genetic models are that seizures are spontaneous and thus better reflect the underlying pathophysiology of the human condition, and on the other hand genetic models simply reproduce the symptoms of absence seizure.

Also the thalamocortical circuits obviously involved as the critical generator of absence seizures.
The Anticonvulsant Effect of Vitamin C on Seizures Induced by Pentylenetetrazol Kindling in Rat

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Background:
Epilepsy is one of the most common and chronic neurological disorders and often progressive, which appears periodically and with unpredictable seizures due to abnormal discharge of brain neurons. This study, were studied the anticonvulsant effect of vitamin C on seizures caused by pentylenetetrazole (PTZ) kindling in rats.

Methods:
Male rats (200 to 250 g), after anesthesia, were placed in a stereotaxic apparatus and the can be placed cannula guide. After a recovery period, rats were randomly divided to 4 groups. In the first group as vehicle and in other groups (groups 24-) vitamin C injected into the brain ventricle at doses of 3, 6 and 12 mg and then seizure parameters were measured. The effectiveness of vitamin C in the prevention of seizure were measured based on the increased latency to onset of symptoms or increase in latency of different epileptic seizures.

Results:
Intraventricularly injection of vitamin C (12 mg) significantly reduced the duration of delayed seizures in phase 1 caused by PTZ kindling compare to the control group (P < 0.05), but delay time in the stage 1 and 2 didn’t changes at doses lower than 12 mg. also, vitamin C injection showed anticonvulsant effects in low doses on the cumulative time delay seizures caused by PTZ kindling in phase 2. Injection of vitamin C reduced the number of injection at a dose of 12 mg to produces stage 5 than the control group.
Conclusions:

It seems that the effects of vitamin C on the treatment of seizures is dose dependent., which in high dose, vitamin C has a direct relationship by reducing the threshold of each of the phases 1 and 2 and Injection of vitamin C reduced the number of injection at a dose of 12 mg to produces stage 5 than the control group.
The Role of 5-HT and their Receptors on Inhibitory Effect of Curcumin in Seizure Induced by PTZ in Mice

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Introduction:
Medical plants are used for treatment of epileptic disorders. It has been shown curcumin (the principal curcuminoid of turmeric) has antiepileptic properties. Hence, the mechanism of antiepileptic effect of curcumin is not clear yet. This study was conducted to evaluate the effect of 5-HT and their receptors on inhibitory effect of curcumin in seizure induced by PTZ in mice.

Methods:
Ninety of mice (2230- gr) were subdivided in nine groups. Mice in group one were injected with PTZ and after 25 min the vehicle of curcumin and p-chlorophenylalanine (PCPA) were injected. Groups 2 to 4 received curcumin, PCPA and Curcumin+PCPA, respectively. The animals in group 5 were injected curcumin+selective antagonists of 5HT1A, 5HT2C, 5HT4, 5HT7. Groups 6-9 in addition to PTZ and curcumin, received selective antagonists of 5-HT (5HT1A, 5HT2C, 5HT4 and 5HT7), respectively.

Results:
Curcumin decreased tonic-clonic and tonic seizure duration. It also decreased falling and death and increased the latency of onset of seizure stages (p<0.05). Block of 5HT1A, 5HT2C, 5HT4 receptor with antagonists, eliminate inhibitory effect of curcumin significantly (p<0.05). Finally, 5-HT1A, 5-HT2C and 5-HT4 had inhibitory effect on seizure parameters, but 5-HT7 had excitatory effect.

Conclusions:
The results of this study show that curcumin has inhibitory effect on seizure by 5-HT1A, 5-HT2C and 5-HT4 receptors.
**Spontaneous Arrest of Tonic-Clonic Seizures: The Role of Hypoxia, Hypercapnia and Acidosis**

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**Abstract:**

Several studies aimed to clarify the role of hypoxia, hypercapnia and acidosis in the arrest of seizures. It is known that seizure activity is accompanied by an increase in energy metabolism of the brain. Therefore, it has been suggested that an exhausted supply of energy is responsible for spontaneous arrest of seizures. However, findings showed that termination of seizure activity was independent of the changes in gas tension. This indicates that spontaneous seizure termination cannot as a rule be attributed to hypoxia and hypercapnia, but is based on inhibitory neuronal processes. The role of hypoxia, hypercapnia and changing of pH on termination of spontaneous tonic-clonic seizures will be discussed.
Transgenic Bt Corn Can Provokes Epilepsy in Susceptibles: a Hypothesis

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Nowadays there is an increasing consumption of genetically modified (GM) crops all over the world. According to statics, in 2015, the total acreage of GM crops worldwide was 179.7 million hectares while in 2003 this number was 67.7. Although the high rate of consumption, there is also concern about safety of using GM foods. Bt corn is one of this GM products that contains Bt toxin, a conventional insecticide to be Resistant against insects.

By punching holes in insects' digestive tracts, Bt-toxin acts as an insecticide. A 2012 study confirmed that it punctures holes in human cells as well. It may also activate the immune system. When mice were exposed to Bt-toxin, they not only mounted an immune response to it directly, but they subsequently reacted to foods that had not formerly triggered a response.

Bt-toxin can survive human digestion, and studies showed that it's present in the blood of 93% of pregnant women tested and 80% of their unborn fetuses.

On the other hand, by activating the immune system, eating GM Bt corn could directly lead to the development of gluten sensitivity. Gluten-related disorders are commonly accompanied by and possibly triggered by intestinal permeability, which is commonly referred to as "leaky gut. Leaky gut occurs when gaps form between intestinal cells and large particles from the digestive tract enter the bloodstream, potentially triggering immune or allergic reactions. This "hole-punching toxin" may be a critical piece of the puzzle in understanding gluten-related disorders.

Studies have demonstrated the link between gluten sensitivity (defined as the presence of anti-gliadin antibodies and positive immunogenetics) and epilepsy with occipital calcifications. Also, the prevalence of celiac (a kind of gluten - related disease) cases in people with epilepsy ranges from approximately 0.8–6%.

In conclusion, according to several studies, using genetically modified Bt corn may lead to gluten sensitivity and provoke epilepsy in susceptibles. In vitro studies is needed to making this relationship more clear.