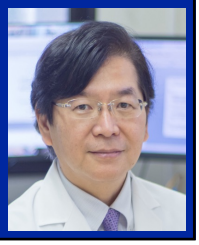
15th AOEC (Asian Oceanian Epilepsy Congress)
February 20-23, 2025
ILAE YES Career Development Session Part 1
Thursday, February *20, 11:10 - 11:30*

Translational research on epilepsy in the AO region, where and how

Akio IKEDA, MD, PhD, FACNS
Department of Epilepsy,
Movement Disorders & Physiology
Kyoto University Graduate School of Medicine
Kyoto, JAPAN

Past-president, Vice-President, Japan Epilepsy Society
Past-regional Chair, ILAE-Asia Oceania, ILAE



1

2023-2025 Disclosure Form

Company Name	Nature of Affiliation
• Sumitomo Pharma Co • Nihon-Kohden	• Industry-Academia Collaboration Courses • Collaboration study
• UCB Japan • Eli Lilly Japan • RICHO	• Collaboration study
Off-Label Product Usage	
• None	

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14th AOEC (Asian Oceanian Epilepsy Congress)
A Virtual Congress, November 17-19, 2022
ILAE YES Career Development Session Part 1
Friday, November 18, 13:45 - 14:45

Research career pathways / balancing clinical and research "Enjoy your process"

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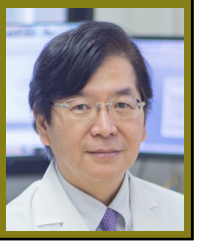


3

Translational research on epilepsy in the AO region
where and how

---

1) Features of AO region
   Very active clinical care, education, patient care
   Less active research, lesser publication：except Australia, China etc
   Large population, but geographical & cultural diversity

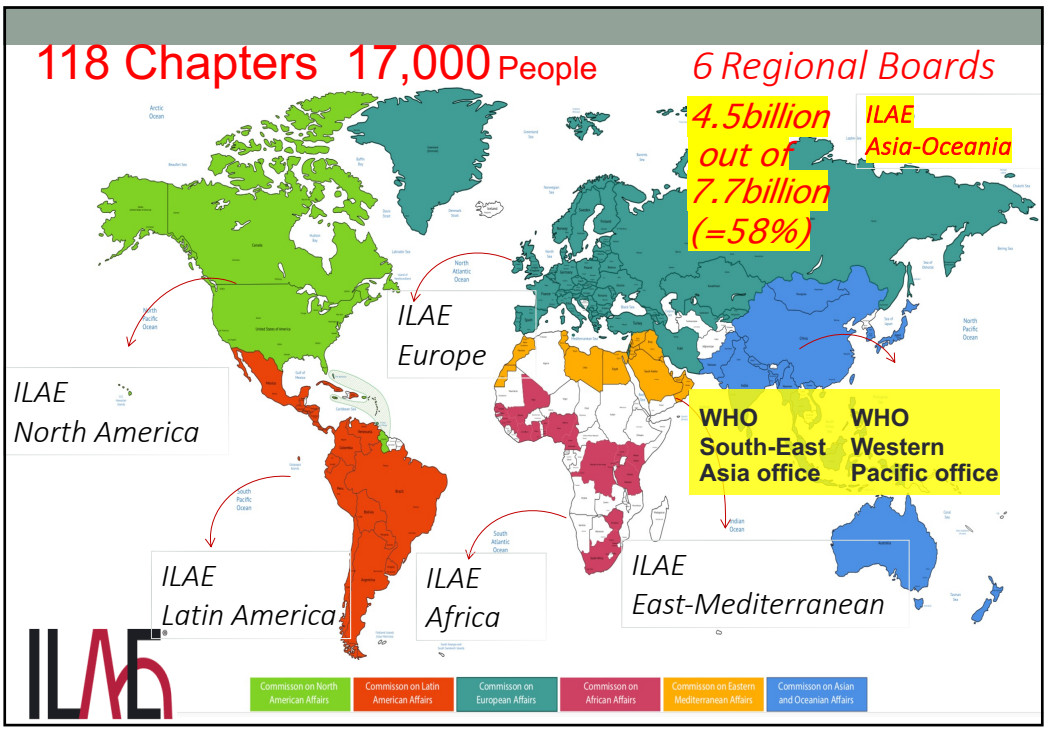
2) Clinical research vs. basic research
   animal study, patient study, big data analysis

3) Translational (TR) vs reverse tranlational research (rTR)
   from clinical question to research question (clinical/ basic)

4) How
   from clinician (resident/fellow/young staff), physican-scientisit, clinician

3) When
   around board-certified, specialists (epilepsy, neurology, EEG)

4



5

CAOA= 20 chapters, geographically and culturally divergent,,,

6

ILAE executive committee meeting

JUNE 21, 2019 (Bangkok)

ILAE-Asia Oceania

(formally, CAOA)

Akio IKEDA, MD, PhD, FACNS
Chair (2017-2021), CAOA

Department of Epilepsy, Movement Disorders & Physiology
Kyoto University Graduate School of Medicine
Kyoto, JAPAN

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Aims of the ILAE-AO (CAOA)

To develop, stimulate and coordinate epileptology initiatives in the Asian and Oceanian regions.

Missions of ILAE-AO & ASEPA

1. To advance and disseminate knowledge concerning the epilepsies throughout the Asian & Oceanian region;
2. To improve **education and training** in the field of the epilepsies in Asia via the activities of the Asian Epilepsy Academy(ASEPA)
3. To organize the Asian Oceanian Epilepsy Congresses together with the International Director of Meetings (IDM) and IBE's Regional Executive Committees;
4. To facilitate clinically relevant **epilepsy research** in Asia;

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ASEPA Activities for 2018-2019

- **Epilepsy Fellowship Training** Fellowships and opportunities
  (coordinated by CT Tan)
  - ASEPA Fellowships x 2
  - Japan Epilepsy Research Foundation (JERF) fellowships: 2/year
  - Japan Epilepsy Society fellowships: 2-3/year
  - Korean Epilepsy Society (KES) annual fellowship program: 2/year
  - Epilepsy Society of Australia (ESA) Clinical Observerships: 2/year
  - ESA-ASEPA Travel Grants 3-day Clinical Epilepsy and EEG courses: 8-9/year

- **ASEPA-ASNA EEG Certification Examinations (parts 1 and 2)**
  (coordinated by SH Lim. Singapore, ex-chair of CAOA, currently ILAE-AO)
  - 2018 Part 1 written exam x 5, Part 2 oral exam x 3
  - 2019 Part 1 written exam x 5, Part 2 oral exam x 5

- **ASEPA teaching courses**, workshops and supported education meetings
  - 2018 10
  - 2019 16

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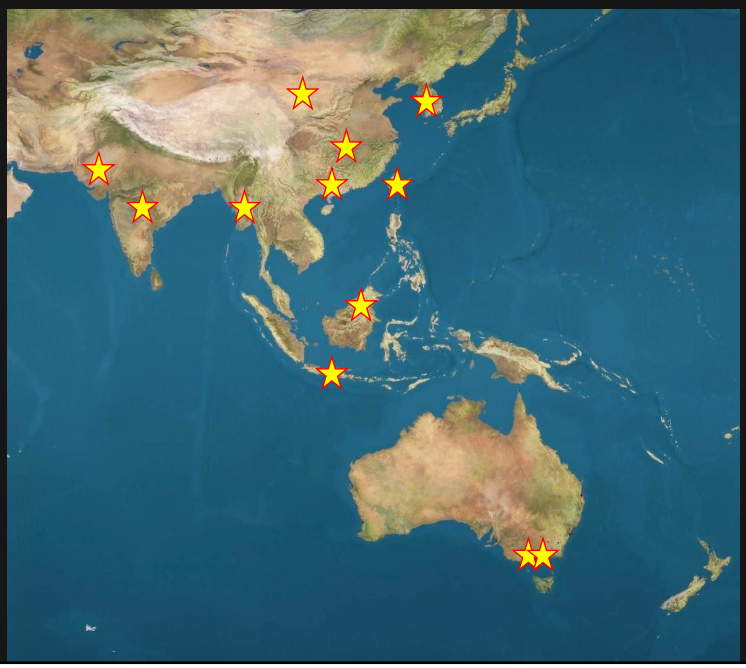
Teaching Courses and Workshops in 2018



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2. The top 5 or 6 problems that your region is facing and the current barriers to addressing those issues

Stigma and global campaign againt epilepsy, and treatment gap
Status and economics of epilepsy surgery in developing countries like India

Continuity and globalization of education made by ASEPA

ASEPA-EEG board examination has been successful, and currently ASNA and India area most intensively worked by ASEPA

Insufficient research activity and very limited financial support
AMED in (Japan =1/5o times of NIH or EC)

Multi-institutional, international, clinical trial or collaboration study
In Japan, since April 1, 2018, strictly regulated by ***the new law of clinical research*** in clinical trial of drugs which were already approved. Therefore, **perampanel trial for cortical myoclonus in ILAE-AO** has not been started yet as the study

Collaboration with other societies such as IFCN and WFN

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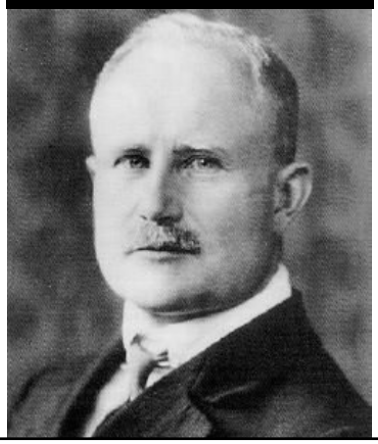
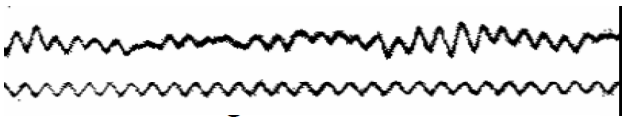
2019-2029
"A decade of EEG & Epilepsy Education" in ILAE-AO forward to the centennial anniversary of the first human EEG reported in 1929 by Hans Berger

HANS BERGER



In 1929 German physiologist and psychiatrist Hans Berger published scalp recording of human EEG, and coined the word "Elektenkephalogram"



The upper tracing is EEG, and the lower is a 10 Hz timing signal

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Translational research on epilepsy in the AO region
where and how

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3) When
   around board-certified, specialists (epilepsy, neurology, EEG)

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Prof. Hans O. Luders *(Cleveland Clinic Foundation→Case Medical School)*

(Cleveland Clinic, Epilepsy Section, 1991)

Clinical training of epilepsy, EEG, evoked potentials, presurgical evaluation,

Best care by best research
Science is writing

Clinical research based on invasive EEG data
Big data accumulation
Excellent clinical experience, and large patient population

All patient data

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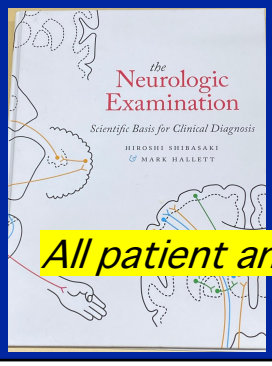
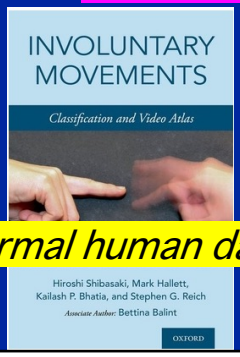
The late Prof. Hiroshi Shibasaki (Kyoto University, IFCN ex-president)

Clinical training of general neurology
EEG, movement disorders, evoked potentials

Motor control
movement-related cortical potentials
(readiness potentials) (1988)

"Learn from patients"
"Solve the clinical questions"





All patient and normal human data

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reverse translational research (rTR)

1) cortical tremor (1990), BAFME
   Benign adult familial myoclonus epilepsy
   Familial adult myoclonic epilepsy (FAME)

2) Ictal DC shifts (1996)
   Wide band EEG: ictal HFO

Cortical tremor: → *BAFME*

A variant of cortical reflex myoclonus

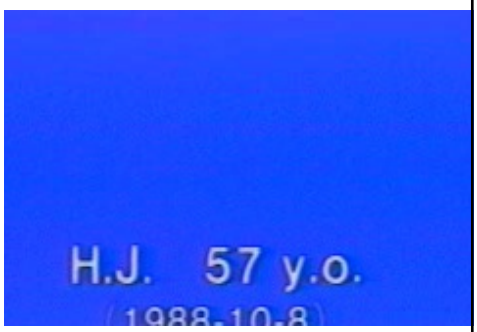
Non-coding DNA repeat
2018, Nature genetics
Popular in AO

Neurology 40: 1561-1565, 1990

A. Ikeda, MD; R. Kakigi, MD; N. Funai, MD; R. Neshige, MD; Y. Kuroda, MD; and H. Shibasaki, MD

Article abstract—Two patients with action tremor that was thought to originate in the cerebral cortex showed fine shivering-like finger twitching provoked mainly by action and posture. Surface EMG showed relatively rhythmic discharge at a rate of about 9 Hz, which resembled essential tremor. However, electrophysiologic studies revealed giant somatosensory evoked

Case reports. Patient 1. A 57-year-old Japanese farmer was admitted to the hospital because of tremulous finger movement and an unconscious seizure. In the 4th decade, he had noticed difficulty in writing due to fine finger tremor. The diagnosis of essential tremor was made, but β-blocker was not at all effective. At age 45, he had the 1st unconscious seizure impossible. Of the patient's 6 siblings, 1 sister and 1 brother had similar symptoms of finger tremor and seizure.



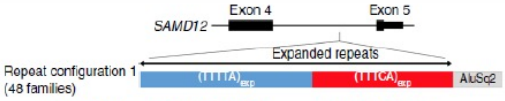
nature genetics

ARTICLES

https://doi.org/10.1038/s41588-018-0067-2

(Ishiura,,,,Ikeda,,Tsuji, 2018)

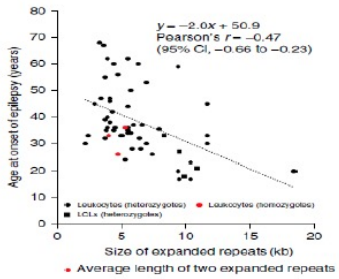
Expansions of intronic TTTCA and TTTTA repeats in benign adult familial myoclonic epilepsy



BAFME: $(TTTTA)_{exp} + (TTTCA)_{exp}$ (Normal: $(TTTTA)_{about\ 20}$)

Repeat length is correlated with age at onset of epilepsy

リピート数： 4.0kb (ホモ)



(Ishiura et al. Nature Genetics 2018)

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reverse tranlational research (rTR)

1) cortical tremor (1990), BAFME

Benign adult familial myoclonus epilepsy

Familial adult myoclonic epilepsy (FAME)

2) Ictal DC shifts (1996)

Wide band EEG: ictal HFO

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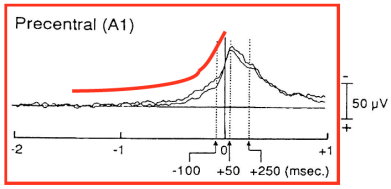
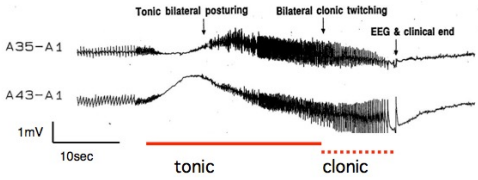
Serendipity

While Readiness potentials were recorded after changing time constant from 0.1sec to10 sec of EEG amplifier manually, spontanouse seizure occurred, and readiness potentials were not recorded.
However. ictal DC shifts were very clearly recorded unexpectedly.





Epilepsia, 37(7):662–674, 1996
Lippincott-Raven Publishers, Philadelphia
© International League Against Epilepsy

Subdural Recording of Ictal DC Shifts in Neocortical Seizures in Humans

Akio Ikeda, Kiyohito Terada, *Nobuhiro Mikuni, ‡Richard C. Burgess, §Youssef Comair, *Waro Taki, †Toshiaki Hamano, †Jun Kimura, ‡Hans O.Lüders, and Hiroshi Shibasaki

*Departments of Brain Pathophysiology, *Neurosurgery, and †Neurology, Kyoto University School of Medicine, Shogoin, Sakyo-ku, Kyoto, Japan; and Departments of ‡Neurology and §Neurosurgery, The Cleveland Clinic Foundation, Cleveland, Ohio, U.S.A.*

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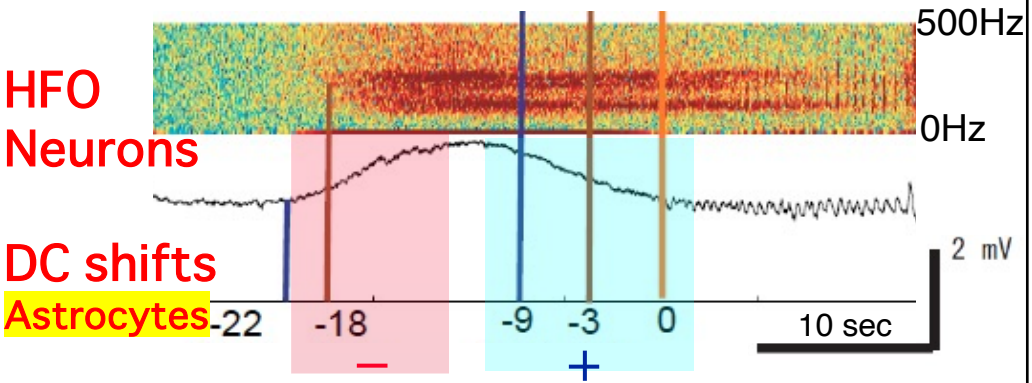
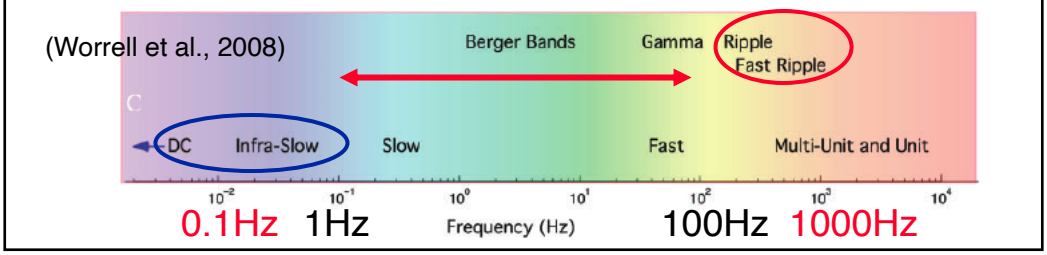
Ictal DC shift preceded ictal HFO in invasive recording.

(Imamura et al.,2011) (Kanazawa et al. 2015)(Daifu et al., 2016)





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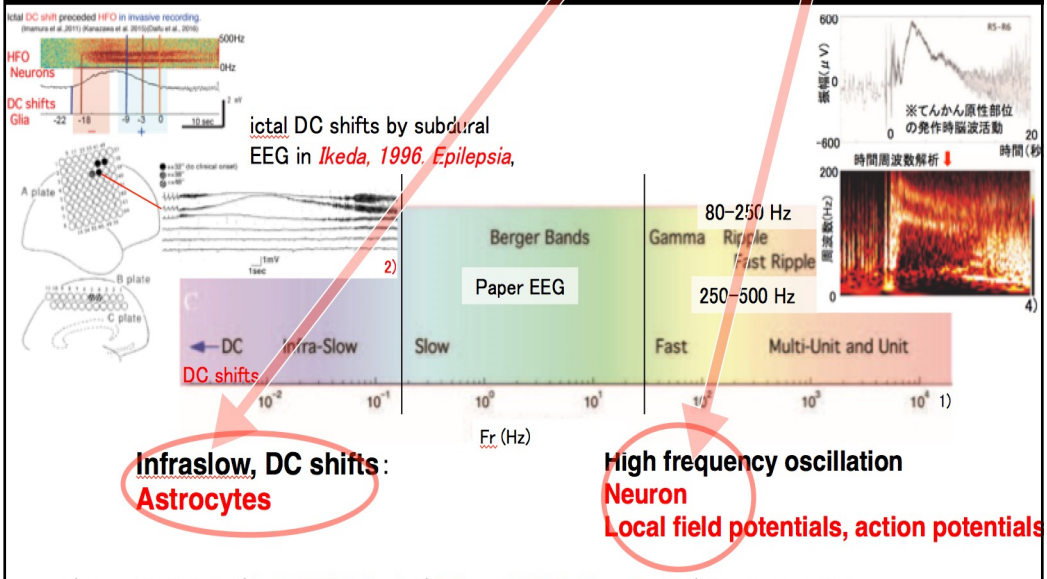
Digital wide-band EEG could provide us with both ***infralow/ DC shifts*** and ***high frequency oscillation*** together for invasive EEG as well as scalp EEG as the potential biomarker



Infraslow, DC shifts:
Astrocytes

High frequency oscillation
Neuron
Local field potentials, action potentials

1) Worrell, 2008, Brain, 2) Ikeda, 1996, Epilepsia, 3) Kajikawa, 2022, Clin Neurophysiol, 4) Grinenko, 2018, Brain

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BRAIN COMMUNICATIONS

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JOURNAL ARTICLE ACCEPTED MANUSCRIPT

Ictal direct current shifts contribute to defining the core ictal focus in epilepsy surgery

Mitsuyoshi Nakatani, MD ✉, Morito Inouchi, MD, Masako Daifu-Kobayashi, MD, Tomohiko Murai, MD, Jumpei Togawa, MD, Shunsuke Kajikawa, MD, Katsuya Kobayashi, MD, Takefumi Hitomi, MD, Takeharu Kunieda, MD, Satoka Hashimoto, MD, Motoki Inaji, MD, Hiroshi Shirozu, MD, Kyoko Kanazawa, MD, Masaki Iwasaki, MD, Naotaka Usui, MD, Yushi Inoue, MD, Taketoshi Maehara, MD, Akio Ikeda, MD ✉

Brain Communications, fcac222, https://doi.org/10.1093/braincomms/fcac222
Published: 03 September 2022 **Article history** ▼

PDF Split View Cite Permissions Share ▼

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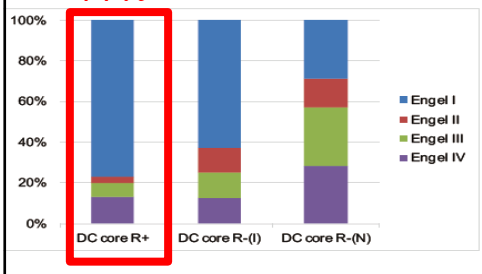
Results: surgical outcome

Complete resection of ictal DC and ictal HFOs 'core' areas significantly **correlates with good surgical outcome**.

Ictal DC evaluation

A.

77%



B.

46/49pts

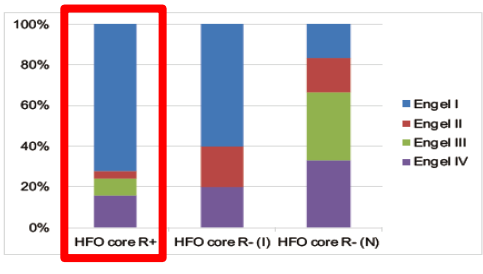
	Good	Bad
DC core R+	23	7
DC core R-	7	9

(p=0.044, Pearson's chi-square test)

Overall, 66% in Engel I

Ictal HFOs evaluation

72%



36/49pts

	Good	Bad
HFOs core R+	18	7
HFOs core R-	4	7

(p=0.043, Pearson's chi-square test)

Overall, 61% in Engel I

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RESEARCH ARTICLE

Epilepsia

Received: 16 February 2024 | Revised: 11 July 2024 | Accepted: 17 July 2024

Investigating current clinical opinions in stereoelectroencephalography-informed epilepsy surgery

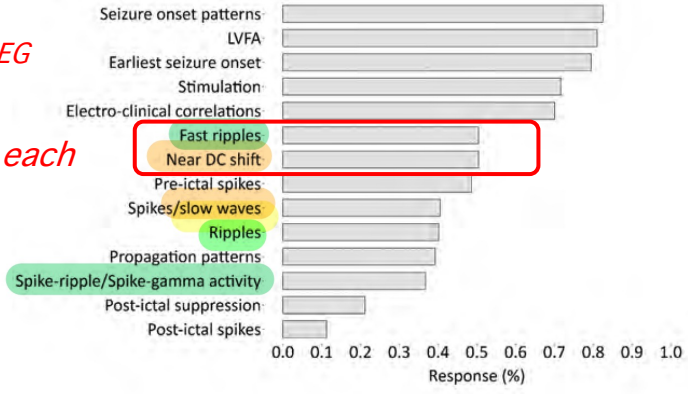
John Thomas[1,2] | Chifaou Abdallah[1] | Zhengchen Cai[1] | Kassem Jaber[1] | Jean Gotman[1] | Sandor Beniczky[3] | Birgit Frauscher[1,2,4]

(A)

Opinion from 321 experts

Out of 14 Ictal s-EEG features

50.2% in each



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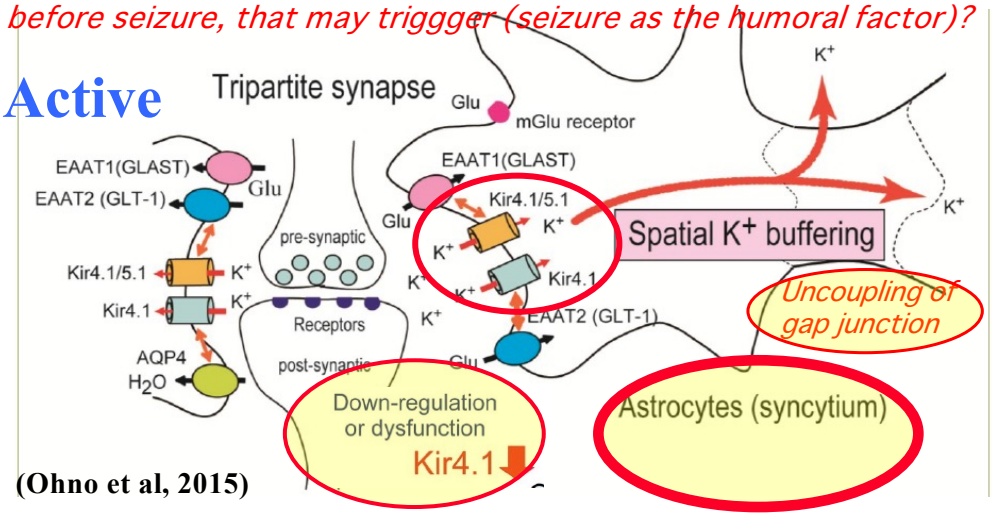
Impaired K⁺ homeostasis is important both after seizure and before seizure, that may triggger (seizure as the humoral factor)?



(Ohno et al, 2015)

(recently shown by animal study, human sample from epiileptogenic zone generating ictal DC shifts)

Astrocyte depolarization (including DC shifts)
→ inhibition of astrocyte glutamate clearance
→enhancing neuronal activation by glutamate
(Armbruster et al, Nature Neurosciece, 2022)

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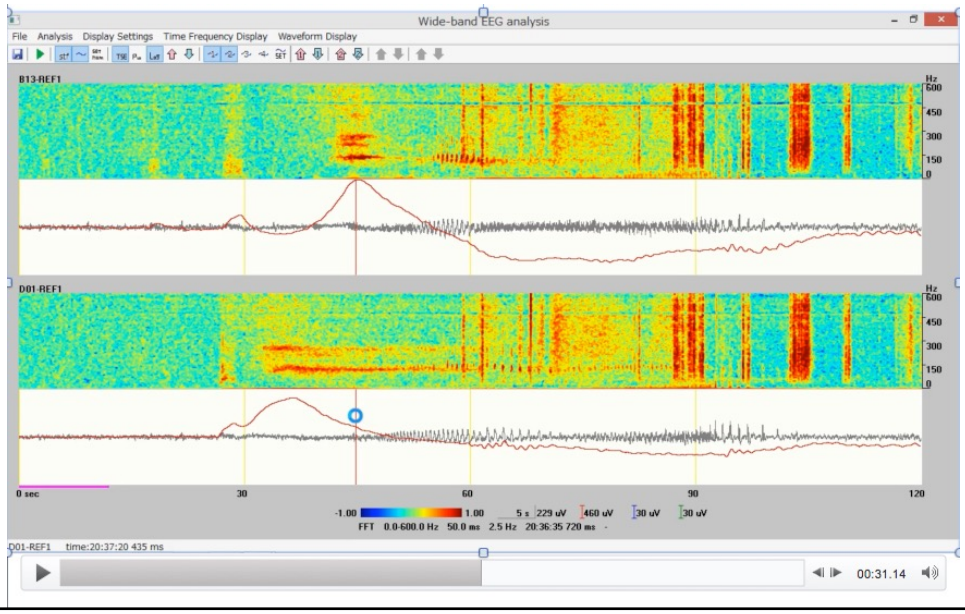
Time frequency analysis on the EEG review station (+-60sec)

Collaboration with Nihon Kohden (HFO up to 600Hz and DC shifts shown together in the review station)



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Japan Agency for Medical Research and Development (AMED)
International Collaborative Research Program

Implementation study of wide band EEG recording, analysis and dissemination in epilepsy care using digital EEG in Indonesia 2022–2026

インドネシアでの、てんかん診療の質向上をめざした デジタル脳波のワイドバンド成分の 記録解析普及の実装研究

日本医療研究開発機構

地球規模保健課題解決推進のための研究事業

キックオフミーティング

京都大学大学院医学研究科てんかん・運動異常生理学講座教授

京都大学医学部附属病院てんかん診療支援センター長

池田昭夫

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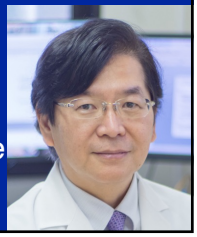
35th International Epilepsy Congress
September 2-6, 2023, Dublin, Ireland

Special Interest Group
International academia-industry collaboration:
implementation of EEG/ epilepsy education and research

Implementation of research ***beyond*** academia-industry collaboration

Akio IKEDA, MD, PhD, FACNS
Department of Epilepsy, Movement Disorders & Physiology
Kyoto University Graduate School of Medicine
Kyoto, JAPAN



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AMED (Japan Agency for Medical Research and Development) Supports

International Collaboration

Implementation of wide band EEG in epilepsy care by digital EEG

Lecture:

Wide Band EEG Analysis

Now ready for clinical implementation

Akio IKEDA, MD, PhD, FACNS

Department of Epilepsy, Movement Disorders & Physiology

Kyoto University Graduate School of Medicine

Kyoto, JAPAN

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31st January 2025
(Friday)

Wide-band EEG from DC shifts to HFO 1

Moderator

Dr. Fitri Octaviana (Dr. Cipto Mangunkusumo Hospital, Indonesia)

Contents

- ✔ Mini lecture from Prof. Ikeda (Kyoto University, Japan) [30 min.]
- ✔ Presentation from Dr. Katsuya Kobayashi (Kyoto University, Japan) [30 – 60 min.]

14th February 2025
(Friday)

Wide-band EEG from DC shifts to HFO 2

Moderator

Dr. Aris Catur Bintoro (Central General Hospital Dr. Kariadi, Indonesia)

Contents

- ✔ Mini lecture from Prof. Ikeda (Kyoto University, Japan) [30 min.]
- ✔ Presentation from Dr. Masao Matsuhashi (Kyoto University, Japan) [30 – 60 min.]

India (New Delhi)	IST	2:30 PM –
Indonesia (Jakarta)	WIB	4:00 PM –
Thailand (Bangkok)	ICT	4:00 PM –
Taiwan (Taipei)	CST	5:00 PM –
Japan (Tokyo)	JST	6:00 PM –

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Wide-band EEG: a mysterious and very useful technique

1) What is the wide-band EEG?

2) Special machine? Special technique?

3) Is it useful? Is it redundant? Just only research?

4) Useful only in invasive EEG?

5) Is it recorded by scalp-EEG?

6) EEG technologist could analyze?

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Translational research on epilepsy in the AO region where and how

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ILAE-AO Mentor-Mentee Program Meeting
Date: *6/23/2019*
Start Time: *3:30:00 PM*, Finish Time: *6:00:00 PM*
Venue: *Room Lotus 13*

Program

- Clinical epilepsy genetic study - Dr. Tsai Meng Han (15 minutes)
- Stigma in epilepsy - Dr. Lim Kheng Seang (15 minutes)
- AED hypersensitivity, the clinical and social implications - Dr. Lim Kheng Seang (15 minutes)
- Quality improvement study in epilepsy – Dr. Eishi Asano (He is now in Detroit, will not be in IEC, but happy to guide via teleconference) - presented by Dr. Lim Kheng Seang (5 minutes)
- Pediatric epilepsy project – Dr. Derrick Chan (He already has a Myanmar mentee. However, for those who are interested in Paed project, I can ask him or other Paed Neurologist if they are interested to be mentor.)
- Group discussion (60 minutes)

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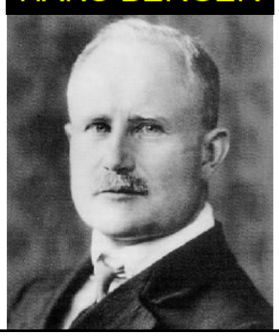
Golden era of digital EEG of much advanced utility has come, with research and clinical or social implementation.

ILAE-AO chapter meeting in 13th AOEC , Bali

2019-2029
"A decade of EEG & Epilepsy Education" in ILAE-AO forward to the centennial anniversary of the first human EEG reported in 1929 by Hans Berger

HANS BERGER



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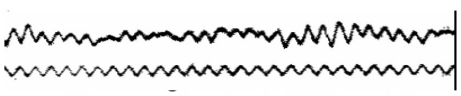

The upper tracing is EEG, and the lower is a 10 Hz timing signal

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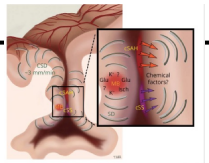
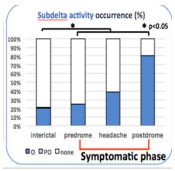
TC of 2sec scalp EEG could open the window for diagnosis, genenator mechanisms, and treatment in other neurological disorders other than epilepsy



1) ***Epilepsy***
Active DC shifts, red slow, AI analysis,

2) ***Migraine aura is similar to epileptic aura in semiology involving posterior hemisphere***
delta slow, subdelta slow (1Hz>)
(Hosokawa et al., clin Neurophysiol, 2024)



CSD

3) ***Cerebrovascular disease, Dementia***
transient focal neurological episode (***TFNEs***), infaslow activity (0.3Hz>)
Amyloid spell in cerebral amyloid angiopathy (***CAA)***

4) ***Critical care, Head trauma***
Burst suppression with SISA(short infraslow activity) (Tougo et al, 2022)
Moyamoya disease (Hayashi et al., 2024)

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Conclusion: Translational research on epilepsy in the AO region where and how

1) AO region has overcome gradually the proper problems of AO in last several decades, and thus now ready to expand into the research activity in general.

2) It may be easier to start from clinical research rather than basic research.

3) Seeds of basic research is further growing by the collaboration of other regions of ILAE and with other fields of neurology even in the AO.

4) Constant collaboration within and outside AO, with other filed of neurology such as migraine, demetia, amyloid angiopathy, stroke, head trauma, immunological diseases, etc.

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4) Constant collaboration within and outside AO, with other fields of neurology such as migraine, demetia, amyloid angiopathy, stroke, head trauma, immunological diseases, etc is a good chance.