

Interview with Dr. Daichi Sone (Japan), Winner, Michael Prize 2023, Psychiatry, Psychology and Neuropsychology

by Dr. Divyani Garg (India)

Congratulations on the Michael Prize, Daichi! How do you feel on receiving this honour from the ILAE?

First of all, I would like to express my strong gratitude to the Michael Foundation and the ILAE for this prestigious award.

One morning in February 2023, I woke up to find an email and it was a notification of the Michael Prize. I felt very incredulous and immediately showed it to my wife, but she had just woken up and didn't seem to understand much either. I then immediately emailed to my mentor, Prof. Matthias Koepp in London. He was incredibly pleased and that made me realize that I had finally won the prize. When I first moved to London in 2018, I stayed in a room in his house for a month. And I remember very well that I found his Michael Prize 2001 in that room. But at that time, I had no idea that I would win the same award.

It is not easy to describe how I feel now. Of course, I am very happy and very honored, but I also feel a strong responsibility to fulfill my work for the future development of epileptology. Also, my work has never been accomplished by me alone, but always by a team effort. In particular, as the Michael Prize is a most prestigious award in epileptology, I could never have achieved it without my work at UCL. I am especially grateful to Matthias, Prof. John Duncan, Dr. Marian Galovic and many colleagues in London and Japan. Marian was the first chair of ILAE-YES, and we worked at neighboring desks in Queen Square, so I feel very connected to him.

Apart from my own feelings, I believe that this award has two meanings. One is that a psychiatrist received it. As you know, psychiatry is a minority in epileptology.



The clinical importance of psychiatric comorbidity is constantly emphasized, but biological research is far from advanced. I am grateful for the recognition of our work in this area and hope that this field will develop further in the future. The other meaning is that this is the first time in the long history of this prize that a Japanese person has received it. There are many epileptologists in Japan who are engaged in daily clinical practice and research works. I also learned the basics of epileptology, psychiatry, EEG reading and neuroimaging research in Japan, and I feel that Japanese institutions and the Japan Epilepsy Society have nurtured me. I hope that this award will contribute to the further development of epileptology in Japan and Asia Oceania.

Tell us a little more about your background and your interests (unrelated to medicine!).

I was born in Japan in 1983 and grew up in Kobe until I entered the University of Tokyo, Faculty of Medicine at the age of 18. When I was a university student, I belonged to an alpine skiing club and spent about two months every year in the snow mountains. Outside of skiing, I enjoy traveling and have been to over 100 countries. In fact, both Matthias and Marian are also expert skiers and love to travel.

My career at UCL started with a ski trip to Zermatt, Switzerland in 2018. It is no exaggeration to say that skiing started my life at UCL smoothly and I am very thankful for skiing and my past coaches. I currently live in Tokyo with my wife and 7-year-old son, and I spend most private time playing with him.

How did you get interested in the field of epilepsy?

When I began my career as a psychiatrist at the University of Tokyo Hospital in 2010, I must admit that I did not know much about epilepsy. In Japan, psychiatrists have traditionally been treating epilepsy including seizure control, although neurologists are now quite involved in this field. At the time, I knew so little about epilepsy that I thought I would be in trouble in the future, so I applied for a short epilepsy residency at National Center of Neurology and Psychiatry. There I met my mentor on clinical epileptology, Dr. Masako Watanabe, and became struck by the profound fascination of epileptology. This was truly a turning point in my life. Later, in 2013, I attended the ILAE epilepsy course in San Servolo, where I met young epileptologists from all over the world, as well as Prof. Fernando Cendes and Prof. Christoph Helmstaedter, who were tutors of my group. This course further expanded my world of epileptology, and I am still friends with them to this day. After San Sevrvolò, I began my epilepsy imaging research with Prof. Hiroshi Matsuda and Dr. Noriko Sato, while working temporarily as a diagnostic neuroradiologist.

I feel that the appeal of epileptology lies in the fact that the prognosis of people with epilepsy can sometimes be dramatically improved by appropriate treatment using various testing and treatment modalities, and that through epileptology we can gain a deeper understanding of the pathology and function of the brain.

And of course, it is essential and extremely rewarding to develop new treatment and testing methods for cases where current treatments have limitations.

The psychiatric aspects of epilepsy often have a secondary place in management of epilepsy. Please can you tell us about your work on these aspects, and especially pertaining to your findings on the mu-opioid receptor system?

As noted above, psychiatry is a minority in epileptology, and research on the psychiatric aspects of epilepsy is far from advanced. However, what on earth separates psychiatry from neurology? Both should be treating the brain, as psychiatric disorders also occur in the brain. Therefore, I feel it is necessary to bridge the gap between neurology and psychiatry, and this is one of my important tasks on epilepsy and other neuropsychiatric disorders. In this regard, it is very meaningful that attention is being paid to the bidirectional relationship between epilepsy and psychiatric comorbidities. This is not simply based on the high prevalence of depression in epilepsy, but on the fact that psychiatric symptoms can precede the onset of epilepsy or influence the prognosis of seizure treatment.

Our study of the opioid receptor system focused on the bidirectional relationship between temporal lobe epilepsy and affective disorders. The opioid receptor system is involved in memory, learning, reward systems, emotion, and pain control, as well as epilepsy. It is known that opioid-like substances are transiently released around epileptic seizures, and it is assumed that people with epilepsy experience opioid release and withdrawal many times through their repeated seizures. We hypothesized that this phenomenon leads to opioid receptor desensitization and that the resulting dysfunction of the mu-opioid receptor system is responsible for the emotional disturbances in epilepsy.

As a result, we found a widespread reduction of mu-opioid receptor binding potentials in the bilateral frontal lobes and a correlation between binding potentials in the posterior cingulate gyrus and negative affect. However, we feel that the sample size is not yet sufficient and further research is needed.

An important contribution by your team has been on defining the optimum extent of surgical resection for better memory and seizure outcomes in temporal lobe epilepsy. Can you please summarize your main findings, for the benefit of our readers?

Postoperative memory decline in epilepsy surgery has been one of the most relevant topics for many years. Various predictors have been reported, but most factors, e.g., age or presurgical functions, are unchangeable. Therefore, we decided to investigate the extent of resection as a modifiable factor for the safe use of resection surgery, the most established treatment in refractory temporal lobe epilepsy. As a result, we found that resection of the posterior hippocampus and fusiform gyrus in left temporal lobe epilepsy affected postoperative verbal and visual memory impairment, respectively, and that resection of up to 55% from the head along the long axis of the hippocampus reduced postoperative memory impairment by a factor of eight. On the other hand, we also found that the piriform cortex resection, rather than posterior resection, was more important for seizure outcome. The importance of piriform cortex resection had already been demonstrated by Marian, but it was important to be able to prove it using a different method. Although we have achieved a certain level of success in our research, there is still a lot of work to be done to apply it to clinical practice.

I am also hopeful that doing so will lead to the ability to further tailor resective surgeries to the individual in order to achieve the best outcome.

Your work is inspiring for many of us young investigators working in the field of epilepsy in the Asia-Oceania region. Any ideas on how to take the work forward and how the YES AO-region can be a strong contributor to advancing the field?

I would be very happy if my work could be an inspiration to young investigators in the Asia-Oceania region. As mentioned above, some of my major work has been done in London, and North America and Europe remain the center of epilepsy research. While Melbourne undoubtedly has a world-class epilepsy research group, I still feel that there is room for improvement in our region. Compared to other regions such as Latin America and Europe, Asia-Oceania is far more diverse in terms of culture and language, which can be a bit challenging to bring together. However, I believe that we have great potential when we come together, and I believe that our large population and diversity can be a strength.

Thank you so much for your time! Any final advice for the young members of the AO region working in epilepsy?

What I want to emphasize is that you have to love what you do and take action. If you are not proud of what you are doing, it will be hard to accomplish great work. Also, youth doesn't last forever, so if you don't take action, time will just pass you by. And since you cannot do great work alone, you need to value and cooperate with the people around you and always respect them. Enjoy your early career in epileptology!