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MS Society awards first MS research prize

As a special highlight at this year's State of the Art Symposium on January 28, 2023, the Swiss Multiple Sclerosis Society awarded its first research prize. The prize is worth 100,000 francs and was awarded to Prof. Jens Kuhle and Prof. Tobias Derfuss.

The prize honours researchers who have made ground-breaking discoveries in the field of MS. The 2023 prize committee was unanimous: Prof. Jens Kuhle and Prof. Tobias Derfuss (both from the University Hospital Basel and members of the Scientific Advisory Board of the Swiss MS Society) stood out with their exceptional contributions to MS research and their great commitment to people affected by MS. With this research prize, which is being awarded for the first time this year, the Swiss MS Society is making another significant contribution to MS research.

Where does MS research currently stand?

The Swiss MS Society warmly congratulates Prof. Derfuss and Prof. Kuhle on the research prize. Thanks to researchers like them, those affected by MS can have hope that multiple sclerosis need no longer be a life-determining diagnosis in the future, and will have better and better treatment options.

We asked the two neurologists, who practise and research at the University Hospital of Basel, to talk to us.

Prof. Kuhle, Prof. Derfuss, congratulations on the research prize! Can you each briefly summarise your most important research focuses?

Prof. Jens Kuhle: Thank you very much for the prize! It is a great honour to be awarded this the first time it has been presented.

My working group has been coordinating the Swiss MS Cohort Study (SMSC) for ten years now in eight large hospitals in Switzerland. In the SMSC, more than 1,500 people with MS are followed up with every six or twelve months in a standardised way, and the data is recorded and monitored. This systematic and long-term recording of data is a very important tool that can help to provide a

better understanding and more efficient treatment of MS. We are also looking at biomarkers, which are changes that can be measured in the blood or cerebral fluid. They can make the progression of the disease and, for example, the response to different therapies more measurable. By establishing a particularly sensitive measurement method for degradation products of nerves in the blood, known as neurofilaments, we were able to make a decisive contribution to the development of this biomarker for use in the clinic.

Prof. Tobias Derfuss: I'd also like to say thank you for the prize.

My research focuses are the role of B cells in the development of MS and the search for autoantibodies and autoantigens. We want to understand how multiple sclerosis develops – what are the triggers, which antigen triggers the autoimmune responses? We've got some interesting results, and although they are not the ultimate solution to the mystery of MS, they do indicate that we are on the right track. Through long-term studies, we are also investigating how the immune system of MS patients changes during therapy and how this in turn can provide information about their response to treatment and also about the development of the disease. Jens primarily looks at soluble biomarkers in the cerebral fluid or blood, which are proteins that immune cells or cells in general produce in the body. We look at the cells themselves. Since Jens is in charge of the practical side of the cohort and provides us with the samples, we work closely together. If the samples weren't available, if the data wasn't standardised, I wouldn't be able to do my research.

What motivates you to be so dedicated to MS research?

Prof. Derfuss: For me, my passion was born during my studies, when I attended a lecture on multiple sclerosis. The professor spoke about the uneven spread of multiple sclerosis worldwide. I found that as interesting as it was mysterious. I wanted to find out what the causes were behind it.

Prof. Kuhle: On the one hand, I've been struck by the massive progress in the number of drugs available since I started working in the field of MS in early 2000. On the other hand, I find it almost shameful how helpless we are today when deciding who should start which therapy and when, or whether we can even stop medication again. It is quite possible that the disease activity of individual patients decreases by itself to such an extent that they become symptom-free, but we misinterpret this as a result of therapy. Moving forwards with that is my motivation.

These contrasting situations are also a constant concern for us at the MS Society and, of course, for all those affected. MS research is progressing steadily, yet the exact cause of multiple sclerosis is still not fully understood and a cure has not yet been found. What is it that makes it so difficult to find answers?

Prof. Derfuss: Multiple sclerosis is a very heterogeneous disease that likely has different triggers in individual patients and a widely varying make-up of causes. We know, for example, that genetics play a role, and that environmental factors also come into play. Smoking is a risk factor for MS, as is infection with the Epstein-Barr virus (EBV). This is probably why it's so difficult to find an exact cause – in the end, it's likely that there are multiple causes that trigger this autoimmune reaction rather than just one.

Do you have a sense or an estimate for how long it might take to find a cure for MS?

Prof. Derfuss: One question is whether the onset of the disease can be prevented. This depends on whether infection with EBV is a necessary trigger or not. If it is, then it's possible that vaccination against EBV could prevent multiple sclerosis. However, it will take decades of research to find out for sure and, if necessary, to develop a vaccine.

For cases where the onset of multiple sclerosis has already begun, it's possible that the person affected could be cured through early and efficient treatment. We know of some affected people who no longer show progression of the disease. MRIs, clinical symptoms and biomarkers remain stable for years. It may be that some of them were treated at a time when effective immune intervention was able to stop the disease early. I am confident that we will find that out soon.

Prof. Kuhle: As a third scenario, there are people affected by MS that have undergone many years of highly effective therapy. We see people who have stable MS symptoms over many years. However, we currently have no way of assessing with certainty whether this will remain the case and whether changing or interrupting ongoing treatment poses a reasonable risk. For this reason, we try to record all possible effects that MS has on the life of those affected – not just with precise clinical, neurological examinations in a consultation setting, but most recently by actively involving the patients themselves using smartphones and smartwatches. We also have information from MRI examinations with new procedures and identification of liquid biomarkers in the blood, which give us a glimpse behind the scenes so we can recognise effects as early as possible, before impairments arise. All this brings us closer to our goal of personalised treatment that is tailored as closely to the individual's needs as possible.

The Swiss MS Society's research prize has awarded you each CHF 50,000 to support your research efforts. How exactly do you plan to use these funds?

Prof. Kuhle: We'll invest the majority into research staff and research tools. This is the only way to ensure that research projects can advance in the future. The prize money also enables us to give projects a more secure foundation. With more funds, we can, for example, expand the Swiss MS Cohort Study in a modular way. We've already started systematically collecting blood cells from all participating patients so that Tobias and others can research them. This takes much more effort from our lab technicians than collecting and freezing the blood plasma. It's possible, for example, to pick out 'extreme phenotypes' from a cohort, i.e. people in whom the progression of the disease is particularly severe or benign. If individual patients differ in terms of cell properties or other biomarkers that we examine, this provides important clues about how the disease 'works'. While this sounds simple, it involves following a large number of people with MS over long periods of time and documenting their disease progression and biospecimens in a standardised and systematic way. At the end of the day, all of this takes staff, lab equipment and infrastructure. Without the ongoing, relevant financial support from the Swiss MS Society, the work we have achieved over the past few years would not have been possible.

If we dare to think about the future for a moment, what would you like to be able to tell people affected by MS about your research in five years' time?

Prof. Kuhle: I would like to be able to provide those affected by MS with increasingly reliable information so that we have a solid basis for joint decisions on optimal treatment. I believe that we can combine medicines and, in doing so, stop the slowly creeping deterioration in a higher

percentage of patients than previously. This is a very ambitious goal, but progress is realistic over the next few years.

Prof. Derfuss: In terms of my own research, it is certainly to define and identify autoantibodies and autoantigens so that we can better map the situation of individual people affected by MS. We want to find subgroups of people affected by the disease, which we can use to make more precise prognoses and informed treatment decisions. And we're well on our way to achieving this.

Prof. Kuhle and Prof. Derfuss: We would like to thank the Swiss Multiple Sclerosis Society not only for the special honour of receiving this research prize, but also for their incredibly valuable continued financial support for MS research in Switzerland. The current high standard of MS research would not have been possible without this support.

Thank you very much for talking to us.

About Prof. Tobias Derfuss

Prof. Tobias Derfuss is a clinical neurologist specialising in neuroimmunology. He completed his clinical training at the Clinic for Neurology at Klinikum Grosshadern in Munich. Since 2010, he has been Professor and Head of the Outpatient Clinic at the Clinic for Neurology and Research Group Leader at the Department of Biomedicine of the University Hospital Basel.

Alongside his clinical activities, he has been involved in a large number of clinical studies on new MS medication. In his experimental research at the Department of Biomedicine at the University of Basel, he examines the role of B lymphocytes and antibodies in MS and other neuroimmune diseases. He is also working on developing and using new biomarkers aimed at improving diagnosis, prognosis and treatment approaches.

About Prof. Jens Kuhle

Prof. Jens Kuhle completed his studies at Eberhard Karls University in Tübingen (DE) with a doctorate, and he specialises in neurology and neuroimmunology at the University Hospital Basel. Between 2012 and 2014 he conducted research at the Queen Mary University in London. In 2018, he was appointed Head of the Multiple Sclerosis Center at the University Hospital Basel. He is the Senior Physician at the neurological clinic and has been Professor of Neurology since 2019. He heads up the Swiss MS Cohort Study, a national clinical and academic network dedicated to researching biomarkers and outcomes in MS.

The research prize from the Swiss MS Society is awarded every two years to a researcher from a Swiss research institute or a Swiss clinic. Their work in basic or clinical research is considered to have achieved ground-breaking discoveries on the aetiology, pathophysiology, diagnosis or treatment of multiple sclerosis and thus to have made a significant contribution to helping people affected by MS. The prize money goes into the MS research projects conducted by the winner, who is selected by a team of experts appointed by the Medical-Scientific Advisory Board of the Swiss MS Society.

Support people affected by MS. Help to make it better for them.

Multiple sclerosis can affect anyone and progresses differently for everyone affected.

The Swiss Multiple Sclerosis Society has been supporting people affected by MS for over 60 years. You too can help us to give people with MS a better quality of life:

www.multiplesklerose.ch

Donation account: IBAN CH04 0900 0000 8000 8274 9

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