PRESS RELEASE

Understanding neuronal vestibular processing

Maximilian U. Friedrich is receiving the 2024 Jung Career Advancement Award for Medical Research for his research into the brain's sense of balance

Hamburg, 2nd May 2024. What do sound engineering, civilian service and a research stay in New York City have in common? They have all driven the career of Dr Maximilian U. Friedrich. The young neurologist is currently working as a clinician-scientist in Neurology and post-doctoral researcher at the Center for Brain Circuit Therapeutics at Brigham and Women's Hospital, and Research Fellow at Harvard Medical School. There, he is researching the brain circuits that play a key role in balance disorders, which are very common in neurological diseases such as stroke, multiple sclerosis and Parkinson's disease. He is particularly keen on gaining a better understanding of the vestibular system as a basis for the development of innovative therapeutic approaches for neurological diseases. For this research approach, he is receiving the 2024 Jung Career Advancement Award for Medical Research from the Hamburg-based Jung Foundation for Science and Research. The prize will support his scientific work on neuronal vestibular processing over the next three years with a total of €210,000, which Maximilian U. Friedrich is free to use as he sees fit.

The sense of balance enables humans to adapt to gravity, one of the fundamental laws of nature. This sense is controlled by the vestibular organ in the inner ear, which consists of three arch ducts and two otolithic organs. This organ records the movements of the head and body in all spatial directions. Signals from this system as well as visual stimuli are transmitted to the brain and constantly give us information about where and how we are in a space. Accordingly, disturbances in the sense of balance can drastically reduce our quality of life and even lead to an inability to work or, in the long

term, to depression and anxiety. These facts are well known, however, there are no effective therapies to date. One of the winners of this year's Jung Career Advancement Award is addressing this with his project – Dr Maximilian U. Friedrich is researching the 'Brain in Balance: Translational Neuroanatomy and Connectome-Based Network Analysis of the Vestibular System'.

Previously, Maximilian Friedrich has investigated, amongst other things, how and where signals concerning the sense of balance are processed further. The starting point was stroke-related injuries and electrical stimulation in the brain that impair the perception of balance. He also succeeded in developing a system based on artificial intelligence that can be used to analyse eye movement disorders that are characteristic of balance disorders, using conventional smartphones. The results are comparable to those of previous, costly special methods, with the result that the findings obtained by him could play a role in medical examinations directly at the patient's bedside in the future. The Jung Career Advancement Award now enables him to build on his previous research and further investigate the vestibular system in detail over the next three years. One of the aims of his planned work is to integrate state-of-the-art, high-resolution imaging techniques such as magnetic resonance imaging (MRI) with detailed anatomy slices in order to create an atlas of the neuronal vestibular network. This atlas is intended to help with the better understanding of stroke-related damage to vestibular networks. He is free to use the €210,000 that come with the Jung Career Advancement Award over a period of three years to achieve these goals.

In addition to Dr Maximilian U. Friedrich, this year's Jung Career Advancement Award is also going to cardiologist Dr Christine Maria Poch, who studies the human heart using model systems at the Clinic and Polyclinic for Internal Medicine I of the Klinikum rechts der Isar of the Technical University of Munich. Both will receive the full amount of funding.

A detour to the destination – the career trajectory of Dr Maximilian U. Friedrich

Maximilian U. Friedrich almost never ended up in medicine or science, as he originally planned to study German, philosophy and classical languages. However, before he could even start, he was called for civilian service. He decided to work as a nurse in a hospital – and set a completely new course for his professional life. ‘I just felt at home straight away. Because I often work in neuropsychiatry, I can still pursue my fascination with the “science of the mind” – only now from a different perspective,’ he says, summarising his decision. People could have seen earlier that his professional career would head in this direction, though: ‘In my youth, I was a hobby sound engineer. That naturally also meant I dealt with circuitry and signal processing – topics that are part of my job today.’

After starting his medical studies in Würzburg, it quickly became clear that he was particularly enthusiastic about neuropsychiatry subjects. His final decision for this specialist field was made as part of his subsequent rotation in neurology during his practical year, after being inspired by the artistry of his mentor. ‘He was able to solve the most complex neurological puzzles directly at the patient’s bedside, based only on a nuanced examination of eye movements and balance and almost without using any devices,’ explains Maximilian U. Friedrich. ‘This was the spark for what later became my speciality – disorders of balance, eye movements and motor skills.’

2024 Jung Career Advancement Award for fundamental research in neurology

Maximilian U. Friedrich has maintained his love of music to this day. ‘I really like German hip hop. And when I’m not busy with brain circuits, I’m a DJ using electric circuits to create music.’ On top of that, endurance sports and

outdoor adventures provide the perfect counterbalance to the stress of his everyday life. After all, this path is not easy for him. In keeping with his life motto of ‘per aspera ad astra’, he has achieved success with a great deal of initiative, authenticity, down-to-earthness and commitment – and is therefore all the more grateful for the support that the Jung Foundation is now giving him by awarding the Jung Career Advancement Award. ‘Starting on a career path as a clinician scientist is always difficult and depends heavily on external factors such as ideological and financial support,’ says Maximilian U. Friedrich, summing up the current situation, ‘Over the past few years, in addition to my clinical work, I have put my heart and soul into developing my scientific programme, setting up an integrated outpatient clinic for patients with complex balance disorders and gaining outstanding mentors – and I have also had to overcome resistance and setbacks. That’s why I can’t exaggerate the significance of this award from the Jung Foundation.’ He particularly appreciates the independence it brings: ‘The funding allows me to set up my own working group and thus realise my comprehensive clinical and scientific programme. I’m incredibly grateful for that.’

The Jung Foundation has been committed to the advancement of human medicine since 1975. With its awards and various scholarships, the foundation handles grants worth up to €650,000 each year.

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About the Jung Foundation for Science and Research
The Jung Foundation for Science and Research, based in Hamburg, Germany, annually provides up to three awards in recognition of fundamental and advanced research projects of significant clinical relevance. To date, the foundation has invested more than 15 million euros in supporting researchers whose projects build a bridge between research and the bedside. Under the motto of ‘Excellence in human medicine’, the foundation makes a significant contribution to the development of new treatment methods. The Jung Prize for Medicine, the Jung Gold Medal for Medicine and the Jung Career Advancement Award for Medical Research are among the most highly endowed medical prizes in Europe. With the

additional awarding of fellowships and German scholarships, the foundation provides a total funding of up to 650,000 euros annually.

Further information is available at www.jung-stiftung.de

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