

PRESS RELEASE

Gaining a better understanding of epilepsy and migraine: exploring possible treatment approaches

Achmed Mrestani receives the 2023 Jung Career Advancement Award for his research project on understanding the pathophysiology of neurological calcium channel defects

Hamburg, 4 May 2023. Epilepsy and migraine are some of the most common neurological disorders. “The two disorders show significant genetic overlap,” explains Achmed Mrestani, MD, physician in training at the Clinic and Polyclinic for Neurology at University of Leipzig Medical Center and a researcher at the Faculty of Medicine at the University of Leipzig. In part, they originate through a dysfunction of voltage-gated P/Q-type calcium channels caused by point mutations. But how does this affect the architecture of synapses? And what structural and functional changes occur as result of these point mutations? This is where Achmed Mrestani’s current research project comes in. He hopes that this will lead to new potential treatments that, in the best-case scenario, can intervene specifically in the molecular interactions within the active zone. To support this exciting work, the Jung Foundation for Science and Research is awarding Achmed Mrestani with the Jung Career Advancement Award, which is endowed with 210,000 euros. The financial support will be provided over the next three years and can be used as he sees fit to conduct his own research project. The Jung Career Advancement Award is specifically aimed at young researchers and is the only award offered by the Jung Foundation for Science and Research for which people can submit applications.

Point mutations in the *CACNA1A* gene can cause calcium channel defects that lead to dysfunction of the nervous system. The result: neurological disorders such as epilepsy or the rare familial hemiplegic migraine type 1 (FHM1). To gain a better understanding of the disorder and to develop

potential new approaches for specific treatments, Achmed Mrestani's research project aims to take a closer look at the influence of gene mutations on synaptic protein assembly and function. The focus is on three selected mutations: R192Q, which is associated with a relatively mild clinical phenotype very similar to conventional migraine, S218L, which frequently causes epileptic seizures as well as particularly severe and sometimes fatal cases, and T666M, which is of particular interest as the most common type of FHM1 mutation. "I introduce these human point mutations into voltage-gated calcium channels in the fruit fly (*Drosophila melanogaster*) model organism using CRISPR/Cas9 gene scissors. This gives me the opportunity to use different methods from high-resolution imaging and electrophysiology to ultimately study functional and structural changes caused by human point mutations."

Determined path to success: the career of Achmed Mrestani

Growing up with two parents with PhDs in chemical science, Achmed Mrestani was familiar with experimental laboratory work from an early age. "I never had any fear about getting involved with chemistry, physics or mathematics," says the father of two. "Ultimately, however, the biggest thing that got me into medicine was probably my own sense of curiosity. In scientific medicine, you are often looking at questions that no one else has ever worked on or answered before. Behind every project, there's an exciting surprise waiting to be discovered, which you can then be incredibly happy about after completing what is often very difficult work." This determination is also very evident in his career. After graduating from secondary school, Achmed Mrestani studied medicine at Martin Luther University Halle-Wittenberg from 2011 to 2018 and received a scholarship from the German Academic Scholarship Foundation from March 2012. In summer 2015, he already began working on his future doctoral thesis at the Institute of Physiology at the University of Würzburg. After graduating, he moved there full time and worked as a research assistant from 2018 to 2020 before receiving his PhD from the University of Würzburg in April 2021. He

also started his residency at the Clinic and Polyclinic for Neurology at University of Leipzig Medical Center in June 2020. Since July 2022, he has been funded by the Clinician Scientist programme at University of Leipzig Medical Center to conduct an independent research project as part of a cooperation between the Neurological Clinic and the Rudolf Schönheimer Institute of Biochemistry at the Faculty of Medicine.

2023 Jung Career Advancement Award enables Achmed Mrestani to combine clinical and research practices

As well as medicine, he loves his family and music. When he's not spending time with his partner or his two children, he can often be found practising with his cover band, which plays modern pop and rock songs. "The instrument I'm best at is the violin. But these days, I spend more time with my band, where I sing and play the guitar," he reveals. Receiving the Jung Career Advancement Award is a key milestone in his career – and in his life. "The great thing about scientific medicine is being able to work with patients and work on scientific problems at the same time. My goal is to combine both of these worlds and eventually to use the insights that I gain in the lab to create better treatments for patients." This is a vision that goes perfectly with the principles of the Jung Foundation. After all, the central idea of the Jung Foundation for Science and Research is to ease suffering through research. To this end, the Foundation has supported scientists who have made significant contributions to the advancement of human medicine with more than 15 million euros in prize money since its establishment. For Achmed Mrestani, the Jung Career Advancement Award represents a major step towards self-sufficiency: "The funding from the Jung Foundation for Science and Research allows me to take the first steps towards setting up my own working group, where I can shape and run scientific projects myself. This is essential in order to secure academic independence and to be able to pursue my long-term goals."

About the Jung Foundation for Science and Research

The Jung Foundation for Science and Research, based in Hamburg, Germany, honours basic and advanced research projects of particular clinical relevance with three annual awards. To date, the foundation has invested more than 15 million euros in supporting researchers whose projects build a bridge from research to the bedside. Under the motto “Award-winning Human Medicine”, the foundation thus makes a significant contribution to the development of new therapy methods. With a total of 540,000 euros, 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. Talented young doctors can apply directly for the Advancement Award; candidates for the other awards are nominated.

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

Press relations contact:

MuthKomm GmbH
Nele Luchsinger
Hopfensack 19
20457 Hamburg
Germany
Phone: 040 307070710
Email: nele.luchsinger@muthkomm.de