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Deuterium Makes Drugs Biochemically Stable - PhD Prize for Research Work at LIKAT

The Leibniz Association awarded this year's doctoral prize in the natural and technical sciences category to Dr. Sara Kopf, among others. The chemist had developed a deuteration process for aromatic substrates as a doctoral student at the Leibniz Institute for Catalysis Rostock, LIKAT. Dr. Maximilian Kotz from the Potsdam Institute for Climate Impact Research was awarded together with her in this category and Dr. Hana Attia from the Leibniz Institute of Global and Regional Studies in Hamburg for the Humanities and Social Sciences category. The three award winners were nominated along with seven other young researchers from a pool of around 800 applicants.

The award, which is endowed with 5,000 euros per category, was presented at a ceremony on the evening of November 27 as part of the annual conference of the Leibniz Association in Berlin. In his laudatory speech, Emeritus Prof. Dr. Sebastian Lentz, former Director of the Leibniz Institute for Regional Geography, Leipzig, emphasized the high hurdles for this doctoral prize. The selection process is very tough and being one of the nominees is an honor in itself.

Fig. 1Dr. Sara Kopf receives this year's Leibniz Association Doctoral Prize in the Natural and Technical Sciences category (Photo: David Ausserhofer/Leibniz Association)

Sara Kopf defended her dissertation with *summa cum laude* in 2022 after just two and a half years. She was supervised by Prof. Dr. Matthias Beller, Director of LIKAT at the time. Her publications have appeared in eight internationally renowned journals, such as CHEMICAL REVIEWS of the American Chemical Society. Due to the high significance of her research results, her papers also made the front pages of the journals on two occasions.

Sara Kopf's commitment as a spokesperson for all doctoral and postdoctoral students at LIKAT and as a talented communicator of scientific findings was also recognized. Among other things, she was active on the online platform ChemTwitter and organized a workshop on YouTube together with a colleague on the topic of her dissertation.

Delayed degradation of active ingredients

Deuteration processes help pharmaceuticals to be more effective by replacing hydrogen (H) atoms with the hydrogen isotope deuterium (D). This isotope exchange prevents the premature biochemical degradation of drugs. This is because the organism sometimes metabolizes the substances before they can fully develop their healing effect.

Chemically speaking, hydrogen and deuterium are similar. Deuterium only has a heavier atomic nucleus, which is why it reacts more slowly than hydrogen. It is precisely this "inertia" that stabilizes such a drug and delays its degradation. Deuteration processes therefore also help to reduce the dose and side effects of prescribed medication.

The first deuterated drug has been on the market since 2017 for the treatment of Huntington's disease. Since then, laboratories around the world have been researching it. In order to be able to use deuteration on a large scale, it is necessary to greatly simplify the chemical process. This was precisely the subject of the dissertation.

Dr. Sara Kopf now lives in Vienna and works as a medicinal chemist in research at Boehringer Ingelheim.

Fig. 2: This year's winners of the Leibniz Association Doctoral Prize together with President Martina Brockmeier (from left: Dr. Hana Attia, Prof. Dr. Martina Brockmeier, Dr. Sara Kopf and Dr. Maximilian Kotz. Photo: David Ausserhofer/Leibniz Association)

Contact

Dr. Martha Höhne

(Public Relations Office)

Martha.hoehne@catalysis.de