UNIVERSITÄT
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Faculty of Medicine

Department for BioMedical Research

Johanna Dürmüller-Bol DBMR Research Award 2024

The Johanna Dürmüller-Bol DBMR Research Award is a joint project of the Department for BioMedical Research DBMR and the Foundation Johanna Dürmüller-Bol. The award is intended to promote a younger researcher of the Faculty of Medicine, by supporting a promising research project with the aim of obtaining further funding through competitively acquired third-party funds.

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At DBMR Day for BioMedical Research on July 3 2024, Prof. Dr. Carsten Riether announced the awardee of the Johanna Dürmüller-Bol DBMR Research Award 2024.

The award went to:

Dr. Andrea Felser

Department of Pediatrics, Inselspital, Bern
University Hospital, University of Bern

For the project:

The role of mitochondrial energy metabolism in adrenal hyperandrogenism: mechanisms and clinical implications

The DBMR congratulates Dr. Felser and thanks the Foundation Johanna Dürmüller-Bol for their continuing support!

Lay Summary:

Androgens are steroid hormones that are essential for reproduction and sexual development. The adrenal gland is a major source of androgens, especially in children and women. Adrenal androgen excess can lead to polycystic ovary syndrome, a multisystem disorder with severe reproductive and metabolic perturbations. Although the enzymatic pathways leading to the formation of adrenal androgens have been elucidated, the mechanisms that drive hyperandrogenic disorders remain largely unknown and their possible links to energy metabolism are still poorly understood, making current treatment options scarce. Human adrenal androgen production and associated hyperandrogenism in children thus remains one of the least understood phenomena in endocrinology.

My preliminary data in an adrenal cell model suggest that specific defects in mitochondrial energy metabolism lead to adrenal hyperandrogenism. I propose that mitochondrial dysfunction plays a critical role in directing adrenal steroidogenesis toward androgen excess that needs to be further elucidated. I will use the established cell model to perform an in-depth analysis of steroid output, metabolic flux dependencies and transcriptional adaptations in order to identify key metabolic drivers involved in redirecting steroidogenesis towards androgen excess. In parallel, I will evaluate adrenocortical steroid profiles in children with primary mitochondrial disease to characterize the occurrence of adrenal hyperandrogenism in this patient cohort which is currently lacking and expect to identify children with hyperandrogenic steroidogenesis that have not been characterized so far.

The aim of this project is to provide new insights into a fundamental role of mitochondrial energy metabolism for adrenal hyperandrogenism *in vitro* and *in vivo*, to define specific metabolic vulnerabilities for future research on specific treatment options for hyperandrogenic diseases, and to establish the rationale for testing adrenocortical function in children with primary mitochondrial disease.