

# DBMR Research Conference

Date **September 6, 2021, 5 pm – 6 pm**

Title **A novel approach to defeat Alzheimer's disease: Empowering the immune system to mobilize monocyte-derived macrophages**

Speaker **Prof. Michal Schwartz, Department of Neurobiology, Weizmann Institute of Science, Rehovot, ISR**

**Bio:** Schwartz is Professor of Neuroimmunology at the Weizmann Institute of Science. She served as the president of the International Society of Neuroimmunology (2016-2018). Schwartz received her BSc, cum laude, from the Hebrew University, Jerusalem, and her PhD in Immunology from the Weizmann Institute. She is the world pioneer in breaking the long-held dogma regarding the relationships between the central nervous system and the immune system. She was the first to discover (1998) that blood-borne macrophages are needed for brain repair, and the unexpected fundamental role of the immune system in supporting life-long brain functional plasticity and neurogenesis. Deciphering the mechanism led her to propose that aging or exhaustion of the immune system plays a key role in perpetuating Alzheimer's disease (AD) and dementia, and to suggest a novel treatment for AD, which harnesses the immune system to help the brain. The treatment approach is under expedited development towards first-in-human trial, supported by an award from the Alzheimer's Association with the Gates Foundation. Her insights had significant impact, reflected in her publications in leading journals and high citation number (H factor 110, Google Scholar). Schwartz was twice granted an advanced ERC award, as well as receiving numerous prestigious national and international awards for her outstanding achievements, including the 2002 Friedenwald Award from ARVO, for outstanding contribution to vision research and the Distinguished G. Heiner Sell Memorial Lectureship in 2002 for outstanding achievement in the field of spinal cord injury. More recently Schwartz received the Blumberg Prize for Excellence in Medical Science (2015), and the 2017 Rappaport Prize for Excellence in the Field of Biomedical Research. She was chosen in 2019 as Outstanding Mentor of the Year by the Israeli Neuroscience Society; 15 of her former graduate students currently hold academic faculty positions in Israel, USA, Europe and Australia. In 2019 Schwartz received the EMET prize, one of the most prestigious Israeli awards for academic and professional achievement, and lately she was selected as the recipient of FENS EJM Award, 2022.

**Abstract:** Neurodegenerative diseases in general, and Alzheimer's disease (AD) in particular, are associated with multiple factors that contribute to disease escalation. Using immunological and immunogenomic tools, we described how aging of the immune system affects manifestation and progression of neurodegenerative diseases, which led us to envision that boosting the immune system might help supporting the brain. We found that one way to achieve this effect is by modestly reducing the restraints that are imposed on the immune system by the inhibitory immune checkpoint PD-1/PD-L1 pathway. Using this approach facilitated mobilization of bone-marrow-derived macrophages to the diseased brain in animal models of amyloidosis and tauopathy. Systemic blocking CCR2, the chemokine receptor for monocytes migration, abrogated the beneficial effect. Transcriptomic profile of the MDM, using single cell RNASeq revealed that they express molecules associated with anti-inflammatory activity, and scavenger receptors that can uniquely remove the intermediate toxic forms of misfolded proteins, dead cells, and cell debris, and thereby rescue synapses and brain function. We further found that the treatment was also effective in Trem2-deficient 5xFAD mice, which exhibited improvement of cognitive performance, reduced inflammation, and reduction of the amyloid beta oligomers, though not the plaques. Overall, our results indicate that targeting systemic and local immune cells rather than brain-specific disease-escalating factors provides a potential multi-dimensional disease-modifying therapeutic for AD and dementia, regardless of the primary disease etiology. We further demonstrate that recruitment of monocyte-derived macrophages is sufficient to modify the disease in the absence of Trem2 and activated microglia.

**Prof. Dr. Michal Schwartz has been invited by Prof. Dr. Eliane J. Müller  
Lead of the Stem Cell Research and Regenerative Medicine (SCRM) Platform Bern**

The DBMR Research Conference will take place as a webinar via Zoom.

For those wishing to attend, please use this link

<https://unibe-ch.zoom.us/j/65310607727?pwd=YmpndlE5MUJ4ejFvWnRMSDU4ZnlpZz09>

Meeting ID: 653 1060 7727

Passcode: 092054

or scan the QR code for the details



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**Next DBMR Research Conference**

**October 4, 2021**

**Prof. Dr. Anna Greka, Brigham and Women's Hospital, Boston MA, USA**

*Title «The arc of discovery: from genes to mechanisms to therapies for kidney diseases and beyond»*



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