

The power of innate and adaptive immunity in protecting the brain and the mind

Immune checkpoint blockade to combat Alzheimer's disease

Schwartz's research team is focused on the role of innate and adaptive immunity in central nervous system (CNS) plasticity, with implications to neurodegenerative diseases, aging, age-related dementia, and neurodevelopmental syndromes.

Currently, Schwartz's main research focus is how to use immune checkpoint blockade to harness innate and adaptive immunity to combat Alzheimer's disease (AD) and dementia. The Schwartz group has generated intellectual property that created the basis for a company developing the first immunotherapy for AD, a therapy that targets the immune system, and thereby activates a cascade of events that culminates in disease modification in the brain.

Schwartz's team was the first to discover that circulating immune cells, including macrophages and T cells, support CNS repair and healthy brain plasticity, manifested by cognitive ability, neurogenesis, and coping with mental stress ([Nature Medicine, 1998](#); [Nature Medicine, 1999](#); [Nature Neuroscience, 2006](#)). Schwartz's team has redefined the relationships between the brain and the immune system in health and disease. She coined the concept of “protective autoimmunity”, to describe the physiological immune response that protects the brain.

In an attempt to understand where and how the brain communicates with the immune system, she identified the brain's choroid plexus epithelium, which forms the blood-CSF-barrier, as the site through which immune cells can engage in a dialogue with the brain, and which serves as the gateway for leukocytes to patrol and repair the brain, as needed ([Immunity, 2013](#); [Brain, 2013](#); [Science, 2014](#); [Nature Communications, 2015](#)). These findings led her team to discover over the last 4 years, that brain aging and neurodegenerative diseases are associated with dysfunction of this interface ([Science, 2014](#); [J. Neuroscience, 2015](#); [Nature communication, 2015](#)), and that immunotherapy that unleashes the immune system from suppression can potentially combat Alzheimer's disease ([Nature Communications, 2015](#); [Nature Medicine, 2016](#); [Science, 2017](#)).

Schwartz's H index is 103 (Google Scholar). She has received numerous awards for her research, including the 2002 Friedenwald Award from ARVO (Association for Research in Vision and Ophthalmology), for her outstanding contribution to vision research and

ophthalmology. She was appointed by the American Spinal Cord Injury Association to the Distinguished G. Heiner Sell Memorial Lectureship in 2002 for outstanding achievement in the field of spinal cord injury. She was one of the recipients of the NARSAD (The Mental Health Research Association) Distinguished Investigative Award (2007), she was twice granted Advanced European Research Commission awards (2008, 2017), received an honorary doctorate from Ben-Gurion University (2009), and a National Brain research award for her pioneering work (2009). In 2015, Schwartz was awarded the Blumberg Prize for excellence in medical science. In 2016, her book: “NEUROIMMUNITY: How Brain Science Will Revolutionize the Way We Live and Age”, by MICHAL SCHWARTZ with Anat London, Yale University Press (<https://proseawards.com/winners/>), received an Accolade from the annual PROSE Awards. Recently, Schwartz was profiled in the Britannica Book of the year 2016, covering selected individuals and events that impacted the course of human history. In 2017, Schwartz received the Rappaport Prize for Excellence in the Field of Biomedical Research (awarded to an established Israeli biomedical researcher). She has mentored numerous graduate students, among whom 13 hold academic positions in universities and institutes in Israel and abroad. In 2017 she was selected as the most influential women of the year, by Lady Globes. Most recently, Schwartz was nominated as the 2019 outstanding mentor by the Israel Society of Neuroscience.