

## THE ANGEL AND THE ASSASSIN

The Tiny Brain Cell That Changed the Course of Medicine

By Donna Jackson Nakazawa

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*The Angel and the Assassin* is a scientific odyssey of recent discoveries about a tiny cell, called microglia, with an outsized mission, to govern brain health; the research pioneers at the helm (Beth Stevens, Li-Huei Tsai, et al.); and stoic patients. With prodigious scholarship and clear, compassionate writing, author and science journalist Donna Jackson Nakazawa traces the decade's findings: The brain is not immune-privileged, as believed, but an immune organ. Microglia are immune cells, functioning as the brain's white blood cells. In homeostasis, microglia are alert protectors that sweep away dead cells and prune synapses—the "angel" of the book title. When relentlessly triggered, microglia can lose their supple attunement and go rogue; hence, the "assassin" of the title. Triggers may be any inflammatory stressor—injury, infection, environmental toxin, early adverse experiences—and notably, maladaptive, such as perceived emotional threats that can trigger the stress immune response (think fight/flight/freeze) from social media shaming. Overzealous microglia can, when overwhelmed, engorge on synapses and spew an inflammatory cocktail that can cause neuroinflammation and neurological disease. Think circuitry disorder, not chemical imbalance; synaptic babble, not serotonin deficiency. Errant microglia are implicated in many conditions that are neuroinflammatory (Alzheimer's), neurodegenerative (Parkinson's), and neurodevelopmental (mood disorders) (63). Offering a lifeline, Nakazawa describes several promising potential therapies, such as fasting-mimicking diets (ProLon FMD) and hallucinogenics (ketamine). Neuroengineering tools ("brain hacks") couple brain maps of how well regions of the brain fire (qEEG, quantitative electroencephalogram) with neurofeedback that entrains and modulates brain waves (TMS, transcranial magnetic stimulation). On the research horizon are techniques to diagnose overreactive microglia at onset and to customize targeted treatments. In Nakazawa's able hands, the landscape is precise and the shore is within view. —Lisa Thaler, author of *Look Up: The Life and Art of Sacha Kolin*, 8 February 2020