



## **Mark P. Mattson, PhD (NIA, Baltimore, MD, USA)**

### **“How fasting and exercise are good for your brain”**

The Challenge of Maintaining Brain Function Throughout the Lifespan

Balancing a relatively balanced diet, Mark Mattson displays the daily fare he's typically eaten since 1983: whole wheat pita, steamed vegetables, oatmeal with skim milk and raisins, walnuts, and an apple. Occasional helpings of fish, yogurt, fruit, and vegetarian restaurant entrées round out his weekly menu, which averages around 2,200 calories a day. A researcher at the National Institute on Aging, Mattson is following up on rodent studies that suggest that smaller and fewer meals can lower blood pressure and heart rate and improve blood sugar regulation, which may reduce the risk of cardiovascular disease, diabetes, and possibly some age-related diseases. As for him? "I feel good on this diet," says Mattson, who is five feet nine inches (175 centimeters) and weighs in at 125 pounds (55 kilograms).

**Research Overview:** Mark Mattson employs an array of experimental models of aging and age-related neurodegenerative disorders. His aim is to establish the molecular and biochemical changes that occur during aging and in disorders such as Alzheimer's, Parkinson's, Huntington's diseases and stroke. To arrive at conclusions as to why neuronal dysfunction and degeneration occur in these disorders Mark integrates data from his experimental models with data obtained in studies of both normal elderly humans and patients with neurodegenerative disorders. Another area of Marks focus is the understanding of adaptive cellular stress responses in neurons, and how they can be activated in order to protect the brain against injury and disease.

Successful brain ageing is determined in part by genetic background, but also by experiential factors associated with lifestyle and culture. Dietary, behavioral and pharmacological interventions have been identified as potential means to slow brain aging and prevent neurodegenerative disease. Many of these interventions recruit adaptive cellular stress responses to strengthen neuronal networks and enhance plasticity. Discoveries made in animal models in Marks laboratory are being translated into preclinical studies and clinical trials in human subjects.

Specifically in Marks talk, he will describe several determinants of healthy and pathological brain aging, giving insights into how these processes are accelerated or prevented. He will also describe the mechanisms underlying the neuroprotective actions of for example exercise and nutritional interventions, with the goal of recruiting these adaptive cellular stress responses for successful brain aging and identify molecular targets for the treatment and prevention of neurodegenerative disease.