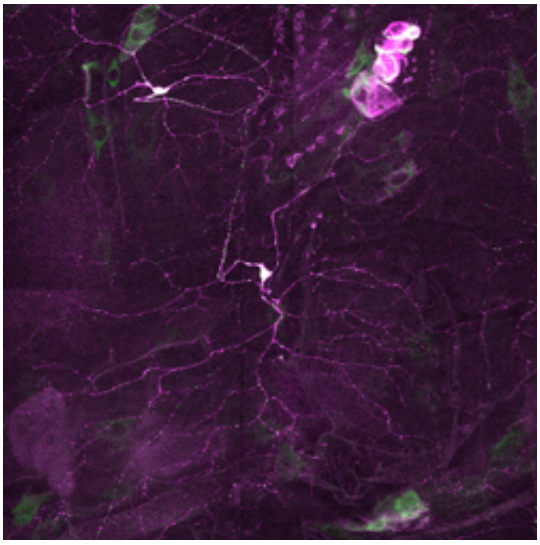
Researchers study aging's effect on the brain

October 10 2011



A Drosophila dendrite field in the body wall of the larvae, showing mitochondria - one possible source of oxidative stress - in green. Image, M.Oswald and S. Sweeney

(Medical Xpress) -- Research by biologists at the University of York and Hull York Medical School has revealed important new information about the way the brain is affected by age.

Working with scientists at the Peninsula College of Medicine and Dentistry in Plymouth, they have studied responses to stress in synapses -- neuronal connections.

The researchers discovered that under stressful conditions, such as neuro-

degeneration, resulting high energy forms of damaging oxygen cause synapses to grow excessively, potentially contributing to dysfunction.

Such stresses occur during neurodegenerative disease such as Alzheimer's and Parkinson's Disease.

The research, which was funded by the Medical Research Council and the Biotechnology and Biological Sciences Research Council, is published in the latest issue of the Proceedings of the National Academy of Sciences (*PNAS*).

Laboratory modelling was carried out using *Drosophila*, but similar pathways are present in humans. The scientists studied the responses using a model of lysosomal storage disease, an inherited incurable childhood neurodegeneration where enlarged synapses have been observed, but the role that growth has in disease progression and brain function is not yet clear.

Co-author Dr Sean Sweeney, of the Department of Biology at the University of York, said: "The findings have strong implications for neuronal function as brains age, and will add significantly to our understanding of neurodegenerative disease such as Alzheimer's and Parkinson's disease."

Co-author Dr Iain Robinson, of the Peninsula College of Medicine and Dentistry, added: "Neuronal contacts in the brain are constantly changing. These changes in the brain enable us to form short term memories such as where we parked the car, or longer term memories, such as what is our pin number for the cash point machine. Our work sheds light on how our brain becomes less able to make these changes in neuronal contacts as we age and helps explain the loss of neuronal contacts seen in several neurodegenerative diseases."