

Paul E. Gold, Ph.D.

University of Illinois at Urbana-Champaign
Champaign, Illinois

Glucose, K-ATP Channels and Memory in Mouse Models of Alzheimer's Disease and Down Syndrome

2009 Investigator-Initiated Research Grant

Glucose is a sugar used throughout the body as an energy source, and it is especially important for the brain to have a constant supply of glucose. Indeed, several lines of evidence suggest that memory in elderly persons is impaired when brain glucose levels fall below normal. There is also evidence that brain glucose levels may fall below normal in persons with Alzheimer's disease or Down syndrome.

Paul E. Gold, Ph.D. and colleagues have been studying the role of brain glucose levels in memory performance. They have found evidence that maintaining adequate brain glucose levels can improve memory performance in persons with Alzheimer's disease or Down syndrome. They have proposed to study the role of brain glucose in memory performance, and some of the molecular mechanisms that may be responsible for these effects.

Dr. Gold and colleagues plan to study how memory training in mice causes depletion of glucose in a region of the brain called the hippocampus, which is known to be important for some forms of memory. They also plan to study the role of an ion channel found in nerve cells of the brain. This ion channel, known as the K-ATP channel, changes the activity of nerve cells in response to changing glucose levels. The researchers plan to study whether drugs that mimic the effect of glucose on the K-ATP channel can enhance memory performance in mice. Dr. Gold's team will also study the role of a chemical normally found in the brain that binds to the K-ATP channel. This chemical, alpha-endosulfine, is often reduced in the brains of persons with Alzheimer's disease or Down syndrome. Thus, it is a possible target for the development of drugs to improve memory performance in persons with either of these conditions. These studies may help to identify and characterize a new target for drugs intended to improve memory performance in persons with Alzheimer's disease or Down syndrome.