

**Meike Willemijn Vernooij, M.D.**

Erasmus MC

Rotterdam, The Netherlands

## Microstructural White Matter Changes and Risk of Cognitive Decline

2009 New Investigator Research Grant

Regions of the brain are often referred to as white matter or grey matter. Grey matter regions contain the cell bodies of nerve cells, whereas white matter regions contain the processes of these cells. White matter regions also contain specialized structures through which brain cells send signals to each other, known as synapses. Thus, the proper structure and function of white matter regions are crucial for brain function.

Brain imaging studies using magnetic resonance imaging (MRI) have shown that areas of white matter become damaged during the progression of Alzheimer's disease, and evidence suggests that such damage may explain some of the cognitive decline that accompanies the disease. Meike Willemijn Vernooij, M.D. and colleagues are planning to conduct more extensive and high-resolution studies of brain white matter in an effort to understand how white matter damage is associated with cognitive decline. The researchers will use a variation of MRI known as diffusion tensor imaging (DTI), which is able to detect structural changes in white matter occurring at the microscopic level.

Dr. Vernooij and colleagues plan to study nearly 900 individuals who are already part of a brain imaging study. These healthy individuals had DTI imaging 3 to 4 years ago, and the researchers plan to perform another round of imaging to detect any structural changes in brain white matter. The researchers will then analyze what risk factors are associated with structural changes in brain white matter, and whether such changes are associated with declines in cognitive function. These studies will improve our understanding of the causes and consequences of white matter changes occurring in the brain during aging.