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Impact of APOE on Cerebral Perfusion and BOLD Response to Word Retrieval

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An important goal of Alzheimer research is to develop ways to detect the disease at its earliest stages. It is known that disease onset occurs several years before it can be diagnosed, but it has been challenging to identify diagnostic criteria that reliably detect disease at this early stage. Specialized methods of brain imaging may hold the promise of detecting changes in brain function before more obvious changes in brain structure can be detected. One such method that is being investigated is known as functional magnetic resonance imaging (fMRI), which is used to measure blood oxygen level-dependent (BOLD) responses in the brain when the person is given a cognitive task, such as word recall.

Christina Wierenga, Ph.D. and colleagues are studying the best ways to measure BOLD responses in persons with suspected Alzheimer's disease. They have observed that the scanning signal may not accurately reflect brain activity because of complications resulting from variations in blood flow. Such variations in blood flow are common in older individuals, especially those who carry a genetic variant of the ApoE gene, which puts them at high risk for Alzheimer's disease.

Dr. Wierenga and colleagues have developed a procedure to correct the BOLD signal so that it accurately reflects brain activity. They plan to test this method in a group of healthy, older adults who are carriers of the high-risk variant of the ApoE gene. This study will advance methods for detecting early signs of Alzheimer's disease, possibly providing opportunities for earlier, more effective treatment.