

## **Transcranial infrared laser stimulation in mild cognitive impairment**

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Recent neuroimaging studies indicate that chronic brain hypoperfusion (CBH) in the posterior cingulate cortex, precuneus and temporoparietal cortex is present long before dyscognitive clinical symptoms, amyloid-beta accumulation and cortical atrophy appear in Alzheimer's disease (AD). Studies have indicated these and other hypometabolic regions participate very early in the pathophysiology of AD and may trigger functional connectivity disruption seen in this dementia. Consistent with the data of diminished cerebral perfusion and hypometabolism are parallel findings of progressive cognitive impairment prior to AD. If CBH is a key element in the development of AD, then interventions that prevent or delay neuronal hypometabolism may be a therapeutic target in patients at high risk of AD, such as patients with mild cognitive impairment (MCI). Transcranial infrared laser stimulation (TILS) offers a non-invasive approach to raise neurometabolic energy levels that can improve cerebral hemodynamics and cognitive function in humans. TILS may work by increasing brain cytochrome-c-oxidase to boost brain cell mitochondrial ATP production and neuronal energy capacity. Preliminary studies in normal adult human volunteers in our department have reported that using TILS aimed at the prefrontal cortex significantly improved memory tasks compared to a placebo group. We will shortly begin a randomized preliminary study on MCI patients and controls to determine TILS efficacy, safety and ability to stabilize or improve cognitive function.