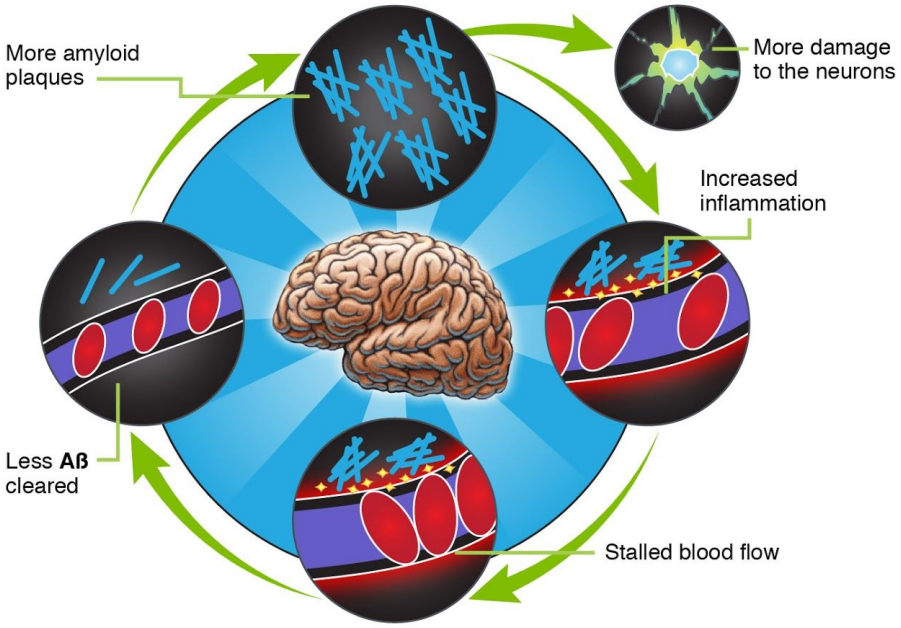
Background:

Despite the fact that Alzheimer's disease (AD) is being studied by scientists around the globe, no clear-cut cause or cure for the disease exists. One aspect of AD, known since its discovery, has been reduced blood flow in the brain. (This 30% reduction is equivalent to a headrush experienced when standing up too quickly.) Until recently, nobody knew why this blood reduction existed or how to prevent it.

New tools and techniques developed by the Schaffer-Nishimura Lab at Cornell University have enabled researchers to observe blood flow in the smallest blood vessels (capillaries) in the brains of live mice. They discovered that "stalls" – clogged capillaries in the brain – may be largely responsible for this blood reduction in AD. About 2% of capillaries can be stalled at any one time in the brain of AD-affected mice. Releasing these stalls reduces some of the AD symptoms, including memory loss and mood changes.

Stall Catchers enables us to look for the reasons behind stalls in the brains of mice, and test drugs that could prevent AD and/or reduce disease symptoms at a much faster rate than in the lab. See this 90 sec video explaining how Stall Catchers helps find a cure for Alzheimer's.



One of the hypotheses being explored via Stall Catchers is the link between stalls and amyloid plaques in Alzheimer's. These plaques are one of the likely culprits of characteristic AD symptoms. They form due to accumulation of amyloid beta protein (A β). Stalls could lead to bad circulation and poor clearance of A β in the brain and, in turn, accumulation of neurotoxic amyloid plaques.

Amyloid plaques also induce local inflammation, which attracts leukocytes (white blood cells) and encourages them to stick firmly to capillary walls. Such leukocyte "plugs" are responsible for the majority of stalls in AD-affected mice. In this way, stalls and amyloid plaques may be involved in a positive feedback loop driving progression of AD. By intercepting this harmful cascade early, AD could be prevented or treated.

Science Info
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Quick facts:

- Stall Catchers participants help analyze movies of blood vessels in live mouse brains
- Catchers search for “stalls” – clogged capillaries where blood is no longer flowing
- Vessel movies are generated from state-of-the-art two-photon microscope images
- Stalls have been demonstrated to occur in up to 2% of capillaries in AD-affected mice
- Stalls could be linked to ~30% reduced blood flow in the brain in AD patients
- Reversing stalls reduces AD symptoms in mice, including memory loss and mood changes
- One the ways stalls could drive AD is by reducing clearance of amyloid beta protein (Aβ) leading to accumulation of neurotoxic amyloid plaques
- Understanding the molecular mechanisms that drive stalls will help identify drugs that prevent or disrupt them without harming the organism
- Stall Catchers helps us look for the reasons behind stalls in the brains of mice, and test drugs that could prevent AD and/or reduce disease symptoms, at a much faster rate than in the lab
- Through Stall Catchers, we can test drugs that are already being used to treat other diseases, some of which could effectively reduce stalls, potentially enabling off-label use to treat Alzheimer’s
- With the help of citizen scientists, we could reduce the time to discover Alzheimer’s treatment targets from decades to just a few years