

## SOS – Save Our Seniors – From Heart to Brain

Seniors are an important segment of Arizona’s population and economy. It is fitting therefore that Science Foundation Arizona has awarded \$680,000 to a group of researchers who are investigating the relationship between atherosclerosis (commonly referred to as “hardening of the arteries”) and Alzheimer’s disease. The group is headed by Dr. Tom Beach and includes Drs. Alex Roher, Douglas Walker and Lih-Fen Lue, all at Sun Health Research Institute in Sun City. This critical investment is focused on giving the team much-



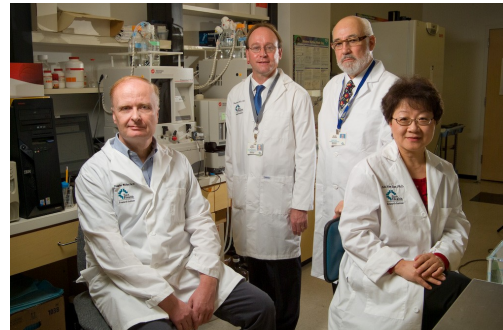
**Above:** Brain arteries from Alzheimer’s patients (lower ) show more plugging from atherosclerosis than those of normal older people (upper half).

needed support for their bid to secure a five-year National Institutes of Health Program Project grant. The research involves the more than 800 Arizona seniors who have volunteered for the Institute’s **Brain and Body Donation Program** and agree to the imaging of their hearts and arteries and tests of their mental abilities. Autopsies done on deceased donors will reveal the circulatory system in even more explicit detail. The goal of the work is to discover new preventative or curative therapies.

Earlier research indicates that Alzheimer’s patients have more atherosclerosis of their brain arteries. As atherosclerosis causes plugging of blood vessels, it is obvious that this cannot be good for seniors’ thinking abilities. Beyond this simple plugging effect it also appears that atherosclerosis accelerates the Alzheimer’s process at a molecular level.

**Below:** The research team consisting of Drs. Tom Beach, Alex Roher, Douglas Walker and Lih-Fen Lue

Dr. Roher’s work uses ultrasound to examine the hearts of living seniors with and without Alzheimers. Atherosclerosis damages the heart, affecting its ability to supply blood to the brain. The connection between Alzheimers and atherosclerosis suggests that drugs now used to lower cholesterol and blood pressure may also help prevent Alzheimer’s disease. If treatment could be extended to all those who should receive it, heart disease, stroke and Alzheimer’s might be prevented in many more seniors.



Drs. Walker and Lue take living brain blood vessel cells from donor’s brains after death and recreate functional blood vessels in a culture dish. Their work has thus far shown that Alzheimer’s blood vessel cells lack the ability to regenerate in response to injury or remodel in response to metabolic demands, and that the interface between blood and brain, so important to maintaining normal brain function, may be impaired in Alzheimers patients due to inflammation.

Dr. Beach is further using a rabbit model of atherosclerosis, in which rabbits are fed a high cholesterol diet, to test his hypothesis that atherosclerosis results in brain accumulation of a toxic molecule called amyloid beta. Brain deposition of this molecule as “senile plaques” is widely considered to be the ultimate cause of Alzheimers, but nobody really knows why it accumulates. As the brain normally gets rid of amyloid beta by dumping it into the bloodstream, it is possible that blood vessels adversely affected by atherosclerosis may be obstructing this.

Clearly this research in partnership with Science Foundation Arizona is important to discovering breakthroughs for Alzheimers and ways in which our golden years can indeed stay golden.