Researchers at the University of South Florida have developed an enhanced drug delivery system for the treatment of neurodegenerative diseases as well as cancer. Alzheimer’s disease is one of the most common causes of dementia in the elderly. Treating Alzheimer’s disease is difficult because of an obstacle known as the blood-brain barrier (BBB). The purpose of the BBB is to protect the brain from toxins, but it also blocks certain drugs from entering the brain which otherwise could treat neural diseases. Researchers are beginning to use nanoparticles to enhance drug delivery to the brain, as well as to decrease the toxic side-effects of drugs. It is possible to create nanoparticle capsules that carry drugs across the BBB which otherwise would be blocked from entering the brain. One drug, called MKT-077, is a promising candidate for the treatment of Alzheimer’s disease. However, its entry into the brain is limited by the BBB, and animal studies show that it is toxic to the kidneys.

USF researchers have developed a nanoparticle-drug system that is capable of delivering higher amounts of MKT-077 to the brain to treat Alzheimer’s disease. The system can be thought of as many tiny pills, made of non-toxic, biodegradable polymers that hold the MKT-077 drug. Putting the drug in this nanoparticle lowers the toxic effects of the drug on the body, and it allows the drug to pass over the BBB to reach the brain. This MKT-077 loaded polymer nanoparticle presents a novel method to treat Alzheimer’s Disease, as well as other neurodegenerative diseases. It may also be effective in the treatment of certain cancers, including melanoma and cancer in the colon, breast, and pancreas.