Washington University in St. Louis
Office of Technology Management

MULTIFUNCTIONAL CHEMICAL AGENTS FOR METAL CHELATION, POSITRON EMISSION TOMOGRAPHY (PET) IMAGING, FLUORESCENCE IMAGING, AND AMYLOID PLAQUE CLEARANCE IN ALZHEIMERÂ€™S DISEASE

Mirica, Liviu, Schultz, Jason, Sharma, Anuj

Poranki, Deepika

T-013190

Alzheimer's disease (AD) is characterized by the deposition of amyloid plaques containing the amyloid beta (Aβ) peptide. Currently, no treatment is available for AD. Metal ion interactions of the Aβ peptide are believed to help formation of toxic aggregates. Developing chemical compounds that will take care of Aβ aggregation and control abnormal metal interaction are therefore highly demanded. To this end, several multi-functional compounds have been developed in our laboratory and tested for the following major applications:

Aβ plaques and metal binding: Our compounds have strong affinities for Aβ peptides aggregates and metal ions, as demonstrated in our laboratory. To the best of our knowledge, there is no other report for such a high affinity ligad for both the plaques and metal ions. Compounds reduce the amyloid plaque formation and can be used as therapeutic agents for AD. Fluorescence imaging of Aβ plaques: The compounds are highly fluorescent and can be used in imaging applications in vitro. We have used these compounds to image synthetic Aβ plaques and
also in the brain slices of Tg2576 APP transgenic mice. Positron emission tomography (PET) imaging: Some of the developed compounds bind very strongly copper ions and can thus be used in the synthesis of 64Cu PET imaging agents for the detection of Aβ plaques in humans. Overall, these compounds have various potential applications as therapeutic or diagnostic agents for Alzheimer's disease.