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SULFUR-CONTAINING COMPOUNDS TARGETING ON VESICULAR ACETYLCHOLINE TRANSPORTER FOR COGNITIVE FUNCTION

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Background: Dementia caused by Alzheimer's disease, Parkinson's disease, and other neurodegenerative diseases manifests as a progressive decline in memory and other cognitive abilities. Deposits of beta-amyloid plaques and tangles of the tau protein are thought to cause the destruction of nerve cells in Alzheimer's disease. For Parkinson's disease, the alpha-synuclein protein forms deposits which decreases neuron function and eventually leads to brain damage. Due to the diversity of causative agents, diagnostic tools that can effectively detect and monitor neurodegeneration are needed in order to diagnose neurodegenerative diseases in their early stages such that patient outcomes can be enhanced. The extent to which cholinergic neurons in the central nervous system are lost is linked to the severity of dementia and could be utilized as a diagnostic tool to monitor the progression of neurodegenerative diseases.

Technology Description: Researchers at Washington University have developed and validated novel F-18 PET tracer analogs for imaging vesicular acetylcholine transport (VAChT). The sulfur containing compounds had high specificity for VAChT during *in vivo* imaging studies of rodents and non-human primates in addition to high uptake, improved clearance kinetics, and clear visualization of the brain structure. Additionally, some of the compounds have high affinity for sigma receptors, which provides the potential for use as therapeutics or imaging tracers targeting sigma receptors. These data suggest that utilizing the PET tracers could provide a novel methodology to assess cognitive dysfunction.