CO-ADMINISTRATION OF A MULTI-DRUG EFFLUX TRANSPORTER INHIBITOR INCREASES EFFICACY OF DRUGS USED TO TREAT NEURODEGENERATIVE DISEASES

Invention Description:
The invention is the co-administration of a multidrug efflux transporter inhibitor with a pharmaceutical compound to improve treatment efficacy for Amyotrophic lateral sclerosis (ALS). A common challenge in the treatment of neurodegenerative disorders like ALS is the resistance and limited bioavailability of drugs in the Central Nervous System (CNS). Pharmacoresistance increases with the progression of ALS, causing a further reduction of drug penetrance into the CNS. By administering an ABC-drug efflux transporter inhibitor concurrently with a pharmaceutical agent used to treat ALS, the inventors collected animal data that show increased concentrations of the pharmaceutical in the CNS, enhanced motor performance, and increased lifespan of the animal model of ALS. These results suggest that this invention could reduce pharmacoresistance in ALS patients, thereby significantly improving the efficacy of pharmaceutical agents used to treat ALS, delaying disease progression, and improving symptoms such as motor function. The invention is significant because it shows that co-administration of a multi-drug efflux transporter inhibitor increases the bioavailability and efficacy of a drug used to treat neurodegenerative diseases, findings that could have broader application to improving pharmacoresistance in ALS and other neurodegenerative diseases.

ALS, also known as Lou Gehrig’s disease, is a progressively debilitating and fatal neurodegenerative disease that kills 100,000 people yearly. Symptoms include muscle weakness, atrophy and spasticity, and difficulty speaking, swallowing and breathing. The precise cause of ALS is unknown. Once diagnosed with ALS, the lifespan of an individual is approximately 2-5 years. Only one drug is approved for the treatment of ALS and its effectiveness is limited to extending patients’ survival by a few months. One possible reason for the poor efficacy of this drug is a progressive decrease in CNS penetration and bioavailability as ALS symptoms worsen.

Competitive Advantage:
The invention represents a new approach to the treatment of ALS and has the potential to further delay disease progression and improve symptoms such as motor function, over current therapy. The currently available treatment prolongs life of ALS patients by 3 to 6 months. There is a desperate need for better treatments for ALS. While the initial application of this invention is to increase the bioavailability and efficacy of known and unknown treatments for ALS, the real competitive differentiator is the ‘know-how’ behind this technology and the opportunity to improve outcomes in other neurodegenerative diseases involving alterations in multi-drug efflux transporters. Knowing how to target these transporters, combined with the technology, provides a platform that can extend to the treatment of neurodegenerative disorders and potentially other diseases where pharmacoresistance is a problem.

Key Publications: In process
Intellectual Property: Patent application is pending
Business Opportunity: Industry-Academic collaboration
Contact: Michael Caggiano, Office of Technology Transfer and Business Development, Thomas Jefferson University, 1-215-955-6862; Michael.caggiano@jefferson.edu. Refer to Docket Number TRO_DAV.001.