Researchers at the University of South Florida have developed an ionic co-crystal of lithium for the treatment of Alzheimer’s disease.

Lithium salts have a long history of human consumption beginning in the 1800s. In psychiatry, they have been used to treat mania and as a prophylactic for depression since the mid-20th century. Today, lithium salts are used as a mood stabilizer for the treatment of bipolar disorder, as well as for other psychiatric indications off-label. Despite these effective medicinal uses, current FDA-approved lithium pharmaceutics (lithium carbonate and lithium citrate) are plagued with a narrow therapeutic window that requires regular blood monitoring of plasma lithium levels and blood chemistry by a clinician to mitigate adverse events. Because conventional lithium salts (carbonate and citrate) are eliminated relatively quickly, multiple administrations throughout the day are required to safely reach therapeutic plasma concentrations.

Recent evidence suggests that lithium may be efficacious for both the treatment and prevention of Alzheimer’s disease (AD). Unlike traditional medications which only address a single therapeutic target, lithium appears to be neuroprotective through several modes of action. For example, it exerts neuroprotective effects, in part, by increasing brain-derived neurotrophic factor leading to restoration of learning and memory. Another neuroprotective mechanism of lithium is attenuation of the production of inflammatory cytokines like IL-6 and nitric oxide (NO) in activated microglia. Moreover, recent clinical studies suggest that lithium treatment may reduce dementia development while preserving cognitive function and reducing biomarkers associated with AD.

With this in mind, University of South Florida inventors have designed, synthesized and characterized a new ionic co-crystal of lithium, LISPRO. LISPRO has been shown to exhibit improved pharmacokinetics compared to current FDA-approved lithium drugs as well as bioactive in many in vitro models of AD. LISPRO stands to be a major improvement over current lithium based treatments and may also represent a means of treating Alzheimer’s disease.

**ADVANTAGES:**
- Highly bioactive
- Improved pharmacokinetics

**Tech ID # 14B168**

**LISPRO notably enhances neuronal stem cell**