Researchers at the University of South Florida have evaluated plasma and brain pharmacokinetics of previously unexplored lithium salts.

Despite its narrow therapeutic window, lithium is still regarded as the gold standard benchmark treatment for mania. This is because lithium has numerous bioactivities that remain unmatched by the alternatives. For example, lithium is the only drug that has consistently reduced suicidality in patients with neuropsychiatric disorders. It also exerts neuroprotective effects by increasing BDNF and attenuating the release of several inflammatory cytokines from activated microglia. Recent attempts to find new drugs with similar therapeutic activities have yielded new chemical entities.

Cocrystallization represents a low risk, low cost approach with the most potential for achieving the desired therapeutic outcome. The active pharmaceutical ingredient (API) in this crystal engineering approach remains lithium, which is already FDA-approved with a long history of use in the medical field. Our researchers have synthesized and evaluated two unique and previously unexplored cocrystals: lithium salicylate and lithium lactate.

USF researchers have determined that these lithium salts exhibit profoundly different plasma and brain pharmacokinetics compared to the more common FDA approved salt, lithium carbonate. They produce elevated plasma and brain lithium levels out to 48 hours while attenuating the spike associated with the toxic side effects of current lithium therapeutics. These salts are ideal for development of the next generation of lithium therapeutics.

ADVANTAGES:
- Higher lithium levels
- Lower side effects
- Low cost and risk

Bioavailability of LiSalicylate
LiLactate

Pharmacokinetic curves. Lithium measurements are plotted as mean ± SEM

Tech ID # 14A039  Patent #: 9,662,351