Promising ferroptosis inhibitors to treat Central Nervous System diseases

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Ferroptosis is a mechanism of regulated cell death that plays an important role in various diseases, including central nervous system (CNS) disorders such as Alzheimer's, Parkinson's and amyotrophic lateral sclerosis (ALS). [1] Unlike other types of cell death, ferroptosis is caused by an iron-mediated cell membranes damage making it an important target for potential therapies.

At the Laboratory of Medicinal chemistry and Cell Death Signaling Lab, we focuses on developing small molecules called radical trapping antioxidants, (RTAs) to block ferroptosis. [2] In previous work, we discovered a potent compound UAMC-3203, but its limited ability to cross the blood-brain barrier reduced its effectiveness for treating brain diseases.[3]

To overcome this, we developed new RTAs that can more effectively reach the brain while still blocking ferroptosis. One of these compounds, UAMC-4821, showed great potential in preclinical studies, with strong activity and the ability to reach the brain making it a suitable candidate to treat ferroptosis in neurodegeneration. [4]

Our work contributes to the research of new treatments that can protect the brain from damage and slow the progression of CNS diseases. By refining these compounds, we hope to pave the way for therapies that can target ferroptosis and help improve outcomes for patients suffering from these conditions.

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