Researchers at the University of South Florida have developed novel drugs to mimic or block actions of the Granulocyte-Colony Stimulating Factor (G-CSF) that can act directly on the central nervous system (CNS).

G-CSF is a large protein that stimulates the production of white blood cells (WBCs) in bone marrow. It is administered in patients who cannot sufficiently make WBCs, and also in healthy donors before bone marrow transplant. Recent research indicates the potent use of G-CSF in treating brain injury and diseases of the CNS such as traumatic brain injury (TBI), Alzheimer’s, Parkinson’s and stroke. However, the protein is large and can cause dangerous proliferation of WBCs in the brain. It is also expensive to manufacture and extremely difficult to deliver selectively into the neural system.

Scientists at USF have invented a means to control the actions of G-CSF in treating brain disorders without stimulating the WBCs. G-CSF mimetic neutrophic factors can serve to inhibit G-CSF receptor activity by antagonizing its peripheral effects, while keeping its CNS actions alive at the same time. Based on in-silico modeling, several lead compounds have been identified that can interact with the G-CSF receptor and inhibit its intracellular actions.

Making G-CSF ‘druggable’ confers significant therapeutic benefits in the treatment of stroke, traumatic brain injury (TBI), Alzheimer’s Disease (AD), Parkinson’s Disease (PD) and Amyotrophic Lateral Sclerosis (ALS). The findings of this study can be taken to the clinic for controlled analysis of G-CSF mimetic compounds on patients with conditions amenable to treatment with G-CSF itself.

**ADVANTAGES:**
- Makes G-CSF ‘druggable’ to the CNS
- Potential treatment of several brain diseases and disorders
- G-CSF receptor blocking to control its peripheral effects
- Antagonize intracellular actions of G-CSF

**‘Druggable’ G-CSF Mimicking Compounds that can Potentially Treat Brain Disorders**

**Compounds 6 and 10 Playing an Antagonistic Role in Neuronal and Monocytic Cell Lines**

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