

Alternative Hydrogen Sulfide Delivery Molecule for Oxidative Stress Mitigation:

Synthesis of *t*-butyloxycarbonyl-protected thioglutamic acid

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Simple signaling molecules (SSMs) are small, natural compounds (*i.e.*, gases, ions, and redox molecules) that influence the regenerative and differentiative pathways in cells. Specifically, the SSM hydrogen sulfide (H_2S) has been shown to possess neuroprotectant capability at low concentrations through its antioxidant, anti-inflammation, and anti-apoptosis effects that could assist in the healing of peripheral nerve injuries (PNIs) *via* hollow nerve guidance conduits. The development of N-protected amino thioacids syntheses has led to the development of a sustained H_2S -releasing molecule, thioglutamic acid (GluSH). This research looks at the synthetic pathway of *t*-butyloxycarbonyl-protected thioglutamic acid (Boc-GluSH) as a more suitable molecule for future polymerization prospects. This was accomplished through thiolation reaction of Boc-Glutamic (OBzl) acid and sequential palladium on carbon reduction reaction (Scheme 1). Products formed were detected using thin-layer chromatography (TLC), purified using column chromatography, and characterized for their structure confirmation by employing Fourier transform infrared spectroscopy (FTIR) and proton (1H) as well as carbon (^{13}C) nuclear magnetic resonance (NMR) spectroscopy techniques.

Scheme 1: Boc protected thioglutamic acid (Boc-GluSH) synthesis process.

