

David Chen

The development of an efficient oxidizing reagent for the formation of disulfide bonds.

There are many disulfide containing proteins and peptides that are of biological importance such as insulin, oxytocin, and apamin. The formation of disulfide bonds, as well as their correct pairing is critical for their synthesis. Biologically, disulfide bond formation is catalyzed by an enzyme, protein disulfide isomerase (PDI). One of the ways in which PDI works is by acting as an efficient, catalytic oxidant for the formation of disulfide bonds. This work seeks to develop efficient chemical oxidants for the formation of disulfide bonds. A new oxidant that we have recently identified is benzeneseleninic acid. Oxytocin, a mammalian hormone that contains two cysteine residues was treated with benzeneseleninic acid in order to find out if selenium serves as an efficient oxidant to induce disulfide bond. Yellow precipitate was obtained from the experiment and it matched the hypothesized evidence of the disulfide bond formation on the oxytocin peptide. The identity of the solution is to be determined by comparing the HPLC chromatogram of the actual oxidized oxytocin and the solution. If the result meets hypothesis, it could suggest that benzeneseleninic acid could serve as the basis for developing mimics of PDI.