



Biospecialties International

Gamma-glutamylcysteine (GGC)

Structure and synthesis

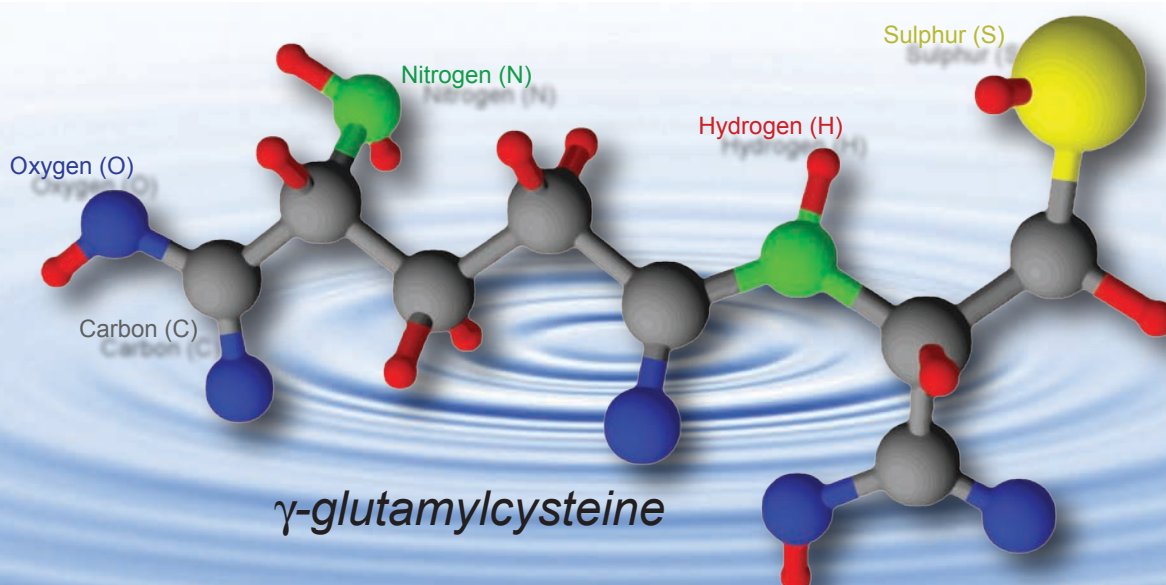
γ -glutamylcysteine (gamma-glutamylcysteine) is synthesized in cells by the enzyme gamma-glutamylcysteine synthase, which catalyses the condensation of L-Glutamic acid with L-Cysteine. In infant mammals, GGC is initially provided in mothers' milk, as they cannot produce it themselves in sufficiently high enough quantities. By the time they are weaned, they are able to produce it internally from dietary protein sources (Bonous, 1991).

Method of action

The production of GGC within a cell is a major rate-limiting step in glutathione synthesis. Historically, strategies for increasing glutathione levels have focused mainly on cysteine delivery compounds such as N-acetylcysteine (NAC) and 2-oxothiazolidine-4-carboxylate (OTC). Elevating glutathione levels by using such cysteine prodrugs is of limited use. Glutathione exerts feedback inhibition on the first synthetic enzyme gamma-glutamylcysteine synthase, and, as such, can restrict the production of GGC. The second enzyme, glutathione synthetase, is not subject to feedback inhibition and its substrate, GGC, is usually the limiting substrate in glutathione synthesis. GGC is the most immediate precursor to glutathione, and is normally present at lower levels than cysteine.

GGC Formulation Information

GGC is a simple dipeptide of the naturally sourced amino acids L-Glutamic acid and L-Cysteine. The product is a fine yellow/white powder which is slightly hygroscopic. It is extremely soluble in water (up to 70% w/v) and 1g dissolved in 10mL of water will give a solution of pH 3. GGC is stable in solution in the pH range between 3 to 8.



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