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Product Information

Chorionic gonadotropin human

Catalog Number **CG5**
Storage Temperature –20 °C

CAS RN 9002-61-3
Synonym: hCG, Choriogonin

Product Description

pI:[1] 2.95
Extinction Coefficient:[2] $\varepsilon^M = 1.41 \times 10^4$ (280 nm)
$E^{1\%} = 3.6$ (280 nm)

Human chorionic gonadotropin (hCG) is a glycoprotein hormone produced by the chorionic tissue of the placenta. The glycoprotein hormone family includes luteinizing hormone (LH), follicle-stimulating hormone (FSH), and thyroid-stimulating hormone (TSH), in addition to hCG. The function of hCG is to maintain the corpus luteum and stimulate steroid secretion from the ovary in the beginning stages of gestation. hCG appears in the blood and urine during the first trimester of early pregnancy, and levels decrease thereafter. It has been used for superovulation in animals.[3]

hCG consists of an α subunit of 92 amino acids and a β subunit of 145 amino acids.[1] The α subunit is common among the family of glycoprotein hormones, whereas the hormone-specific β subunit, which exhibits different degrees of homology, may confer biologic specificity of the individual hormone.[1] The amino acid sequences of the α subunit[4,5] and the β subunit[5,6] and the crystal structure of hCG[7] have been reported. NMR studies of the α subunit have been reported.[8,9]

The molecular mass of hCG is ~37.9 kDa, with ~31% carbohydrate by weight. The theoretical molecular mass of 37.9 kDa is based on the native form, which contains 2 subunits. The α subunit has a molecular mass of 14.9 kDa, with a polypeptide portion of ~10.2 kDa and a carbohydrate portion of ~4.7 kDa. The α subunit is *N*-glycosylated at Asn^{52} and Asn^{78}.[8]

The β subunit has a molecular mass of 23 kDa, with a polypeptide portion of ~16.0 kDa and a carbohydrate portion of ~7.0 kDa is for the carbohydrate.[5,7,10,11] The β subunit is *N*-glycosylated at Asn^{13} and Asn^{30}.[12] The structure and location of the *O*-glycosidic carbohydrate units attached to the β subunit of hCG, at Ser^{121}, Ser^{127}, Ser^{132}, and Ser^{138}, have been investigated.[13] The β subunit has been characterized by LC-MS.[14] A MALDI mass spectrometry report on the glycoforms of the hCG β-core fragment has been published.[15]

When hCG was used in combination with recombinant interferon-γ, there was a significant cooperative induction of nitric oxide synthesis (iNOS) in a dose-dependent manner in mouse peritoneal macrophages. This suggests that hCG may provide a second signal for synergistic induction of NO synthesis.[16] hCG has been used as a biomarker for such conditions as epithelial cancer[17] and germ cell tumors.[18,19]

Catalog Number CG5 is 0.2 μm-filtered. A vial contains ~5,000 IU. The calculated value is based on the USP method for human Chorionic Gonadotrophin to meet 5,000 IU per vial, with a tolerance of not less than 80.0% (4,000 IU) and not more than 125.0% (6,250 IU) of the potency stated.

Preparation Instructions

When the contents of a vial of CG5 are reconstituted with water to an hCG concentration of 1,000 I.U./ml, the hCG solution will also contain 0.01 M sodium phosphate buffer, pH ~7.2, and mannitol (stabilizer) at a concentration of 100 mg/ml. hCG is also soluble in aqueous glycerol and glycols, and is insoluble in ethanol.[2] Solutions should be sterile-filtered and not autoclaved.

Precautions and Disclaimer

This product is for R&D use only, and not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Storage/Stability

Dilute aqueous solutions undergo rapid loss of activity when stored frozen, or heated, or if excess acid or base is added. Gelatin and serum proteins help to stabilize aqueous solutions of hCG. hCG is stable in a glycerol solution at 100 °C for one hour.[20]

Solutions reconstituted in water can be stored at –20 °C as single-use aliquots.

References

1. *The Merck Index*, 13th ed., Entry# 2237.
2. Morgans, F.J., *et al.*, *Endocrinology*, **94(6)**, 1601-1606 (1974).
3. Hogan, B., *et al*., *Manipulating the Mouse Embryo, A Laboratory Manual*, 2nd ed., Cold Spring Harbor Laboratory Press (Cold Spring Harbor, NY), p. 130 (1994).
4. Bellisario, R., *et al*., *J. Biol. Chem*., **248(19)**, 6796-6809 (1973).
5. Morgan, F.J., *et al*.,. *J. Biol. Chem*., **250(13)**, 5247-5258 (1975).
6. Carlsen, R.B., *et al*., *J. Biol. Chem*., **248(19)**, 6810-6827 (1973).
7. Lapthorn, A.J., *et al*., *Nature*, **369(6480)**, 455-461 (1994).
8. de Beer, T., *et al.*, *FEBS Lett.*, **348**, 1-6 (1994).
9. de Beer, T., *et al.*, *Eur. J. Biochem.*, **241(1)**, 229-242 (1996).
10. Bahl, O.P., *J. Biol. Chem.*, **244(4)**, 567-574 (1969).
11. Swaminathan, N., and Bahl, O. P., *Biochem. Biophys. Res. Commun*., **40(2)**, 422-427 (1970).
12. Sisinni, L., and Landriscina, M., *Adv. Exp. Med. Biol.*, **867**, 159-176 (2015).
13. Kessler, M.J., *et al.*, *J. Biol. Chem.*, **254(16)**, 7909-7914 (1979).
14. Black, R.S., and Bowers, L.D., *Methods Mol. Biol*., **146**, 337-354 (2000).
15. Jacoby, E.S., *et al.*, *Clin. Chem.*, **46(11)**, 1796-1803 (2000).
16. Kim, H. M., and Moon, Y. H., *Biochem. Biophys. Res. Commun.*, **229(2)**, 548-552 (1996).
17. Iles, R.K., *Mol. Cell. Endocrinol.*, **260-262**, 264-270 (2007).
18. Mitsios, J.V., *et al*., *Clin. Biochem.*, **47(7-8)**, 632-635 (2014).
19. Barlow, L.J., *et al*., *Nat. Rev. Urol*., **7(11)**, 610-617 (2010).
20. *The Merck Index*, 11th ed., Entry# 4534.

GCY,ARO,ALF,RXR,MAM 12/16-1