

Development of recombinant human chorionic gonadotropin (hCG) using high-density culture technique of suspension-adapted chinese hamster ovary (CHO) cells

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Abstract

Human chorionic gonadotropin (hCG) is a heterodimeric glycoprotein hormone consisting of non-covalently linked two subunits, the α and β subunit. It has been used as a infertility drug for ovulation to mimic luteinizing hormone (LH).¹⁾ A stable cell line was established by transfection of Rc/CMV-i-dhfr-hCG, expression vector containing hCG α - and β -genes, into dihydrofolate reductase-deficient CHO cells and subsequent methotrexate-mediated gene amplification. Anchorage-dependent CHO cells were adapted into a serum-free and/or animal component-free suspension medium through gradual serum weaning for the hCG production. The established cell line showed typical morphological characteristics and growth profile of CHO cells, and could produce FSH with passage-to-passage consistency. The high density perfusion culture of the CHO cells was carried out in Celligen Plus bioreactor equipped with a spin-filter as a internal cell retention device. The cell density reached up to $>1 \times 10^7$ cells/ml in less than 7 days and a perfusion-control strategy based on cellular consumption rates of glucose was established.²⁾ Biologically active recombinant hCG was purified by a series of chromatographic steps including anion exchange chromatography and hydrophobic interaction chromatography to homogeneity. The highly purified recombinant hCG was characterized for physicochemical, immunological and biological properties.

References

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