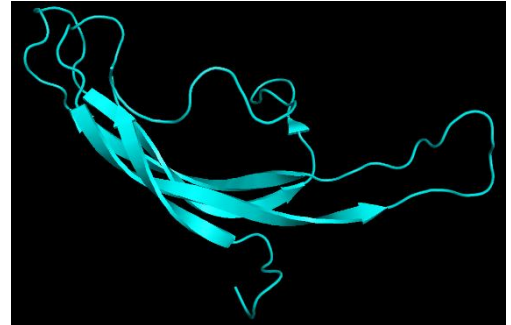


TB11 - Human Chorionic Gonadotropin

Introduction

Human chorionic gonadotropin (hCG) is a hormone produced in the placenta during pregnancy and by some tumours. The β -subunit of hCG (as shown right) contains 145 amino acids.

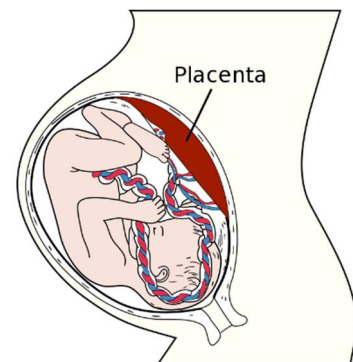


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Choriogonadotropin subunit β 3

Production in placenta

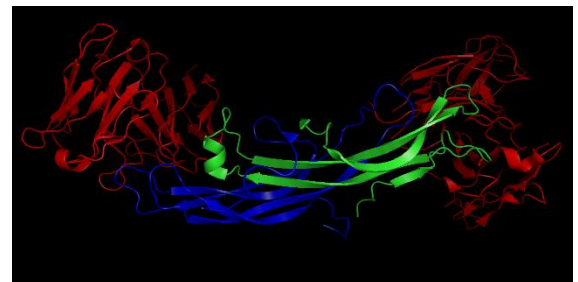
hCG is produced naturally within the human placenta, promoting the maintenance of the corpus luteum, which in turn secretes progesterone during the beginning of pregnancy. Progesterone supplies the uterus with a thick lining of blood vessels to sustain the foetus. Studies have shown that hCG also plays an active role in cellular proliferation and may activate apoptosis (programmed cell death).



Testing for pregnancy

Monoclonal antibodies are antibodies produced from a single group of genetically identical B-cells. Most tests for hCG employ monoclonal antibodies, specific to the β -subunit of hCG. The use of monoclonal antibodies is particularly important to ensure that only hCG is being detected, rather than LH or FSH.

Many tests for hCG are immunoassays, a principle found in tests such as the ELISA. An example of a simple pregnancy test is shown below.

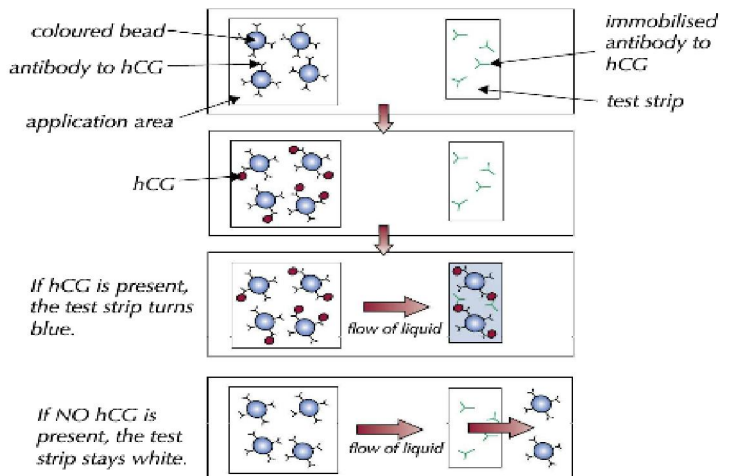


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Green: Glycoprotein Hormone

Blue: Choriogonadotropin

Red: Antibodies



Production in malignant tumours

hCG can be also used as a tumour marker as its β -subunits are secreted by some cancers such as seminomas, choriocarcinomas, and germ cell tumours (all of which predominately affect the reproductive systems of both males and females). Combined with other proteins and hormones (such as alpha-fetoprotein (AFP)), hCG can make a really effective tumour marker, especially in males, to detect testicular cancer.

Elevated hCG only

- Pure seminoma
- Primary hypogonadism*
- Gonadotroph adenoma*
- Marijuana use

Elevated AFP or hCG or both

- Nonseminomatous germ cell tumor
- Gestational trophoblastic disease
- Poorly differentiated adenocarcinoma

*False-positive results from increased LH cross-reacting with hCG immunoassay. Abbreviations: AFP, α fetoprotein; hCG, human chorionic gonadotropin; LH, luteinizing hormone.