

Applications of hCG measurement to cancer diagnostics

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HCG is an extremely sensitive and specific marker for trophoblastic tumors, i.e., choriocarcinoma and testicular cancer containing trophoblastic components. Very rarely, hCG is also expressed by nontrophoblastic tumors, but these fairly often express the free beta subunit of hCG (hCG β). The upper reference limit of hCG β in serum is 2 pmol/L both in women and men. Elevated concentrations of hCG β are found in 30 – 70% of patients with a wide array of nontrophoblastic cancers, e.g., ovarian, tubal, endometrial, cervical, colorectal, biliary, lung, gastric and pancreatic cancer. In most of these hCG β is a prognostic marker that is independent of stage and grade of the tumor. Because this information is available before surgery, it can be used to select optimal therapy. Serial assays of hCG β in serum can also be used to monitor the response to therapy, but for this purpose other markers are usually more informative. However, in seminomas, hCG β is often the most sensitive marker available being elevated in most cases when hCG is normal. Because hCG β is often expressed by nontrophoblastic cancers, most commercial assays for hCG are designed to detect hCG and hCG β together but the upper reference limits of hCG + hCG β are much higher than those of hCG β , 9 and 17 pmol/L in pre- and postmenopausal women and 3 and 7 pmol/L in men below and above 60 years, respectively. Furthermore, most commercial hCG assays do not reliably detect levels below 10 pmol/L (corresponding to 3 IU/l of hCG). Therefore moderately elevated levels of hCG β are not detected by such assays. Most assays specific for hCG β are designed for use in Down's syndrome screening and are therefore not sensitive enough for diagnosis of nontrophoblastic cancers. When excreted into urine, hCG β is mainly broken down to the so called core fragment (hCG β cf), which also is used as a cancer marker. However, in comparative studies hCG β cf in urine has been found to be less useful than hCG β in serum determined by sensitive assays. Recent studies have suggested that hCG produced by tumors is hyperglycosylated and assay of hyperglycosylated hCG is a promising new approach. It remains to be determined whether specific assays of this form of hCG provides diagnostic and prognostic information additional to that obtained with hCG and hCG β .