

The AFP glycoprotein has been used to monitor carcinomas of hepatic and germ cell origins for more than two decades. However, it is also elevated in benign diseases of the liver and germ cells. Hepatic and germ cell carcinomas exhibit different Concanavalin A (Con A) molecular affinity variant AFP patterns compared to AFP patterns in cord serum. (1) AFP antigen, in fact, has three distinct isoforms as defined by differential binding to the lectins ConA or to Lens culinaris (LCA). The three isoforms are designated L1 (Con A binding), L2 (LCA binding) and L3 (strong LCA binding). In patients with testicular tumors AFP-L2 can not be separated from AFP-3. (2) The L3 form or AFP-LCA reacting form has an additional α 1-6 fucose residue attached at the reducing end of N-acetylglucosamine. (3,4) The high affinity to LCA is based on this modification.

The percentage of AFP-L3 to total AFP is higher in hepatic cancers as compared to non cancer hepatic diseases (5,6) Wako Pure Chemicals Industries reports a specificity of greater than 92% using their AFP-L3% assay to diagnose HHC compared to 75% for a total AFP assay.(7)

Bioprocessing, Inc. cell culture derived AFP products, both part and highly pure, contain 65-70% L-3 isoform while our cord serum derived AFP contains only 3% of the L3 form. (as measured by FDA approved Wako Pure Chemical Industries AFP-L3% assay (8)

Diagnostic manufacturers who make AFP assays should be aware that the cord serum derived AFP used most commonly in these assays does not represent the same carbohydrate isoform ratio as compared to the serum of cancer patients. In addition, cord serum derived AFP is usually pool tested for infectious diseases which adds to the risk of using cord serum derived AFP in assays or controls.

References:

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