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S22 MASS SCREENING OF LIVER CANCER BY DETERMINATION OF ALPHA-FETOPROTEIN IN DRIED BLOOD SPOTS ON FILTER PAPER.

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A method for measuring alpha-fetoprotein (AFP) in dried-blood samples spotted on filter paper using a sensitive and simple two-site enzyme immunoassay was developed for mass screening of primary hepatocellular carcinoma (PHC) (Clin. Chem. 1986;32:2079-82). Community-based pilot screening programs were carried out in rural areas of Central Taiwan during late 1985-early 1987. Dried-Blood samples were collected from 1894 men over 40 years of age in Luh-Guu Township and 4084 men (53%) and women (47%) over 30 years of age in the mountain districts of Nan-Tou County. Cases (~1%) with AFP level greater than 20 ng/mL plasma were recalled for ultrasound examination. Four cases of small PHC (<5cm) were detected from the Luh-Guu group and all had their tumors removed successfully. PHC were found in 5 men from the mountain districts, but only one of them had small tumor. A year later, 582 cases with positive AFP level or with positive serum HBsAg from the mountain districts were retested with blood AFP for follow-up. A man with small PHC was detected. During 1986.8-1987.6, a non-community-based program was tested in 5 metropolitan areas in Taiwan. 39,500 dried blood samples were collected (58% male & 42% female; most of them 25-75 years old). From 111 positive cases (0.3%), 97 of them were recalled successfully. Four cases (3 male, 1 female) of small PHC and a case of ovarian cancer were detected and all had their tumors surgically resected. The results indicate that this simple, sensitive and convenient method for the determination of AFP may be used as first line mass screening test for early detection of PHC, especially for rural areas, and as a follow-up test to monitor the high risk population.

S23 BIOTECHNOLOGY AND CANCER RESEARCH.

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Recombinant DNA technology has had a profound effect on the studies of gene structure and function. This technology has led to practical application and the emergence of biotechnology. Large amounts of proteins with clinical potential have been produced, e.g. hormones, viral antigens, cytokines, and oncogene products. Cytokines are a heterogeneous group of biological active proteins which regulate cell growth, differentiation and function, and are thus ideal agents for modifying biological responses of immune system. Several cytokines (e.g. interferons, interleukin-1,2, and 4, tumor necrosis factor, granulocyte and granulocyte macrophage colony stimulating factor) have been in clinical use or proposed for clinical evaluation for the therapy of neoplastic disease. Clinical investigations with interferon-α have confirmed that cytokine treatment can be beneficial for a limited number of cancers. However, the full clinical potential of many cytokines. used individually or in combination with other agents, has yet to be explored. Recombinant DNA techniques have also been applied to functional studies of cloned proteins. Recent work carried out in this laboratory has been focused on the functional studies of p21 *ras* proteins and other guanine nucleotide binding proteins (G) involved in signal transduction. *Ras* genes can induce tumors *in vivo* and tumorigenic transformation of tissue culture cells *in vitro*. We have used linker insertion-deletion mutagenesis to study v-*ras*" proteins. We have identified four non-overlapping segments that are dispensable for morphologic transformation of NIH3T3 cells, several segments that are required for transformation as well as guanine nucleotide binding. One essential segment that does not affect guanine nucleotide binding, which appears to lie on the exterior of the protein, and therefore, may interact with the putative *ras* protein target, has been identified. Since G_o, a specific protein in the neural and neuroendocrine cells, was found to be produced in considerable amounts by all types of neuroendocrine tumors but not in nonneuroendocrine tumors. G_o might be a useful marker for neuroendocrine tumors. We have obtained a human G_o cDNA clone which may provide a useful tool for the diagnosis of neuroendocrine tumors.