

**Diagnosis of Liver Cancer with Carcinoembryonic Antigen (CEA),
Alpha-fetoprotein (AFP) and ^{67}Ga -citrate Hepatic Scintigraphy**

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Primary and metastatic liver cancers have been evaluated by a combination of techniques including CEA and AFP radioimmunoassay and hepatic scintigraphy of ^{67}Ga -citrate. The plasma levels of CEA and AFP were measured in healthy subjects and patients with various cancers. The CEA level for healthy subjects was less than 10 ng/ml, while CEA level greater than 10 ng/ml was found in patients with metastatic liver cancer and some patients with hepatoma. In hepatoma, 28 out of 37 patients (76%) had AFP level greater than 160 ng/ml. Especially ten of 28 patients showed AFP level greater than 10,000 ng/ml. Only one of 39 patients with metastatic liver cancer and two of 39 patients with cirrhosis showed positive AFP level (greater than 160 ng/ml). From these results, hepatoma is well differentiated from other metastatic liver cancers. That is, hepatoma shows high AFP level and low CEA level. On the other hand, metastatic liver cancer shows high CEA level and normal AFP level (less than 160 ng/ml). Scintigraphy with ^{67}Ga -citrate was performed for the

patients with various liver diseases. Eighty-three percent of hepatoma revealed marked accumulation of ^{67}Ga -citrate in the lesions and 10 percent moderately uptake or slight uptake. While, cholangioma and metastatic liver cancer did not show a significant uptake of ^{67}Ga -citrate in the lesions. Most of hepatoma showing marked uptake of ^{67}Ga -citrate revealed negative AFP (less than 160 ng/ml) and the hepatoma showing slight uptake of ^{67}Ga revealed positive AFP (greater than 160 ng/ml). Therefore, cases with positive AFP or marked uptake of ^{67}Ga -citrate in the lesion are highly suggestive of hepatoma.

As differential diagnostic techniques of malignant liver disease, the measurement of CEA, AFP and ^{67}Ga -citrate scintigraphy were performed. The primary liver cancer has positive AFP and/or marked accumulation of ^{67}Ga -citrate. The secondary liver cancer has positive CEA, negative AFP and not a significant accumulation of ^{67}Ga -citrate.