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TUMOUR MARKERS INFORMATION SHEET

INTRODUCTION

Tumour markers are substances which can be measured, commonly in blood or urine, to assist in the detection and monitoring of cancers. This page summarises features of some commonly used tumour markers. The ideal tumour marker should be (1) specific for the cancer for which it is testing; (2) not present in any other conditions; and (3) the concentration should change with the amount of malignant tissue present. An ideal tumour maker could be used for screening, diagnosis and monitoring of disease progression. Unfortunately, there are no ideal tumour markers and most are restricted to monitoring cancers once they have been detected and diagnosed using other methods.

SCREENING

there are no tumour markers which are currently recommended for screening of the general population. The most likely candidate is PSA as a screen for prostate cancer, however there is no agreement about whether screening of the general population reduces premature mortality. Most tumour markers have too many false positives from benign conditions to make screening feasible (see table below). Many only clearly identify malignancy once the cancer is sufficiently advanced to make this detection of limited use. There are some circumstances where screening is useful in defined populations. The use of AFP to screen for hepatocellular carcinoma in patients with chronic liver disease or calcitonin in patients at high risk of thyroid cancer are examples of this.

DIAGNOSIS

Tumour markers are occasionally useful as a pointer towards a diagnosis but never replace the need for formal tissue diagnosis. Urine catecholamines and their metabolites can strongly suggest a phaeochromocytoma and very high levels of some serum markers make some cancers exceedingly likely (eg very high CA 125 and ovarian cancer). It is very important that tumour markers should never be used on their own to make a diagnosis of malignancy.

MONITORING DISEASE PROGRESSION

This is the main clinical use for tumour markers. Appropriate markers should be measured after the diagnosis of a cancer and prior to commencement of treatment. Regular measurement of a marker shown to be elevated in that patient may then assist in demonstrating the effectiveness of a treatment intervention (medical, surgical or with radiotherapy) by showing a reduction in the levels of the marker after therapy. The timing of such measurements should be guided by the half-life of the marker. In the longer term, markers can be used to try and identify disease recurrence or progression prior to the appearance of clinical signs or symptoms which may allow earlier treatment of such a condition.

MEASUREMENT

Cancers consist of abnormal cells and tumour markers are often produced in different forms in different patients. This may lead to different results being obtained for the same patient when different methods are used to measure the marker. For this reason, it is important to follow an individual over time with the same analytical method from the same manufacturer. Ideally patients should be monitored with tests performed at the same laboratory. Most laboratories will indicate on the report the method they have used to measure a tumour marker so that any change in method can be seen. If unusual or unexpected results are obtained it is important to contact the laboratory involved.

Table 1.	**Conditions associated with Elevated serum levels**	
Marker	**Cancers** (main use in bold)	**Benign Diseases**
AFP	**Hepatocellular Carcinoma** **Germ-cell Tumours**	Massive hepatic necrosis Hepatitis Cirrhosis Ulcerative colitis
CA 15-3	**Breast Cancer** Lung Cancer Gastro-Intestinal Cancer Pancreatic Cancer Cervical Cancer Ovarian Cancer	Hepatitis Cirrhosis Auto-immune disorders Benign lung disease Benign breast disease
CA 19-9	**Pancreatic Cancer** **Biliary Tract Tumours** Gastro-Intestinal Cancers Colo-rectal Cancer Ovarian Cancer	Acute pancreatitis Cirrhosis Cholecystitis, biliary obstruction Gastric ulcer Pulmonary disease
CA 125	**Ovarian Cancer** Endometrial Cancer Cervix Cancer Lung Cancer Breast Cancer Colo-rectal Cancer Pancreatic Cancer	Benign ovarian disease Endometriosis Pregnancy Menstruation Pelvic inflammatory disease Pancreatitis Hepatitis

		Hypothyroidism Ascitic or pleural fluid accumulation
Calcitonin	**Thyroid Medullary Carcinoma** Carcinoid Phaeochromocytoma	
Catecholamines and metabolites	**Phaeochromocytoma**	Stress Exercise Medications
CEA	**Colo-rectal Cancers** **Other Gastro-Intestinal Cancers** Pancreatic Cancer Hepatocellular Carcinoma Breast Cancer Bronchial Carcinoma	Cirrhosis Hepatitis Inflammatory bowel disease Chronic lung disease Smokers
hCG / beta hCG	**Germ Cell Tumours** **Choriocarcinomas** Lung Cancer Breast Cancer Gastro-Intestinal Cancer Ovarian Cancer	Pregnancy Hydatidiform mole
5HIAA in urine	**Carcinoid Syndrome**	Foods containing serotonin
PSA	**Prostate cancer**	Benign Prostatic Hypertrophy Prostatitis Urinary tract infection Prostatic instrumentation
Serotonin	**Carcinoid Syndrome**	
Thyroglobulin	**Thyroid Carcinoma**	Benign thyroid disease
Note that for all tumour markers some healthy individuals will have values outside the reference interval. Also note that a normal result does not exclude malignancy.		