



**Figure 7-52** Diverse tumor types with a common molecular pathogenesis.

### Tumor Markers

Biochemical assays for tumor-associated enzymes, hormones, and other tumor markers in the blood cannot be used for definitive diagnosis of cancer; however, they contribute to the detection of cancer and in some instances are useful in determining the effectiveness of therapy or the appearance of a recurrence.

A host of tumor markers have been described, and new candidates are identified every year. Only a few have stood the test of time and proved to have clinical usefulness.

The application of several markers, listed in [Table 7-12](#), is considered in the discussion of specific forms of neoplasia in other chapters, so only a few widely used examples suffice here. Blood tests for *prostate specific antigen* (PSA), a marker for prostatic adenocarcinoma, are frequently used

**Table 7-12** Selected Tumor Markers

Tumor Markers	Tumor Types
<b>Hormones</b>	
Human chorionic gonadotropin	Trophoblastic tumors, nonseminomatous testicular tumors
Calcitonin	Medullary carcinoma of thyroid
Catecholamine and metabolites	Pheochromocytoma and related tumors
Ectopic hormones	See <a href="#">Table 7-11</a>
<b>Oncofetal Antigens</b>	
$\alpha$ -Fetoprotein	Liver cell cancer, nonseminomatous germ cell tumors of testis
Carcinoembryonic antigen	Carcinomas of the colon, pancreas, lung, stomach, and heart
<b>Isoenzymes</b>	
Prostatic acid phosphatase	Prostate cancer
Neuron-specific enolase	Small-cell cancer of lung, neuroblastoma
<b>Specific Proteins</b>	
Immunoglobulins	Multiple myeloma and other gammopathies
Prostate-specific antigen and prostate-specific membrane antigen	Prostate cancer
<b>Mucins and Other Glycoproteins</b>	
CA-125	Ovarian cancer
CA-19-9	Colon cancer, pancreatic cancer
CA-15-3	Breast cancer
<b>Cell-Free DNA Markers</b>	
<i>TP53</i> , <i>APC</i> , <i>RAS</i> mutants in stool and serum	Colon cancer
<i>TP53</i> , <i>RAS</i> mutants in stool and serum	Pancreatic cancer
<i>TP53</i> , <i>RAS</i> mutants in sputum and serum	Lung cancer
<i>TP53</i> mutants in urine	Bladder cancer