Neoplasia - All Cancers with Associated Factors

L1 1	Mixed Tumors	1. **Pleomorphic Adenoma** of Salivary Gland 2. **Fibroadenoma** of the female breast 3. **Wilms** malignant tumor of the **renal** anlage
2	Irregularly Named Tumors*	• Mesothelioma (usually malignant) • Meningioma/Invasive Meningioma • Leiomyoma/Leiomyosarcoma (smooth muscle) • Rhabdomyoma/Rhabdosarcoma (striated) • Nevus/melanoma • Hydatidiform mole/Choriocarcinoma (Placenta) • Seminoma/embryonal carcinoma (testicles, NO benign)
3 L2	Demarcated benign tumor, Unencapsulated	Leiomyoma of the Uterus
4	Un-demarcated & Unencapsulated benign tumor	Benign Vascular neoplasm (Hemangiomas)
5	Locally invasive malignant tumors that rarely Metastasize	1. Basal Cell Carcinoma of the skin 2. Most primary CNS tumors.
6	Disseminated at Diagnosis, Always Malignant	1. Leukemia 2. Lymphomas.
7	May penetrate the cerebral vesicles & be carried by the CSF to reimplant on the meningeal surfaces	1. CNS neoplasms 2. Medulloblastoma 3. Ependymoma
8	Favours Lymphatic Spread	Carcinomas
9	Favours Hematogenous Spread	Sarcomas

10	Vertebral Metastasis	1. Thyroid gland carcinoma 2. Prostate gland carcinoma
11	Systemic Metastasis	1. Prostatic Carcinoma (to bone) 2. Bronchogenic carcinoma (adrenal gland) 3. Neuroblastoma (to liver & bones) [skeletal muscles are rarely sites of metastasis]
12 L3	Death Rate x5 higher in US & EU than Japan	Breast cancer
13	Death Rate x7 in Japan than US	Stomach Carcinoma
14	Infrequent in the US but the most lethal in Africa	Liver Cell Carcinoma
15	Smoking	Cancers of the Mouth, Pharynx, Larynx, Esophagus, Pancreas, Bladder, & 90% of **Lung** cancers.
16	Alcohol	Cancers of Oropharynx, Larynx, Esophagus, & Liver.
17	Alcohol AND Tobacco	Synergistic: Cancers of the **Upper Airways** & the **Upper Digestive** Tract.
18	Cumulative Exposure to Estrogen Stimulation	1. Endometrium cancer 2. Breast Cancer
19	Most Lethal cancers in Children	1. Leukemias 2. CNS tumors 3. Lymphomas 4. Soft-tissue tumors
20	Familial Cancers	1. Breast Cancer 2. Ovarian Cancer 3. Pancreatic Cancer 4. Colon Cancer
21	Arise in Preexisting Polyps	Familial adenomatous polyposis syndrome

22	Associated with Chronic Inflammation	1. Carcinomas 2. Mesothelioma 3. Lymphoma
23	Immunodeficiency states/Virus-induced	1. Specific types of Lymphoma 2. Carcinoma 3. Sarcoma-like lesions.
24	Frequent Passenger Mutations	1. Cancers Caused by Carcinogen Exposure 2. Melanoma 3. Smoking-related Lung Cancers.
25	Gene Rearrangement	• Leukemias • Sarcomas
26	Point mutations that Stimulate Tyrosine Kinase	1. Leukemia 2. Lymphoma 3. Sarcoma
27	Proto-oncogene overexpression	• Burkitt lymphoma (MYC, chr8>14) (an aggressive B-cell tumor) • follicular lymphoma (BCL2) (chr14>18)
28	Fusion Genes (ABL-BCR)	**Chronic Myeloid Leukemia** (Ph chromosome ch9 ABL & 22BCL) & acute leukemias - BCR-ABL kinase inhibitor: **Gleevec/Imatinib Mesylate**
29	RB gene deletions	Retinoblastoma
30	NMYC gene amplification	Neuroblastoma
31	HER2/ERBB2 gene amplification	1. Breast Cancers 2. Adenocarcinomas of the Lung, Ovary, Stomach, and Salivary gland
32	Aneuploidy	Carcinomas
33 L4	PDGF secretion /receptor expression (GF sufficiency)	Glioblastoma
34	TGF-a secretion /receptor expression (GF sufficiency)	Sarcomas

35	ERBB1 overexpression	1. Squamous cell Carcinomas of the Lung 2. Glioblastoma 3. Epithelial tumors of the Head and Neck
36	Mutated RAS	Pancreatic Adenocarcinoma
37	GAP neurofibromin-1 mutation (RAS)	Neurofibromatosis type 1
38	PTEN Mutation (PI3k inhibitor-RAS)	• Carcinomas • Leukemias
39	LMYC gene amplification	Small cell Carcinoma of the Lung
40	Germ-line Mutations of p16	25% of Melanoma
41	Acquired Deletion or Inactivation of p16	1. 75% of Pancreatic Carcinomas 2. 40-70% of Glioblastomas 3. 50% of Esophagus Cancers 4. 20% of non-small cell Lung Carcinomas 5. Soft Tissue Sarcomas 6. Bladder Cancer
42 L5	Homozygous loss of RB gene	1. Breast Cancer 2. Small-cell Cancer of the Lung 3. Bladder Cancer
43	familial retinoblastoma	Increases risk of **Osteosarcoma** & **Soft tissue sarcoma**
44	Homozygous loss of p53 gene	• ***Virtually every type of cancer 1. Lung Carcinoma 2. Colon Carcinoma 3. Breast Carcinoma
45	Mutant p53 allele inheritance	• Li-Fraumeni Syndrome • 25x chance of developing a malignant tumor by age 50 1. Sarcomas 2. Breast Cancer 3. Leukemia 4. Brain Tumors 5. Carcinoma of the Adrenal Cortex.

46 L6	Type II TGF-b receptor mutations	1. Colon Cancer 2. Stomach Cancer 3. Endometrium Cancer 4. Pancreatic Cancer (SMAD4 inactivation)
47	Homozygous loss of Neurofibromin2 (Merlin)	Neural Tumors as Neurofibromatosis type 2
48	APC gene mutation	1. Familial adenomatous polyposis coli 2. 70-80% of **Sporadic Colon Cancers**
49	High genomic instability with low telomerase expression	Progression from **Colonic adenoma** to **Colonic Adenocarcinoma**
50 L7	Germ-line VHL gene mutations	• Hereditary VHL Syndrome 1. Renal cell cancers 2. Pheochromocytomas 3. Hemangiomas of CNS 4. Retinal Angiomas 5. Renal Cysts
51	E-cadherin function is lost	Epithelial Cancers
52	EMT	Breast Cancer
53	Little vs high type IV collagenase activity	Benign tumors of the **Breast, Colon, Stomach** vs Malignant
54	Elevated concentrations of HGF/SCF at the leading edges	Highly Invasive Brain tumor **Glioblastoma Multiforme**
55	High levels of Chemokine receptors CXCR4 and CCR7	**Breast cancer** cells, their ligands are highly expressed where breast cancer cells metastasize
56 L8	Can evoke a subsequent second form of cancer	Direct acting chemical carcinogens, usually **Leukemia**
57	Benzo[a]pyrene formed during tobacco combustion	Implicated in the causation of **Breast Cancer**

58	Benzo[a]pyrene created during burning of coal	High incidence of **Scrotal Cancer** in chimney sweeps
59	B-naphthylamine in heavily exposed workers in the aniline dye and rubber industries	50-fold increase in the incidence of **Bladder Cancers**
60	A strong correlation between dietary levels of grains and nuts contaminated with Aflatoxin B1 produced by Aspergillus mold strains with:	Increased incidence of **Hepatocellular Carcinoma** in Africa and the Far East.
61	Unprotected miners of radioactive elements	10-fold increased incidence of **Lung Cancers**
62	Hiroshima survivors	• Increased Incidence of **Leukemia** • Increased Mortality of **Thyroid**, **Breast**, **Colon**, & **Lung Carcinomas**
63	Therapeutic Irradiation of the Head and Neck	Papillary Thyroid Cancers
64	Natural UV radiation	• Skin cancers 1. Melanomas 2. Squamous cell carcinomas 3. Basal cell carcinomas
65	Total cumulative UV radiation exposure	Nonmelanoma Skin Cancers.
66	Intense intermittent UV radiation exposure (sunbathing)	**Melanomas**
67	Inherited Xeroderma Pigmentosum	Increased risk of Skin Cancer.

68	HTLV-1	Adult T-cell Leukemia/Lymphoma (ATLL)
69	HPV	1. Benign Squamous Papilloma (warts) (H1,2,4,7) 2. Genital warts (H6,11) 3. Cervical Cancer (H16,18) 4. Oropharyngeal Cancer
70 L9	EBV	1. Burkitt Lymphoma 2. Immunosuppressed HIV patients/organ transplantation patients 3. Nasopharyngeal lymphoma 4. Hodgkin lymphoma 5. T cell lymphomas 6. NK cell lymphomas 7. Gastric Carcinomas 8. Sarcomas (immunosuppressed)
71	HBV, HCV	70-85% of **Hepatocellular Carcinomas** worldwide
72	H. pylori	• Gastric Adenocarcinoma • MALT Lymphoma
73	Immunohistochemistry	• PSA: **prostate carcinoma** • Estrogen receptors: **Breast cancer**
74	Flow cytometry is routinely used in the classification of	Leukemias and Lymphomas
75	PSA tumor marker	1. Prostatic Carcinoma 2. Benign Prostatic Hyperplasia
76	CEA tumor marker	Colon, Pancreas, Stomach, Breast Carcinomas

77	a-fetoprotein	1. Hepatocellular carcinoma 2. Yolk sac remnants in the gonads 3. Teratocarcinomas 4. Embryonal cell carcinomas 5. Neural tube defects of the fetus.