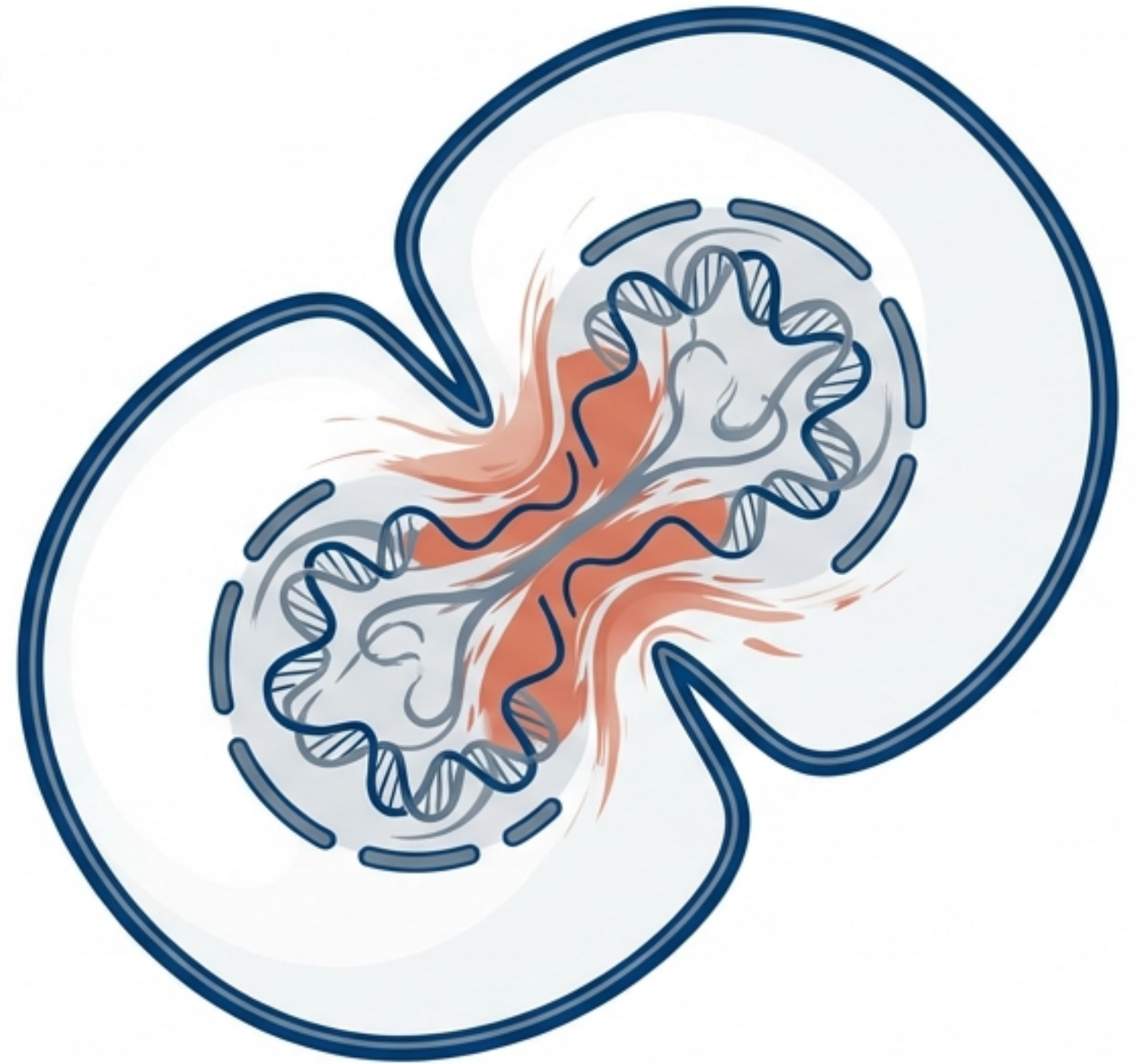
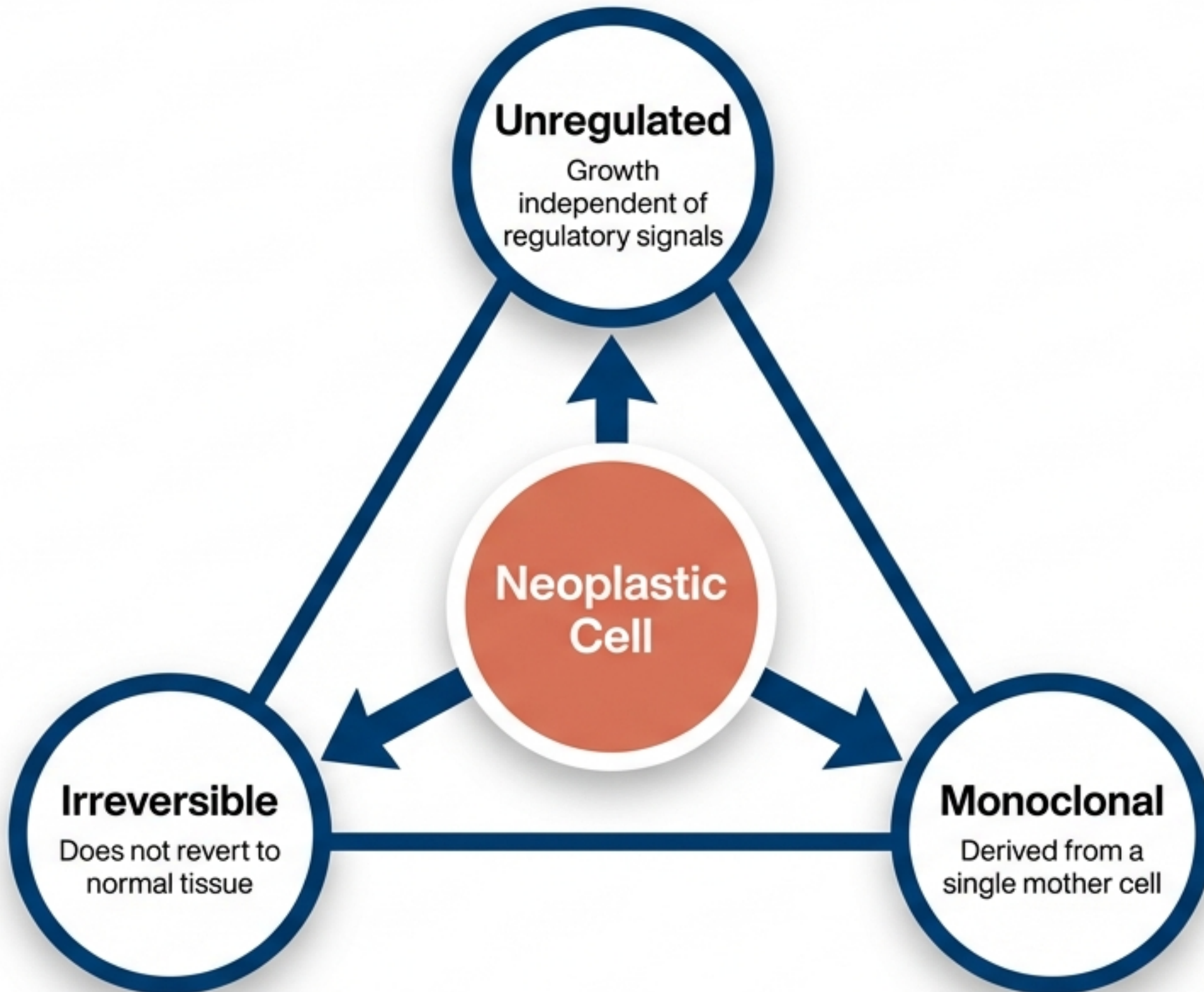


Foundations of Neoplasia & Epidemiology

From Cellular Chaos to
Clinical Control.



Neoplasia is Defined by Unregulated, Irreversible, and Monoclonal Growth

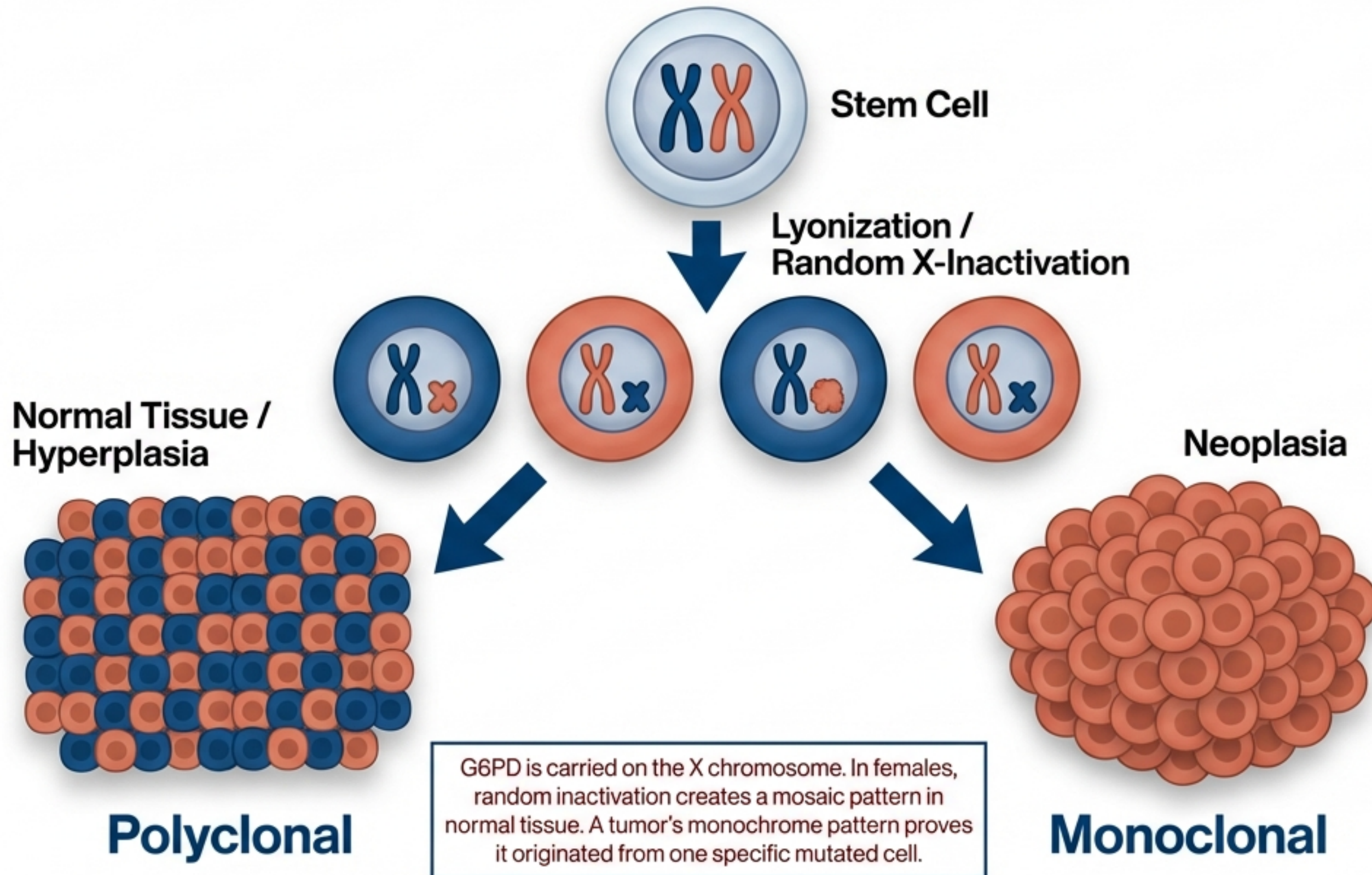


Contrast with Hyperplasia & Repair

Unlike neoplasia, these processes are regulated and polyclonal. They cease when the stimulating stress is removed.

Clonality is Historically Determined by G6PD Isoforms.

The logic of X-Inactivation (Lyonization) proves single-cell origin.

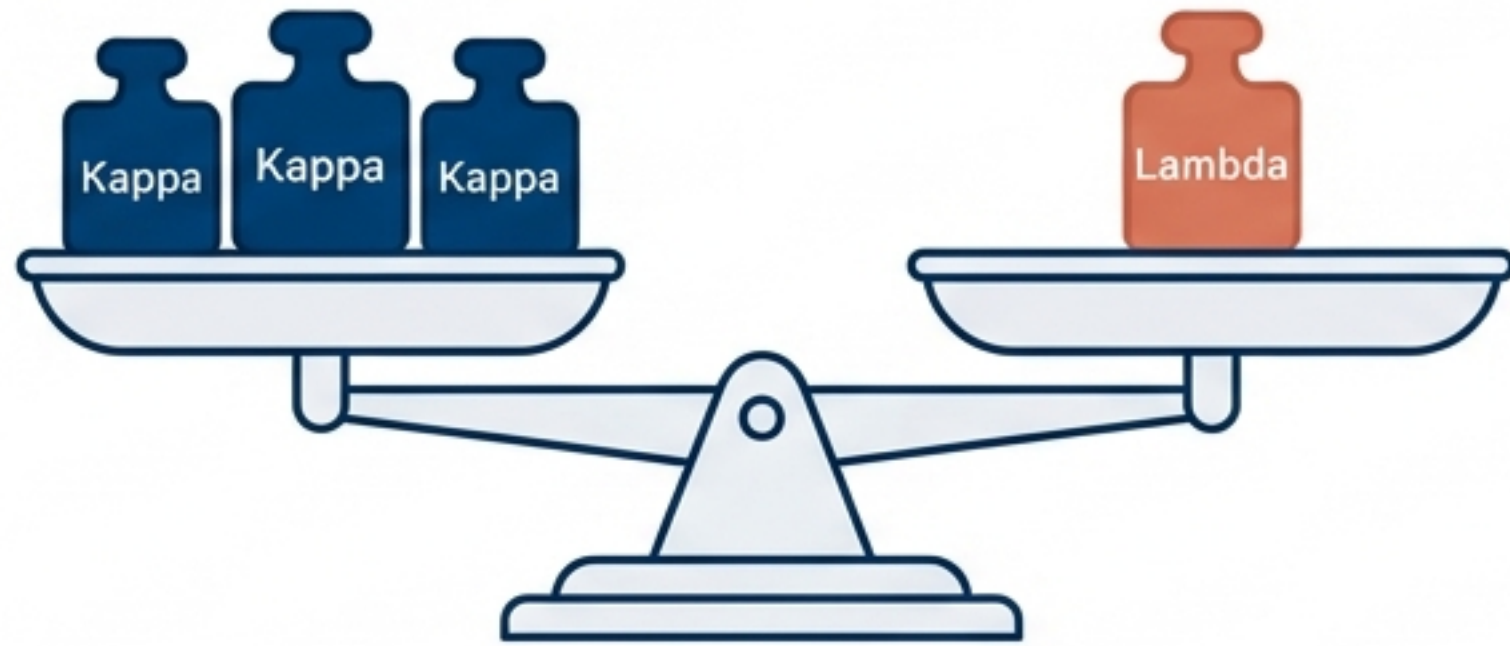


Contrast with Hyperplasia & Repair

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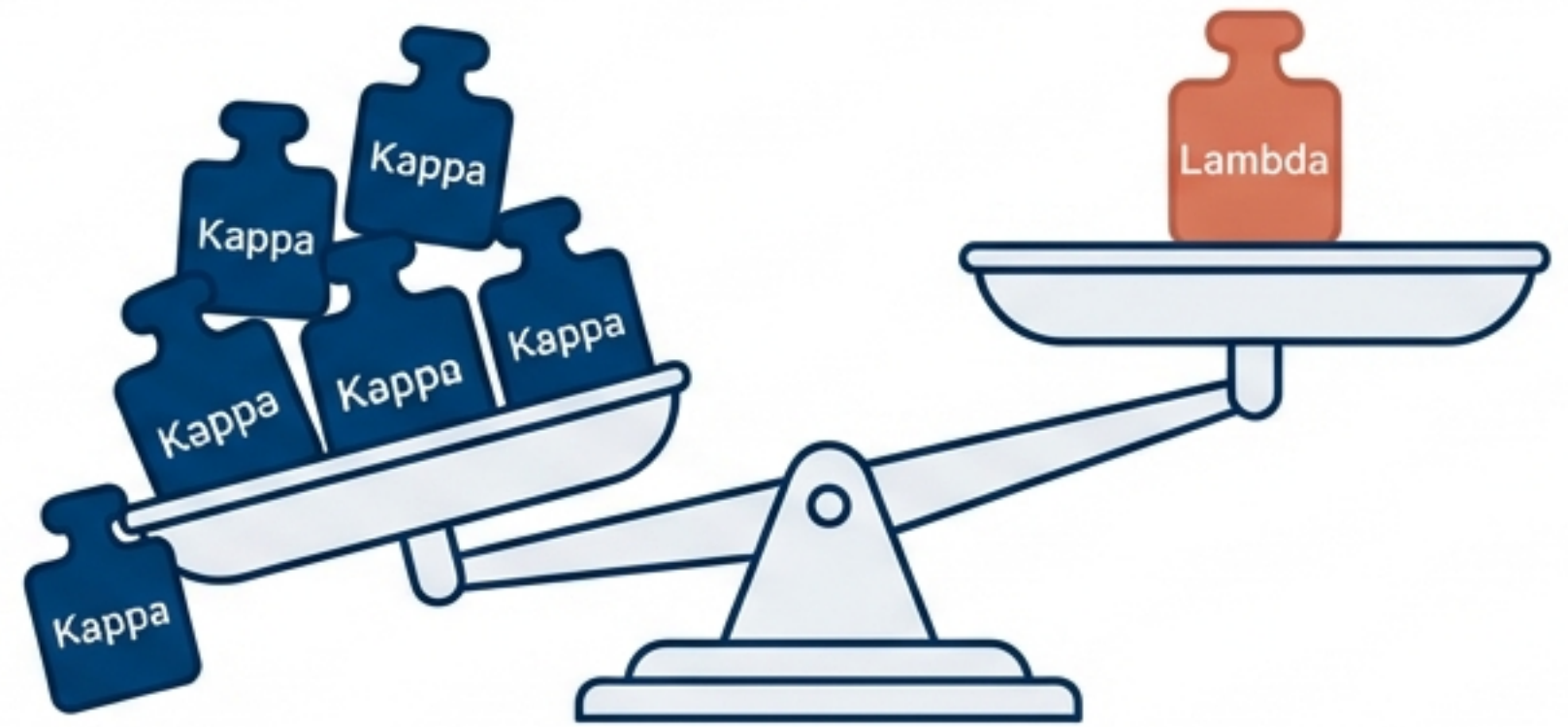
Immunoglobulin Light Chain Ratios Distinguish Lymphoma from Reactive Hyperplasia

Normal / Hyperplasia (Polyclonal)



3:1 Ratio (Maintained)

Lymphoma (Monoclonal)

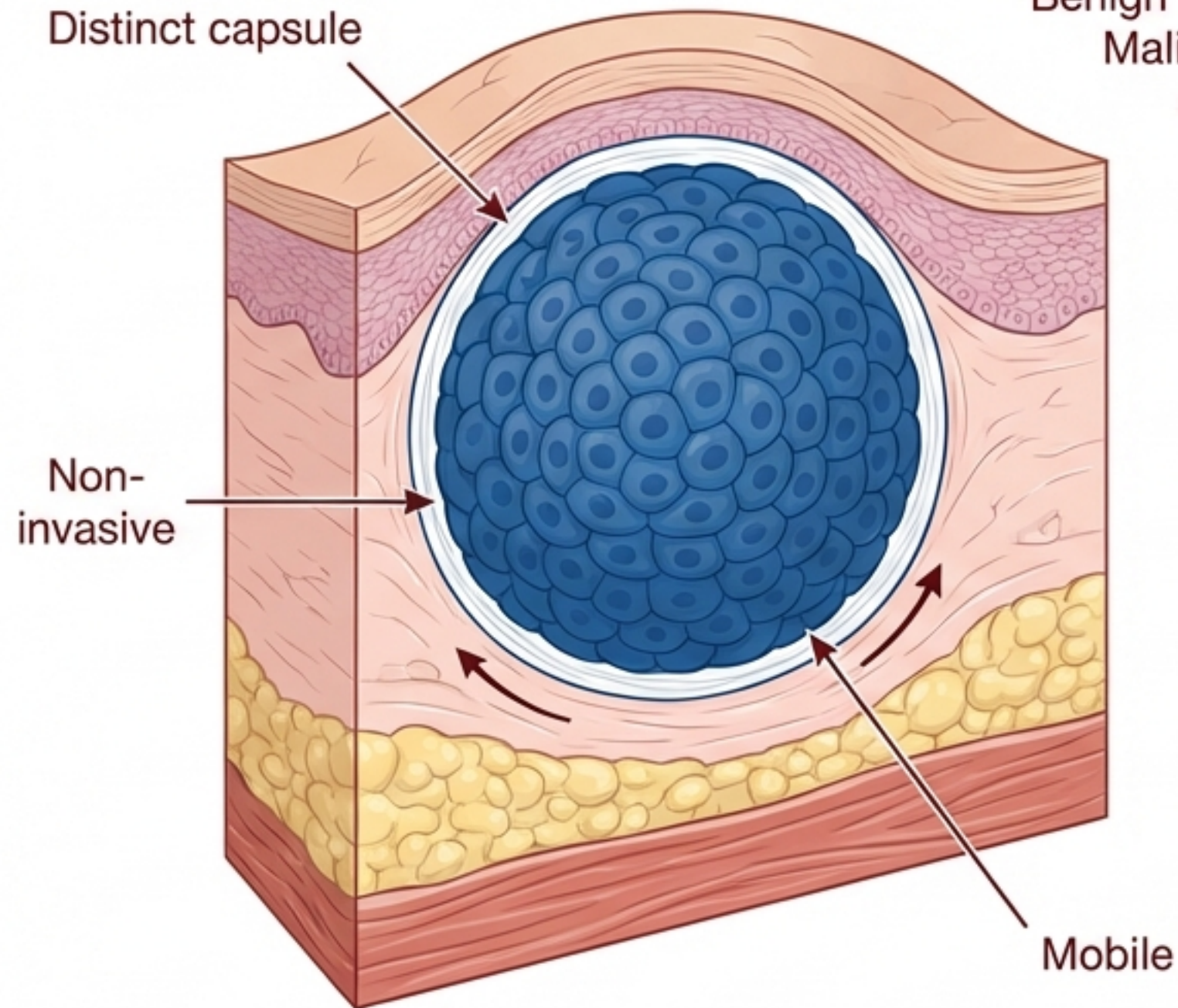


>6:1 Ratio (Inverted or Skewed)

In B-Lymphocyte proliferation, maintaining the 3:1 Kappa:Lambda ratio indicates benign hyperplasia. A skewed ratio proves clonality and malignancy.

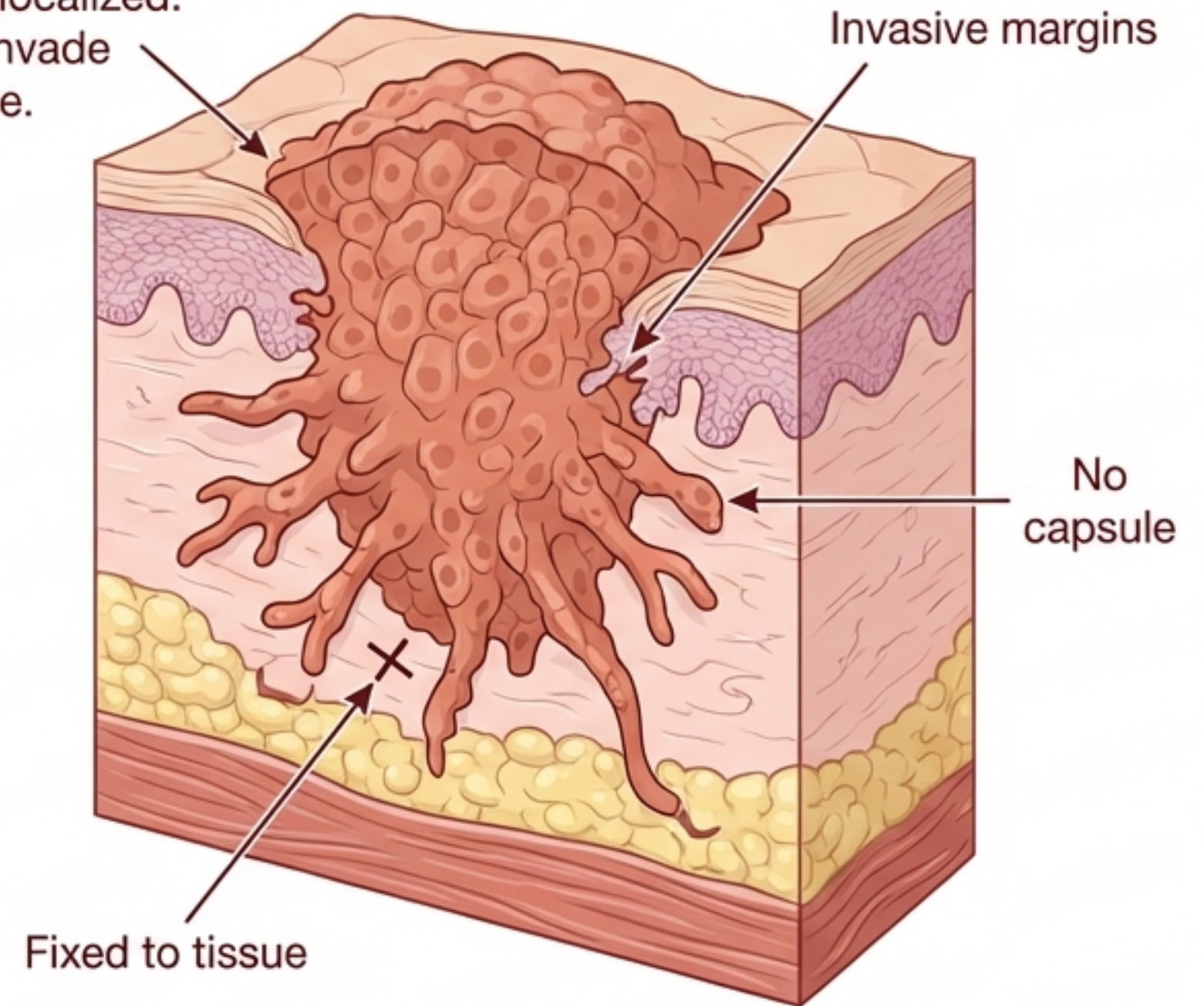
Behavior Determines Classification: Benign vs. Malignant

BENIGN







The distinction is binary:
Benign tumors remain localized.
Malignant tumors invade
and metastasize.

MALIGNANT



Nomenclature is Based on Lineage and Behavior.

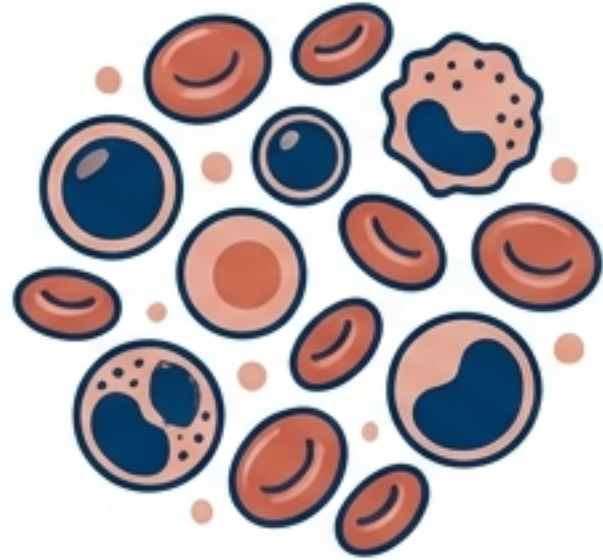
The Nomenclature Matrix

Lineage	Icon	Benign Tumor	Malignant Tumor
Epithelium		Adenoma / Papilloma	Adenocarcinoma / Papillary Carcinoma
Mesenchyme		Lipoma	Liposarcoma
Melanocyte		Nevus (Mole)	Melanoma
Lymphocyte		— (Does not exist)	Lymphoma / Leukemia

Nomenclature Exceptions: Malignancies Masquerading as Benign.

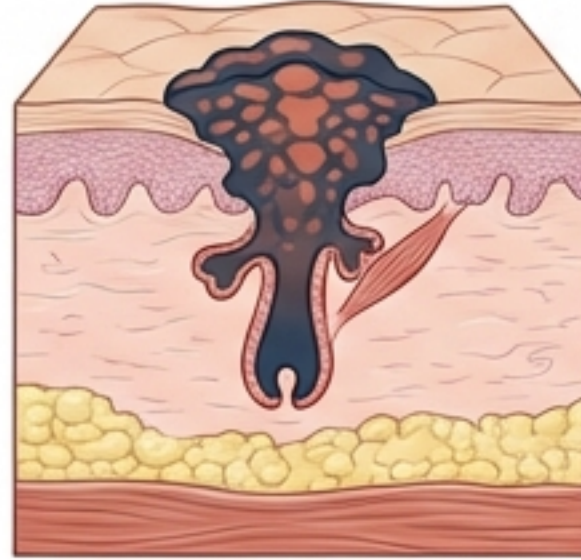
These tumors end in '-oma' but are fundamentally malignant.

Lymphoma & Leukemia



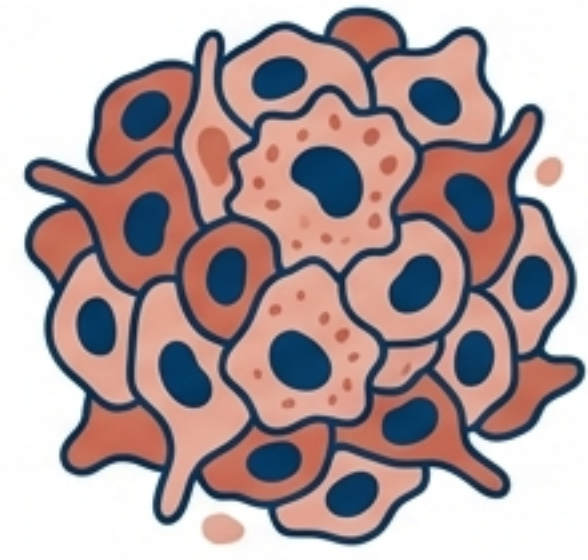
Malignant proliferation of lymphocytes. There is no benign lymphoma.

Melanoma



Malignant skin cancer. The benign counterpart is a Nevus.

Seminoma & Mesothelioma



Malignant germ cell and mesothelial tumors. Despite the suffix, these are invasive cancers.

Cancer is the Second Leading Cause of Death Across Age Groups

Adult Mortality

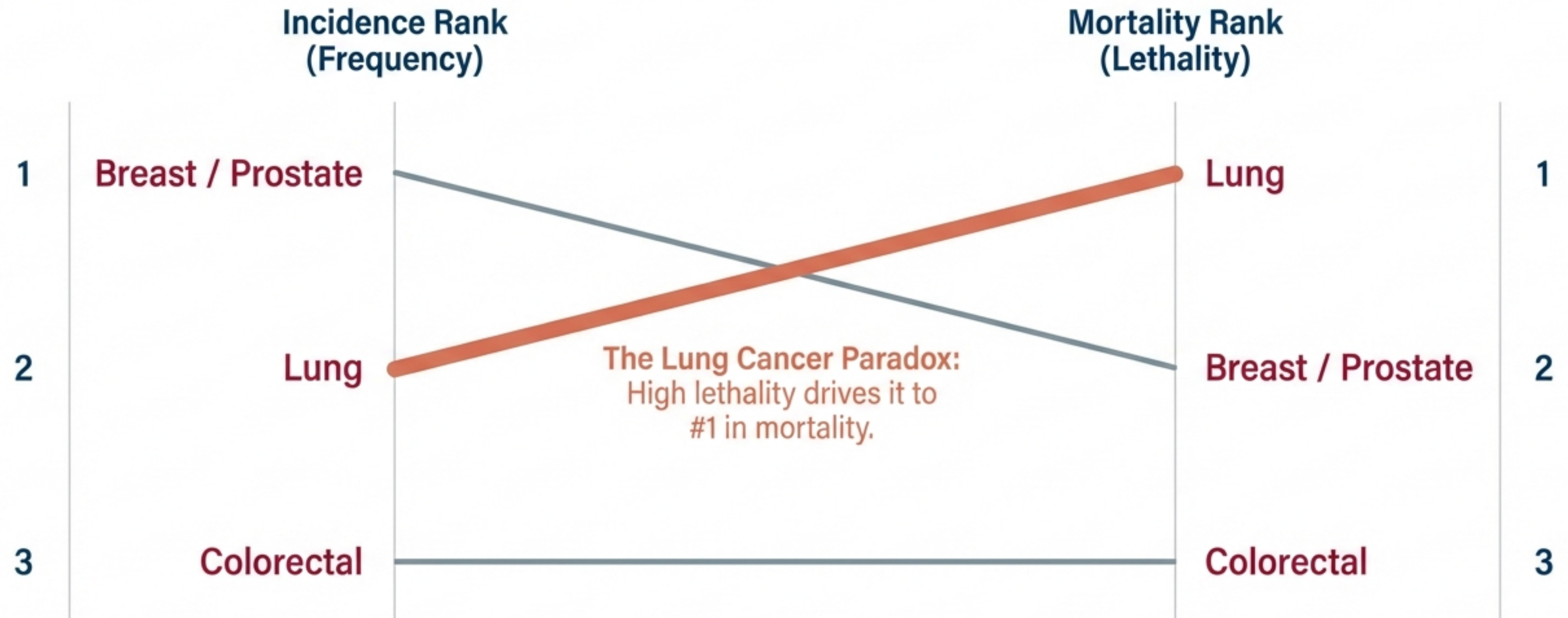


Child Mortality

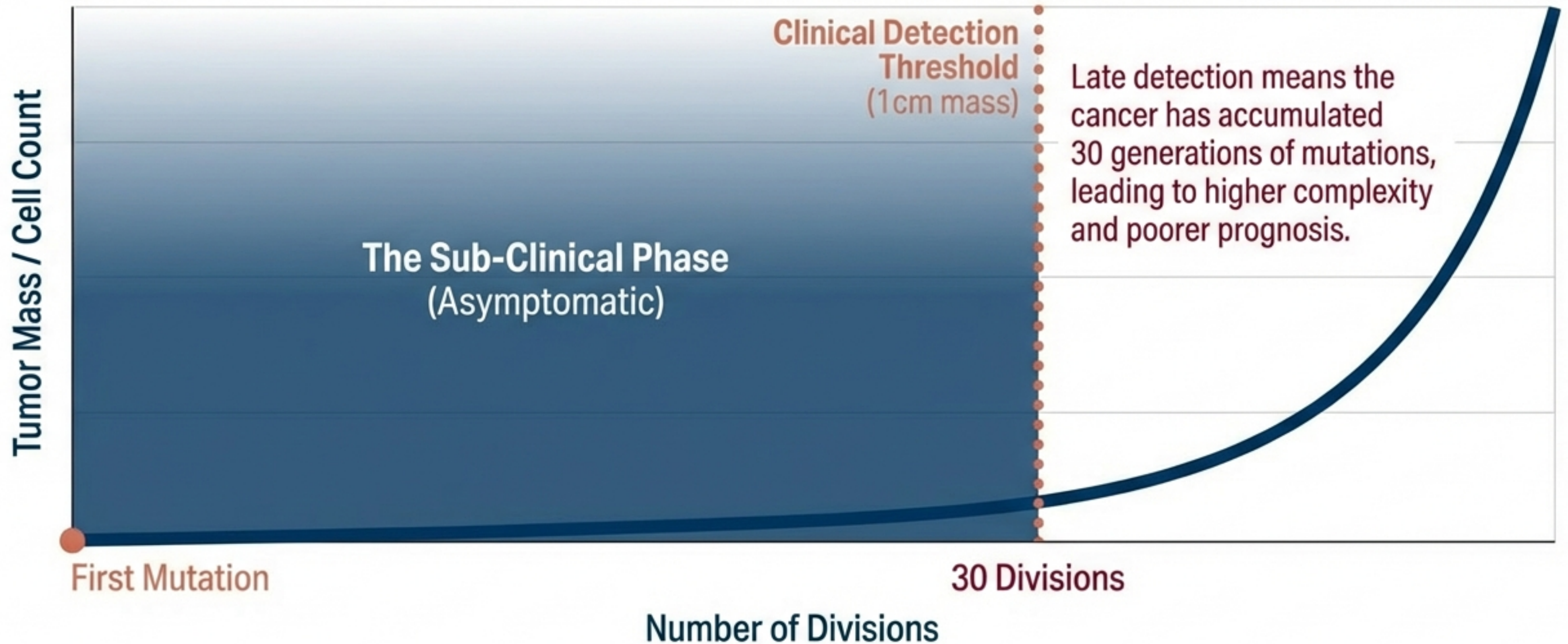


The Disconnect Between Incidence and Mortality in Adults

Lung cancer is less common than Breast/Prostate cancer, but far more lethal.



Approximately 30 Divisions Occur Before Clinical Symptoms Arise.



Screening Targets Dysplasia and Carcinoma Before Symptoms

Tools



Pap Smear



Mammography



PSA & DRE



Colonoscopy



Pathological Targets

Cervical Dysplasia (CIN)

Catch before carcinoma

In Situ Breast Cancer (DCIS)

Catch before invasion

Prostate Carcinoma

Catch before spread

Colonic Adenoma

Catch before carcinoma

Summary: From Genetic Ratios to Global Statistics.

The Micro Rule



Neoplasia is Monoclonal.

- G6PD isoforms (Mosaic vs. Monolith).
- Ig Light Chain Ratio (>6:1).

The Tissue Rule



Nomenclature Dictates Fate.

- Benign = Localized (Adenoma).
- Malignant = Invasive (Adenocarcinoma).
- Beware the traps: Melanoma, Lymphoma.

The Macro Rule



Epidemiology & Screening.

- Lung Cancer: #1 in Mortality.
- Screening intercepts the “30 Division” timeline to reduce death.