# Cancer Genomics

STAGE 1: INITIATION

### First Driver Mutation

Mutation provides growth advantage (e.g., TP53, KRAS)

STAGE 2: EXPANSION

### Clonal Expansion

Cell population grows, accumulates passenger mutations

STAGE 3: PROGRESSION

### Additional Drivers

Sequential genetic changes drive tumor progression

STAGE 4: HETEROGENEITY

### Branching Evolution

Multiple subclones emerge with distinct genetic profiles

STAGE 5: METASTASIS

### Invasive Phenotype

Cells acquire ability to invade and colonize distant sites

### Driver Mutations

Mutations providing selective growth advantage to cancer cells

### Passenger Mutations

Neutral mutations accumulated during tumor evolution

### Clonal Evolution

Tumor progression through sequential genetic changes

### Tumor Heterogeneity

Genetic diversity within and between tumors

Minimal Residual Disease: Ultra-sensitive detection of remaining cancer cells post-treatment