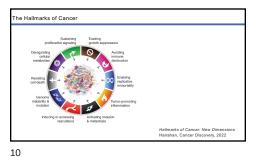
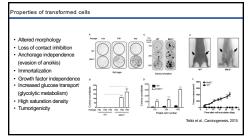


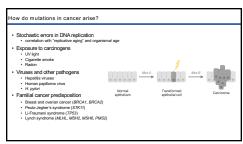
Nomenclature Neoplasia ("new growth", umbrella term for aberrant growths)
 Benign:
 Hyperplasia (overgrowth of normal tissue, e.g. prostate hyperplasia) Metaplasia (change in histological appearance, e.g. Barrett's esophagus)
 Dysplasia (abnormal cells within tissue)
 —oma (pre-malignant tumor, e.g. adenoma, lipoma) Malignant
 Carcinoma (epithelial origin, e.g. adenocarcinoma)
 Sarcoma (mesenchymal origin, e.g. liposarcoma)
 Lymphoma (lymphocytic origin, e.g. T cell lymphoma) Blood disorders:
 -emia (predominant feature of the blood, e.g. leukemia or anemia)
 -penia (lack of something in the blood, e.g. neutropenia or thrombocytopenia)

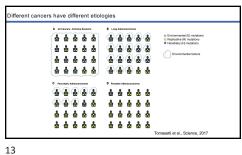
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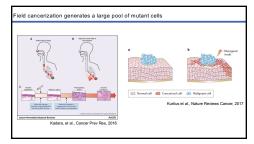
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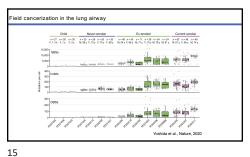


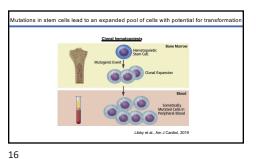


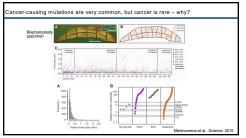


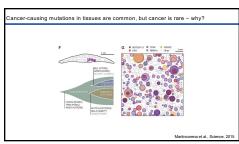


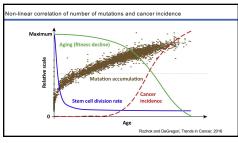








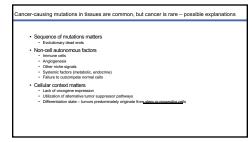




Early neoplasias must compete with normal cells for growth-supporting niche

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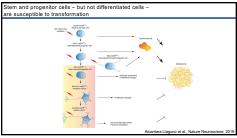
Why do we have stem cells?

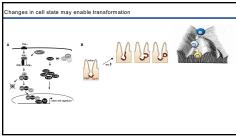
- Maintenance of reserve proliferative potential and genome fidelity in a subset of cells lowers risk of transformation
- Conservation of "epigenetic potential energy" ensures ability to rapidly differentiate into one of multiple possible differentiation states (plasticity)
- Metabolic specialization
- Spatial organization

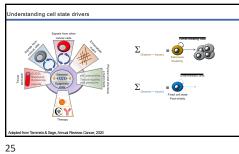
Waddington, The Epigenetics of Birds, 1953

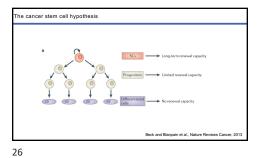
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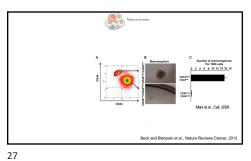
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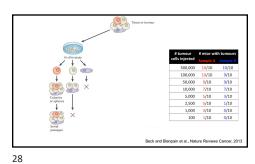




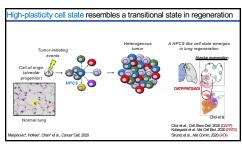


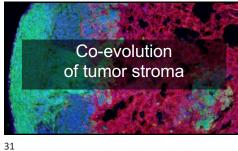


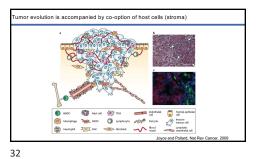


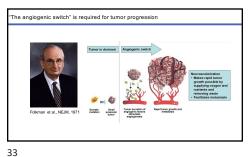


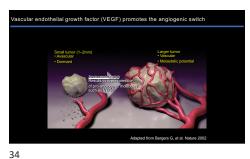


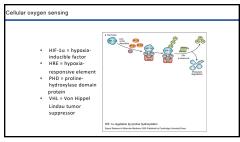


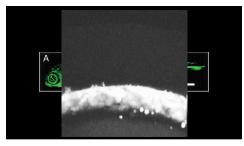


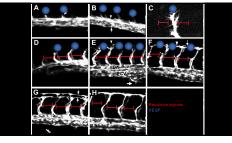


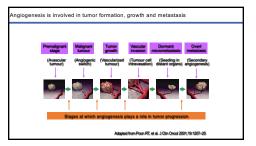




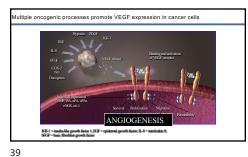


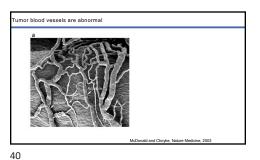


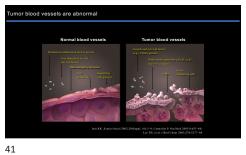




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 Cancer is a result of genetic mutations
 Multiple barriers exist to cellular transformation
 Tumor suppressors
 Cell state context
 Microenvironmental context Cancers co-opt regenerative and embryonic growth programs, which are enabled by epigenetic remodeling and paracrine signaling cues Cancer evolution is an ordered process similar to organogenesis
 Tumor progression requires cooperative relationships with the host stroma
 Mouse models provide a flexible platform for investigating cancer evolution in vivo

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