8. Cancer Evolution

1 unit, Tuomas Tammela, November 30, 2026

Cancer evolution

- Tumorigenesis is a multi-step process that involves a series of genetic mutations and epigenetic alterations.
- The molecular changes that drive cancer progression are a result of fierce Darwinian selection and cellular competition. Cancer therapies can alter the landscape of evolutionary pressures, leading to the emergence of genotypes and phenotypes that are adapted to therapy.
- Cancers co-opt regenerative and developmental programs characteristic of their cell of origin. At the same time, cancer progression is typically associated with increased phenotypic diversity and lineage-plasticity.
- Tumorigenesis involves complex interactions between cancer cells and non-transformed cells in the tumor microenvironment. Additional important cooperative relationships emerge between phenotypically distinct cancer cell subsets.

Discussion Paper:

https://cpb-us-e1.wpmucdn.com/sites.usc.edu/dist/5/476/files/2019/12/FearonVogelstein1990.pdf

Fearon E and Voglestein B, A Genetic Model for Colorectal Tumorigenesis. Cell, 1990, 61: 759-767.