



Technologies for Understanding and Treating Cancer

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How **big** is the problem?

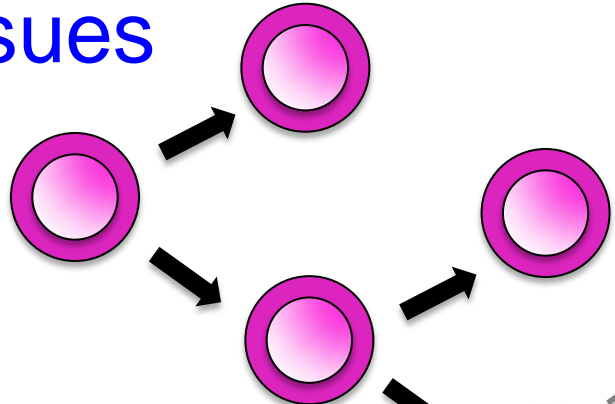
~**40%** of us will be diagnosed with cancer during our lifetimes

~**1.3%** of US GDP in 2010 was spent on cancer care

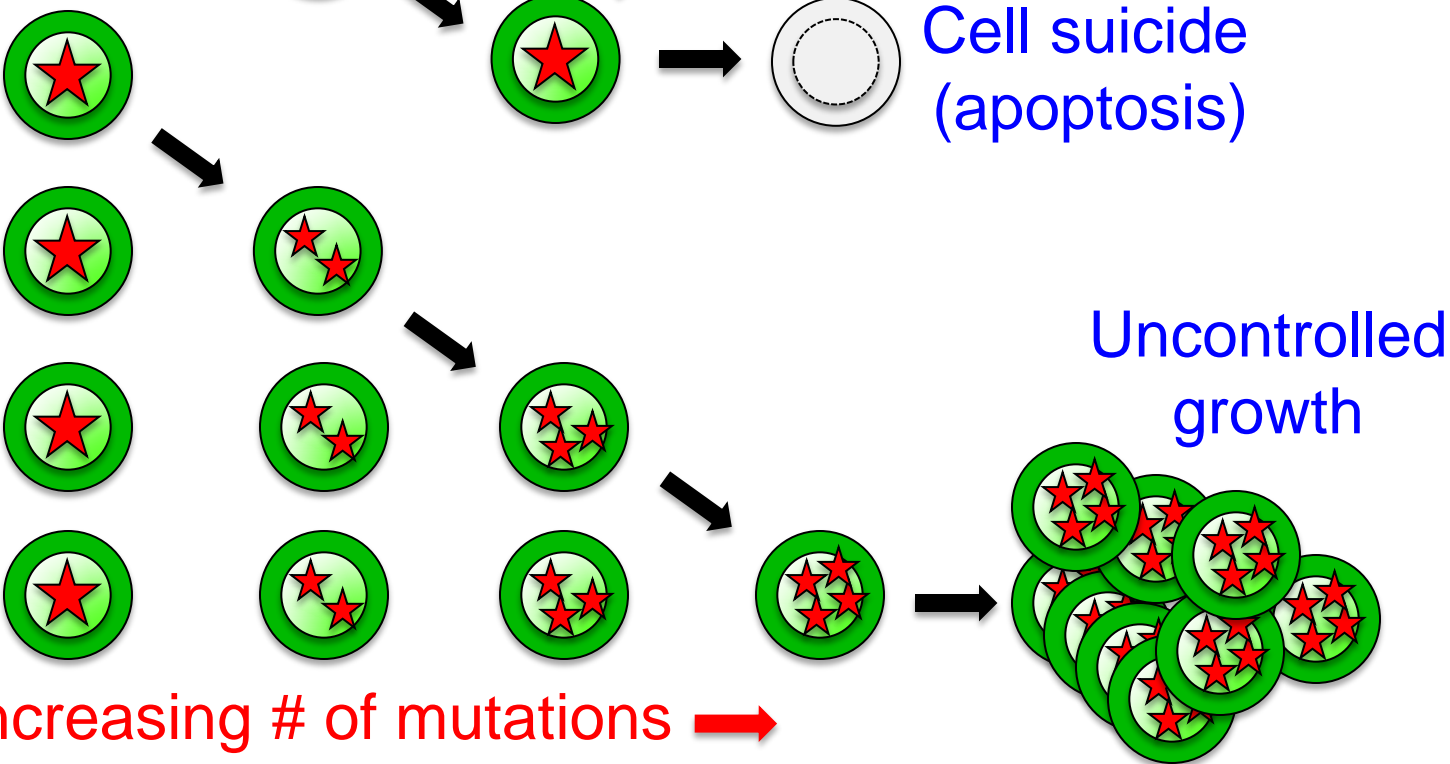
Many types of cancer, including breast, lung, prostate, colon, bladder, melanoma of the skin, non-Hodgkin lymphoma, thyroid, kidney, leukemia, endometrial and pancreatic

Cancer = diseases in which **abnormal cells divide without control** and are able to **invade other tissues**

Normal cell division



Cancer cell division



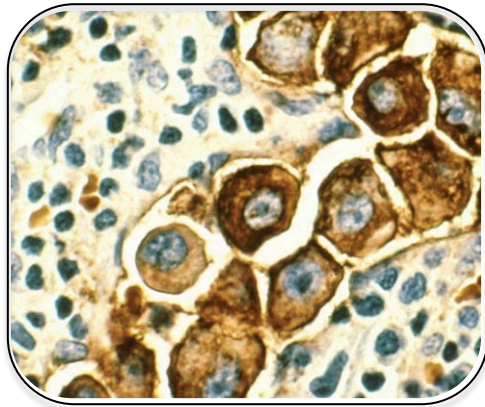
Cell damage (not repairable)

Cell suicide (apoptosis)

Uncontrolled growth

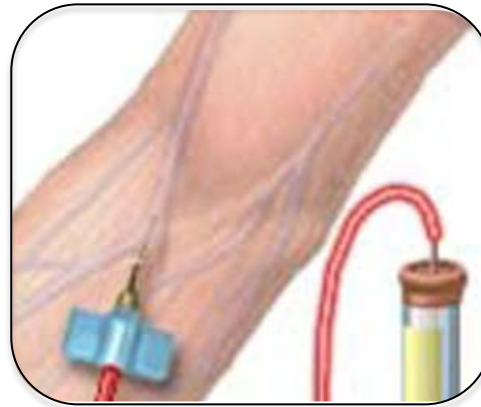
Increasing # of mutations →

Understanding factors that drive cancer



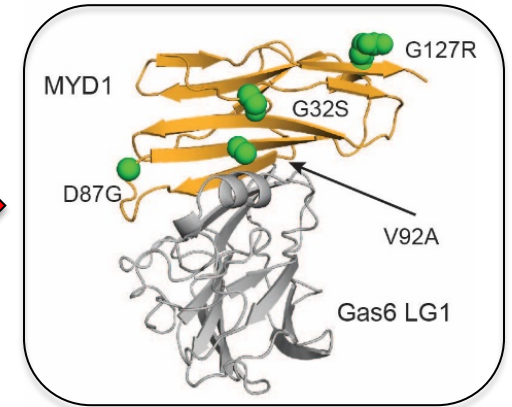
How do chemical and **mechanical signals** influence cancer progression?

Detecting cancer for early diagnosis



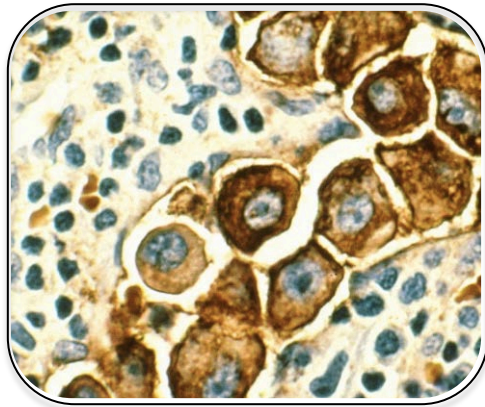
How can **rare cancer cells** in the blood be detected and used for diagnosing disease?

Treating cancer using biotherapeutics



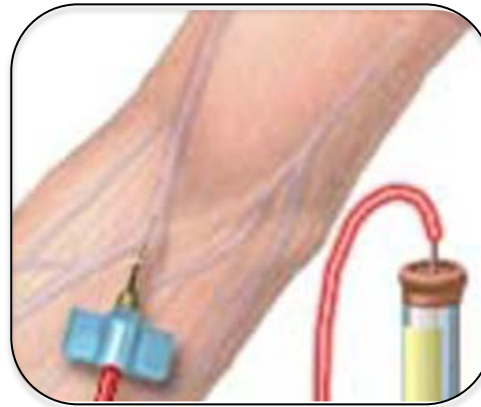
How can natural **proteins** and the **immune system** be engineered to combat cancer?

Understanding
factors that drive
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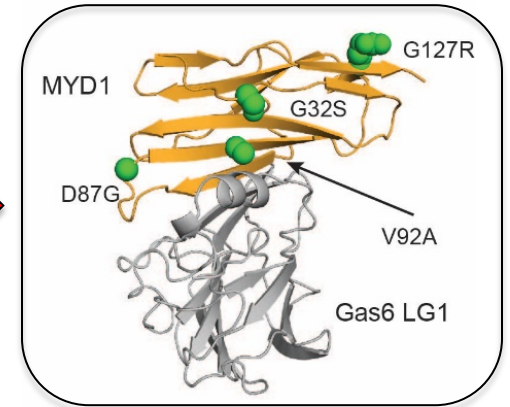
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Detecting
cancer for early
diagnosis



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Treating
cancer using
biotherapeutics



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