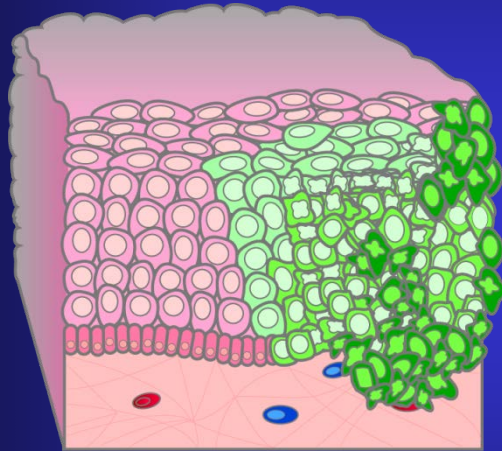


Understanding Cancer and Related Topics

Understanding Cancer



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Developed by:
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Donna Kerrigan, M.S.
Jeanne Kelly
Brian Hollen

Discusses and illustrates what cancer is, explains the link between genes and cancer, and discusses what is known about the causes, detection, and diagnosis of the disease.

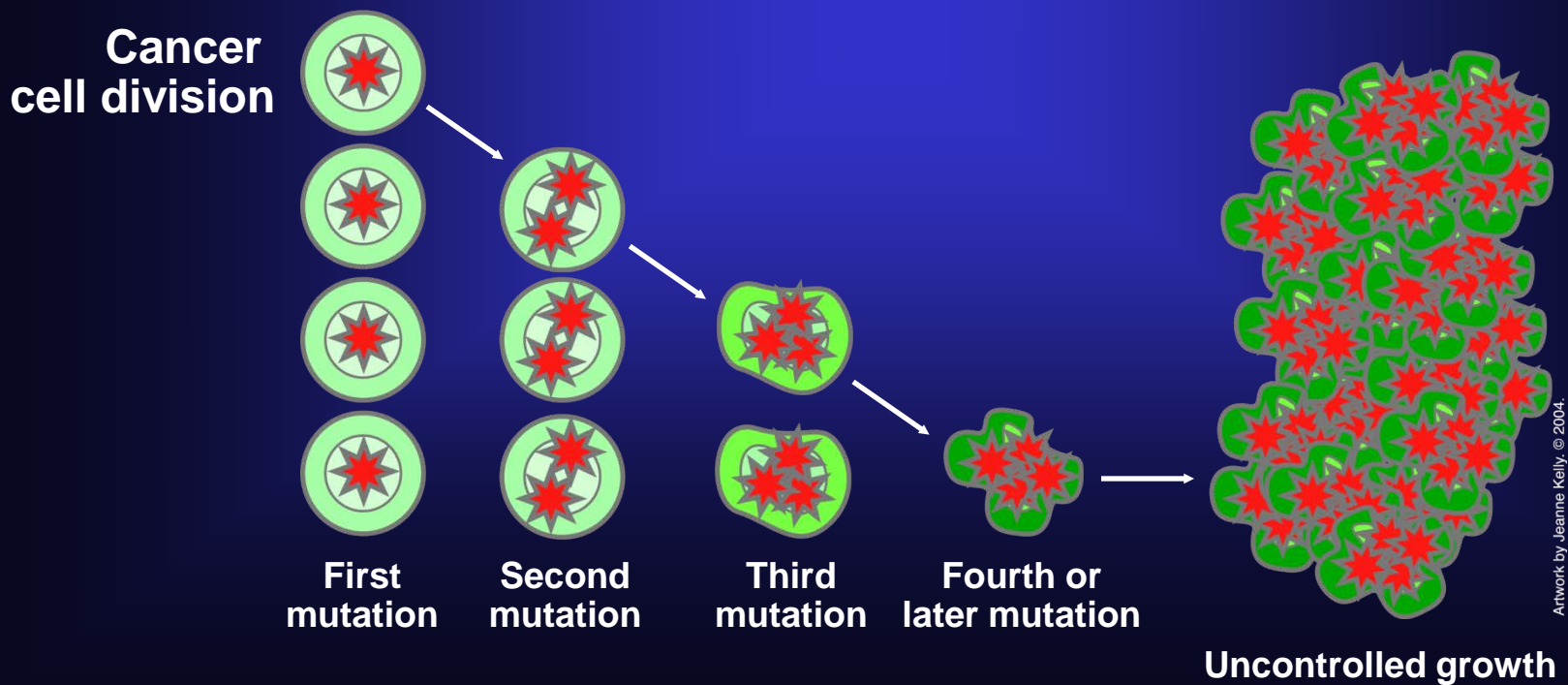
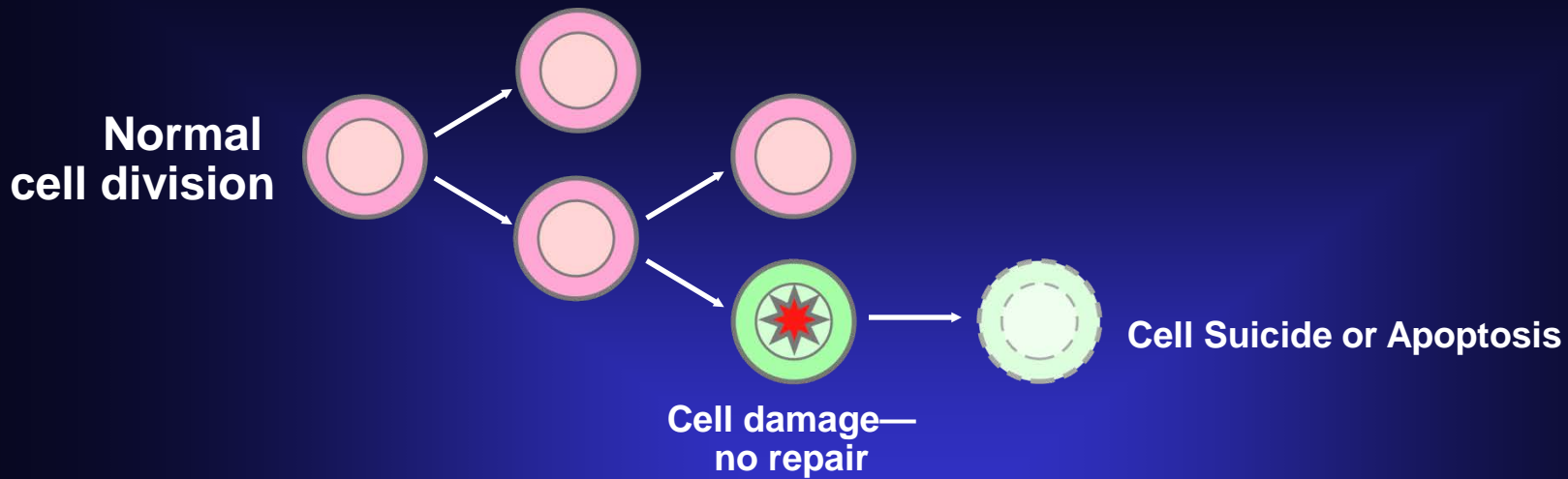
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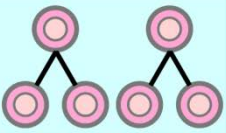
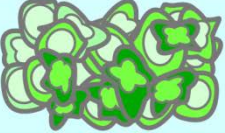










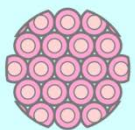

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Loss of Normal Growth Control



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Microscopic Appearance of Cancer Cells

Normal	Cancer	
		Large number of irregularly shaped dividing cells
		Large, variably shaped nuclei
		Small cytoplasmic volume relative to nuclei
		Variation in cell size and shape
		Loss of normal specialized cell features
		Disorganized arrangement of cells
		Poorly defined tumor boundary

Artwork by Jeanne Kelly, © 2004.

Tobacco Use and Cancer

Some Cancer-Causing Chemicals in Tobacco Smoke

aminostilbene
arsenic
benz[a]anthracene
benz[a]pyrene
benzene

benzo[b]fluoranthene
benzo[c]phenanthrene
benzo[f]fluoranthene
cadmium

chrysene
dibenz[a c]anthracene
dibenzo[a e]fluoranthene
dibenz[a h]acridine
dibenz[a j]acridine
dibenzo[c g]carbazone
N-dibutyl nitrosamine
2,3-dimethylchrysene

indeno[1,2,3-c d]pyrene
S-methylchrysene
S-methylfluoranthene
alpha-naphthylamine
nickel compounds
N-nitrosodimethylamine

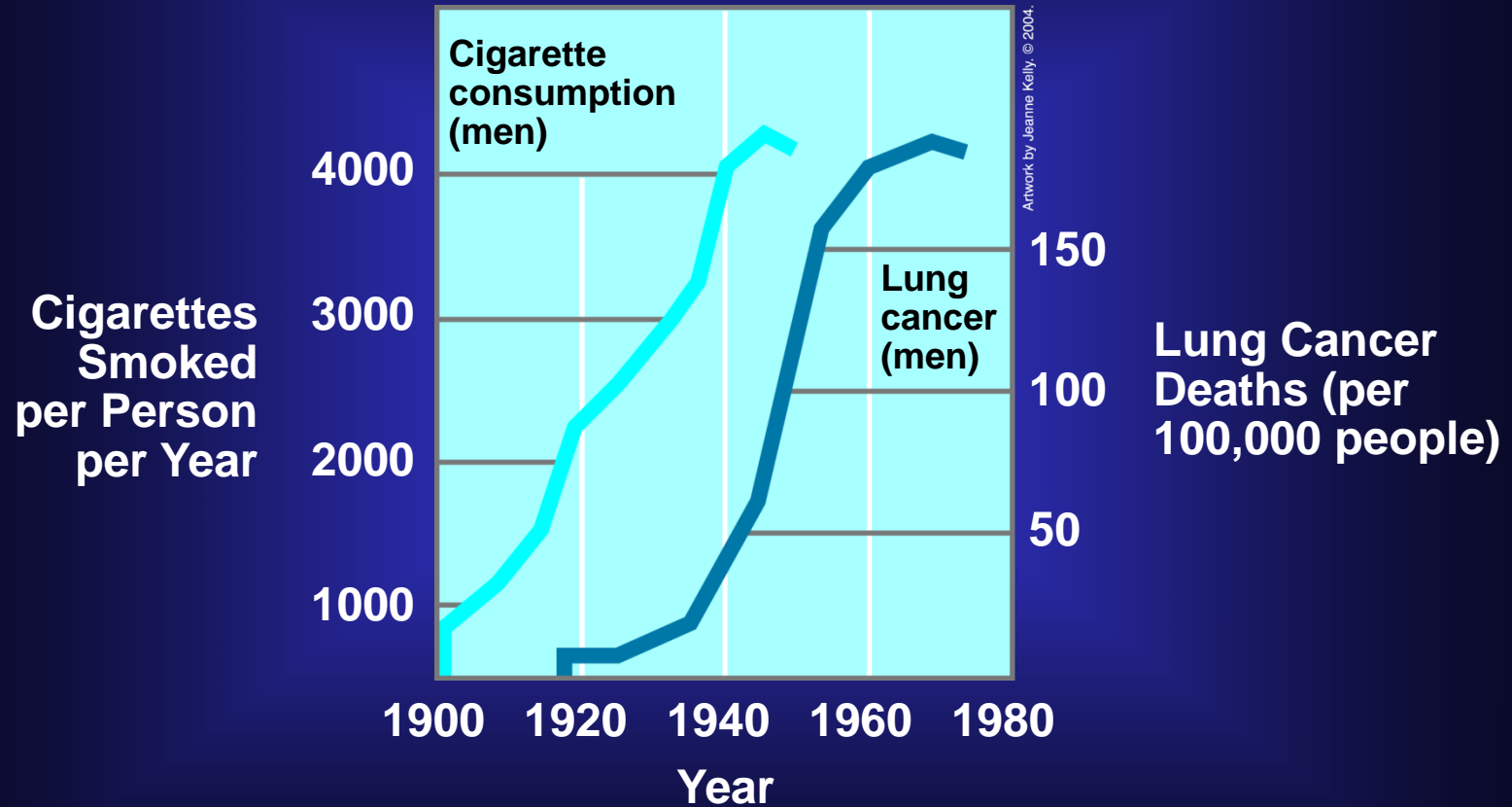
N-nitrosomethylethylamine
N-nitrosodiethylamine
N-nitrosornicotine
N-nitrosoanabasine
N-nitropiperidine
polonium-210



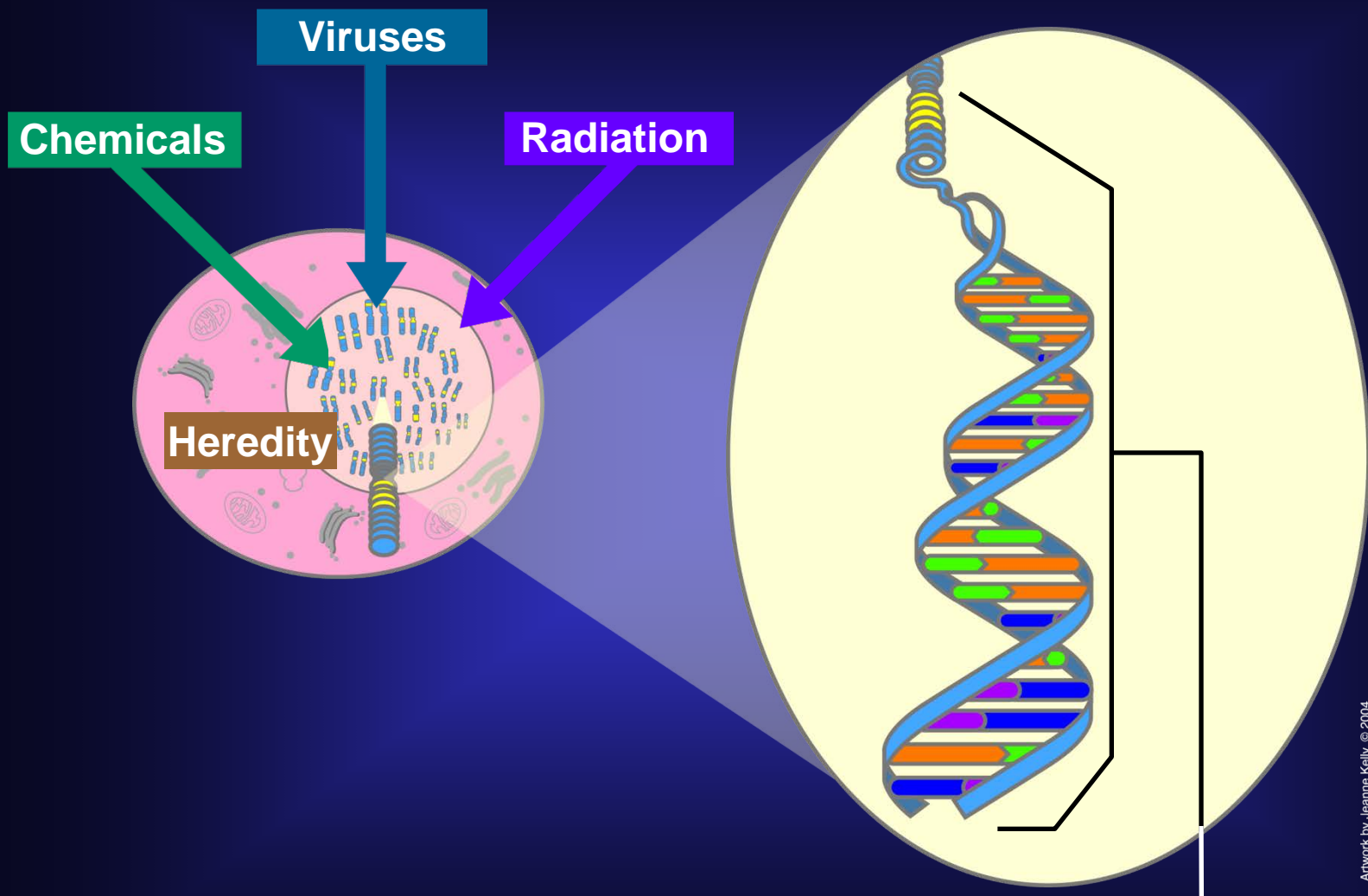
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Lag Time

20-Year Lag Time Between Smoking and Lung Cancer



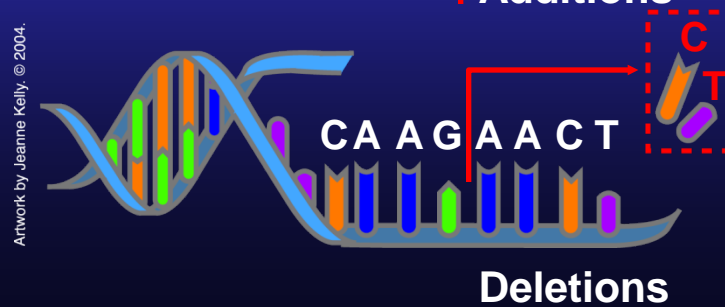
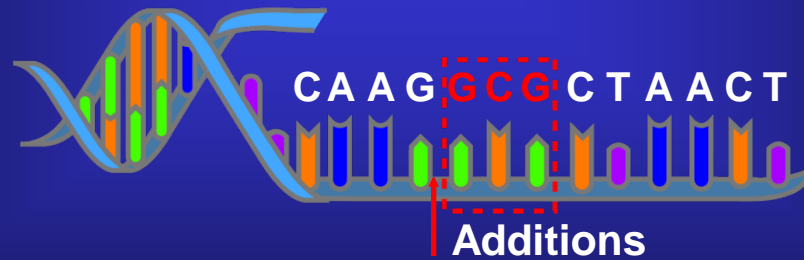
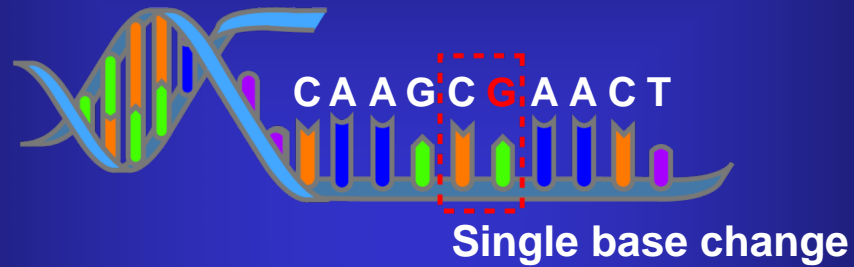
Genes and Cancer



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Chromosomes
are DNA
molecules

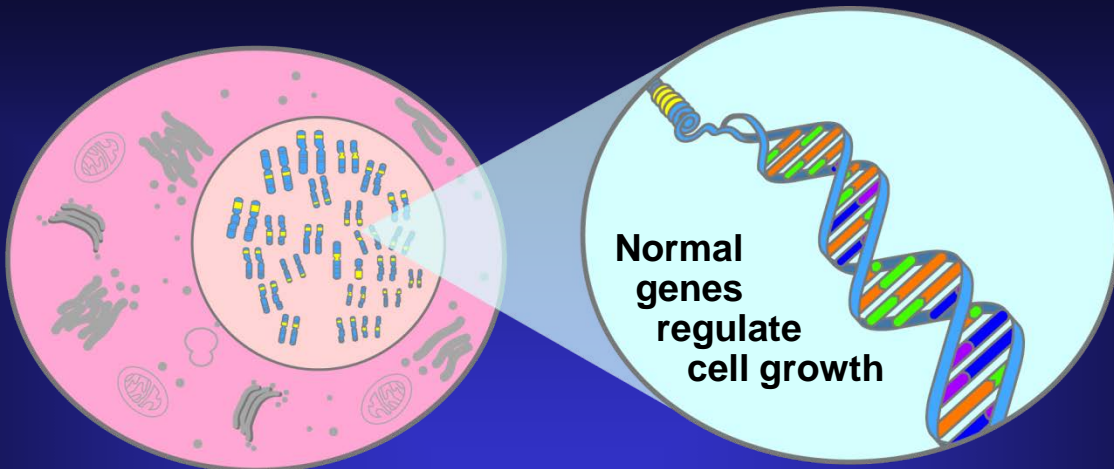
DNA Mutation



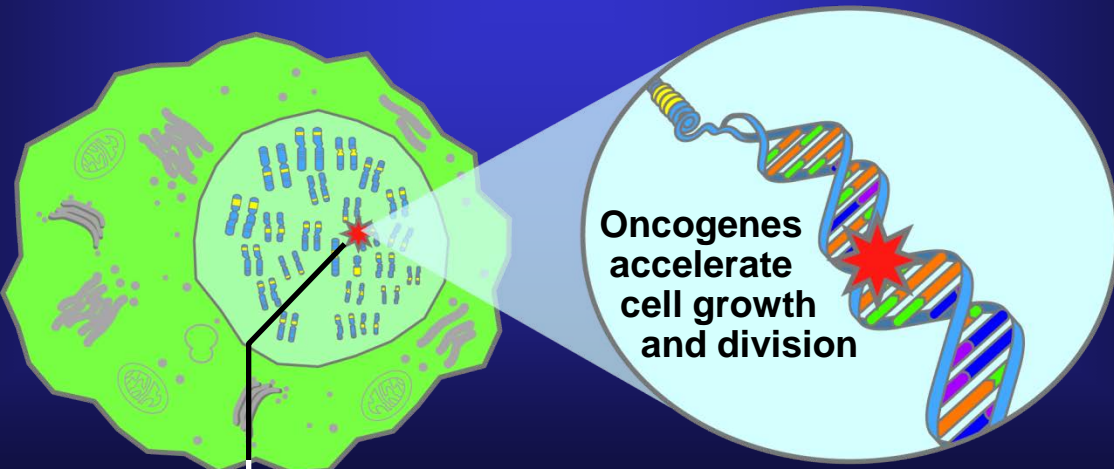
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Oncogenes

Normal cell



Cancer cell

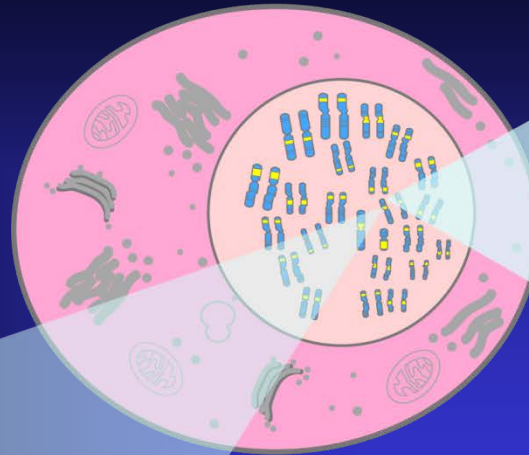


Mutated/damaged oncogene

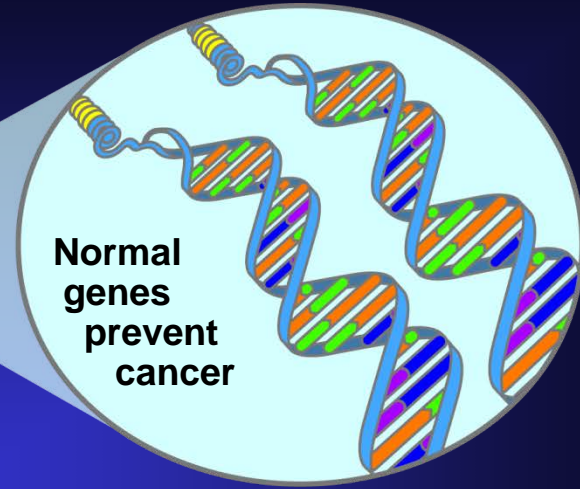
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Tumor Suppressor Genes

Normal cell

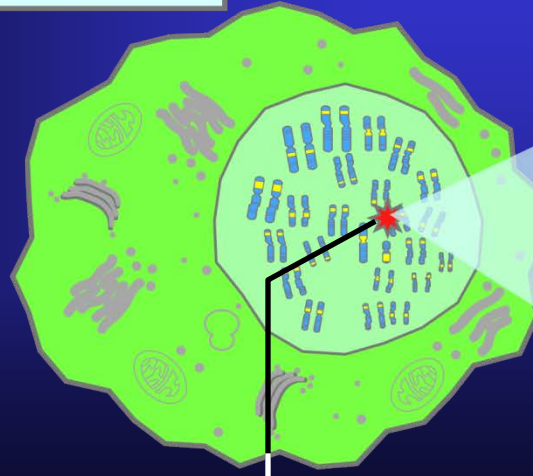


Normal genes prevent cancer

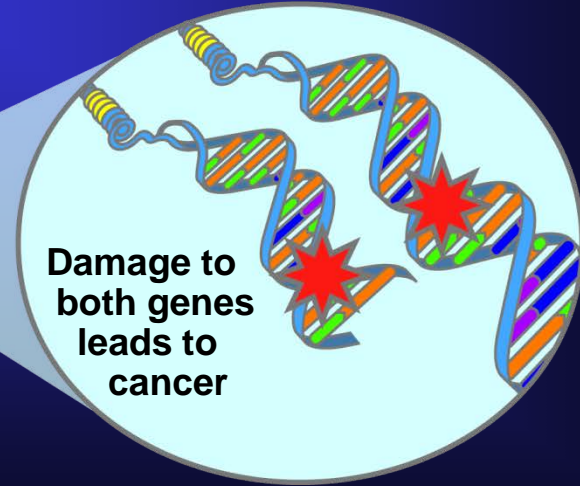


Remove or inactivate tumor suppressor genes

Cancer cell



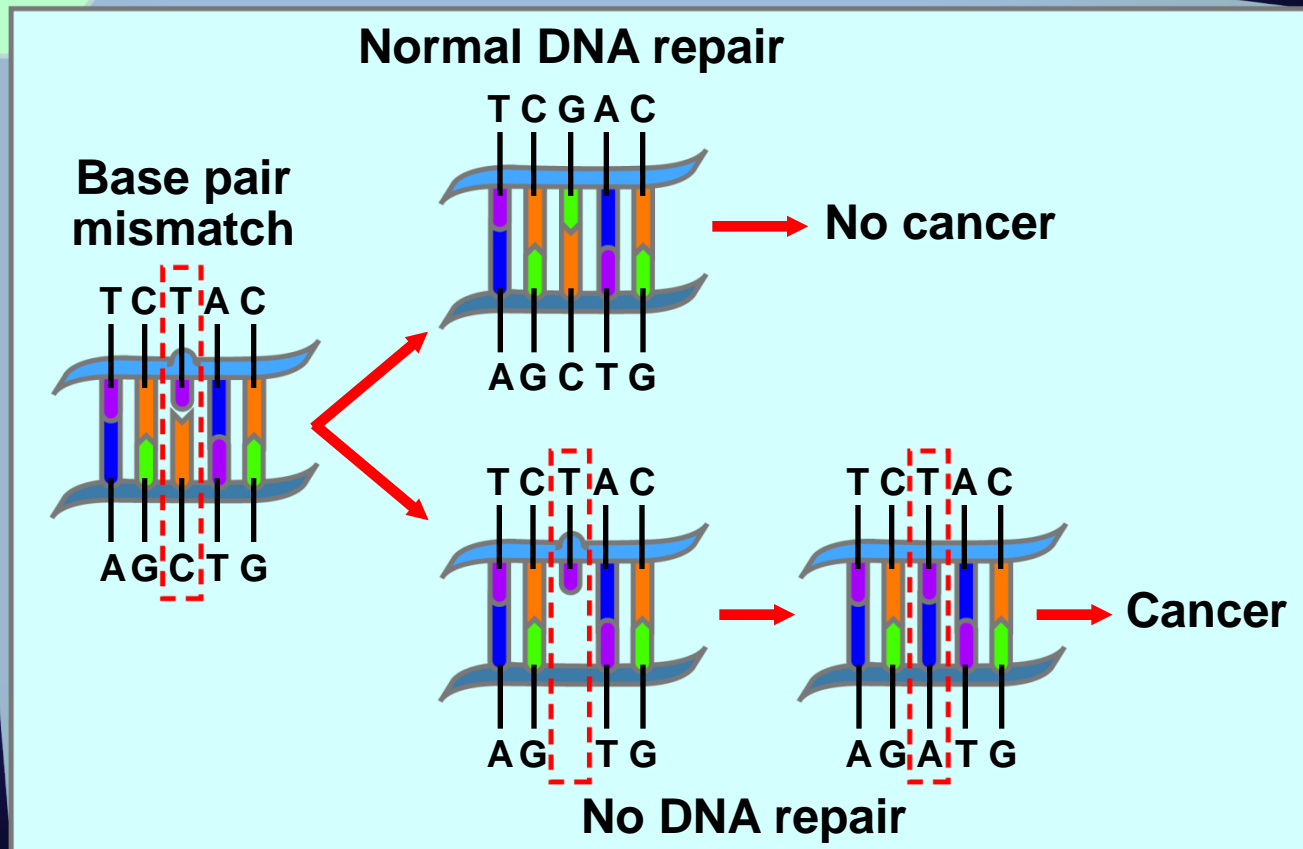
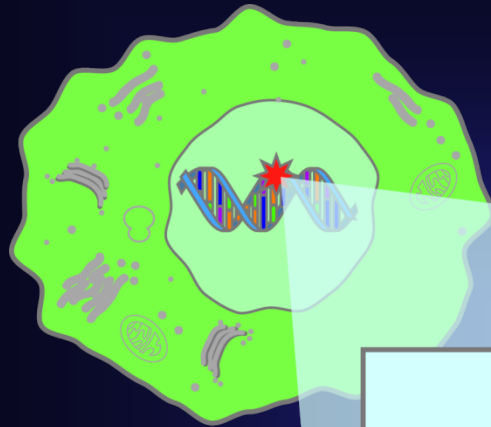
Damage to both genes leads to cancer



Mutated/inactivated tumor suppressor genes

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DNA Repair Genes

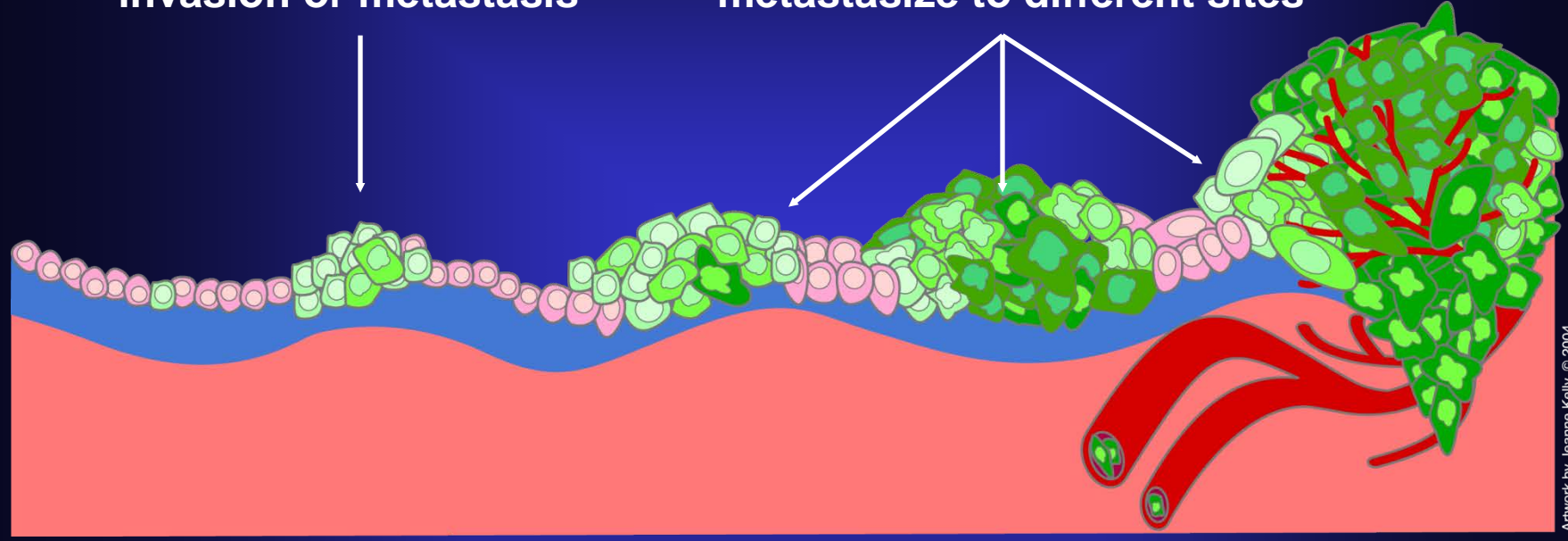


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Cancer Tends to Involve Multiple Mutations

Benign tumor cells grow only locally and cannot spread by invasion or metastasis

Malignant cells invade neighboring tissues, enter blood vessels, and metastasize to different sites



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Time →

Mutation inactivates suppressor gene

Cells proliferate

Mutations inactivate DNA repair genes

Proto-oncogenes mutate to oncogenes

More mutations, more genetic instability, metastatic disease