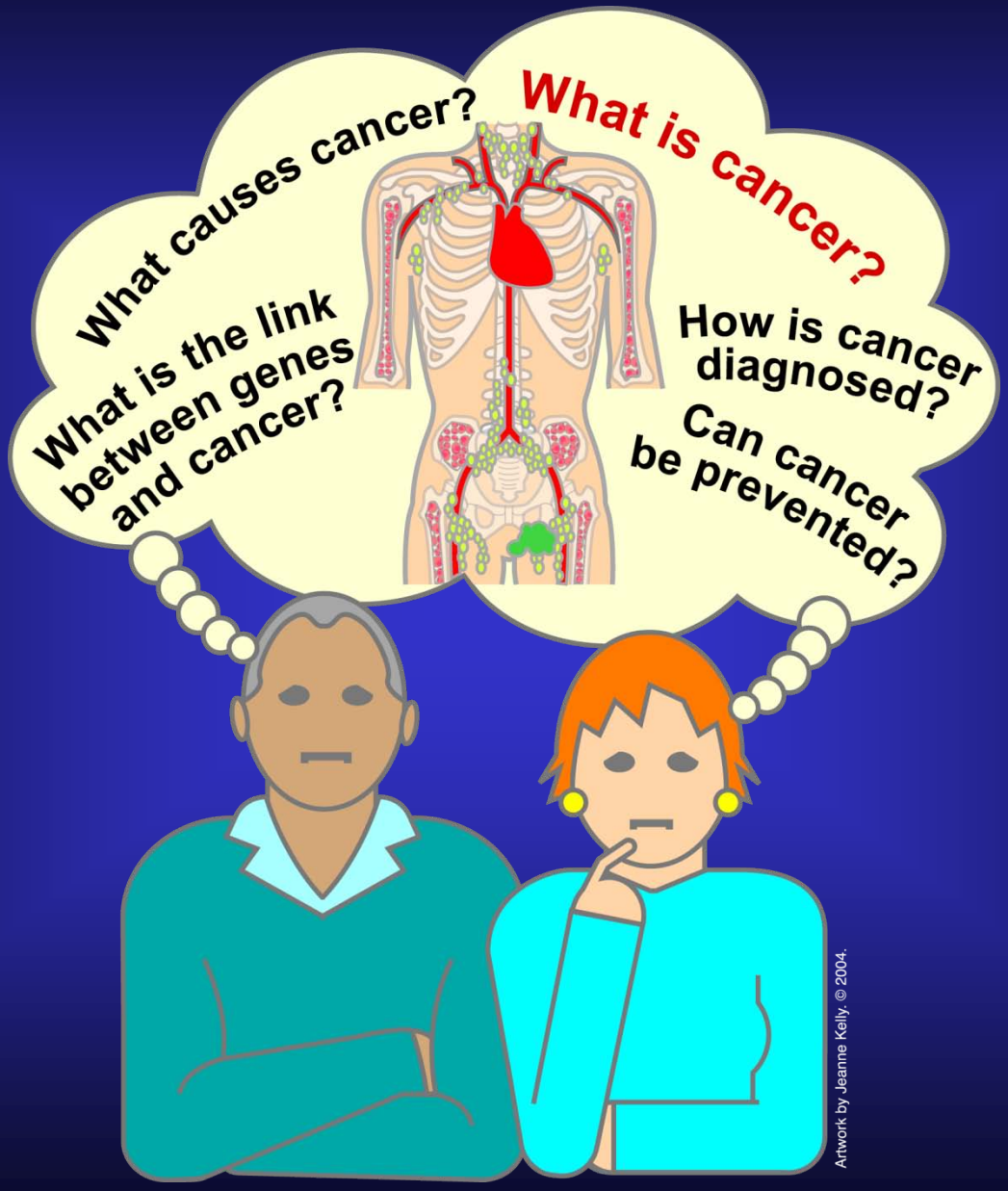
ILLINOIS CANCERCARE, P.C.

Specializing in Cancer and Blood Disorders

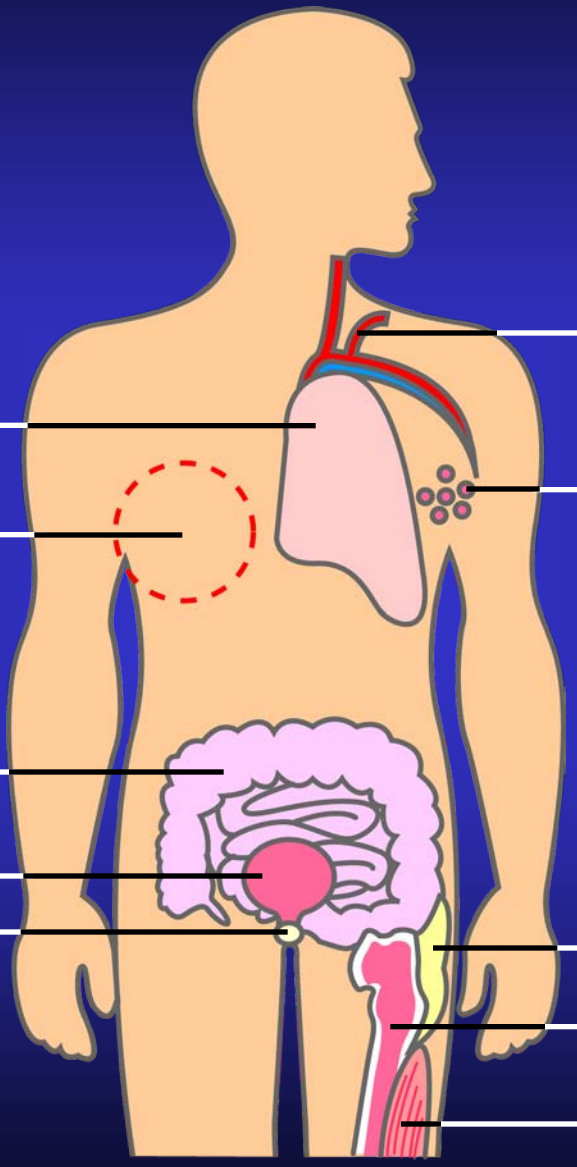
Understanding Cancer

Pankaj Kumar, MD

What Is Cancer?



Different Kinds of Cancer



Some common carcinomas:

- Lung
- Breast (women)
- Colon
- Bladder
- Prostate (men)

Leukemias:

- Bloodstream

Lymphomas:

- Lymph nodes

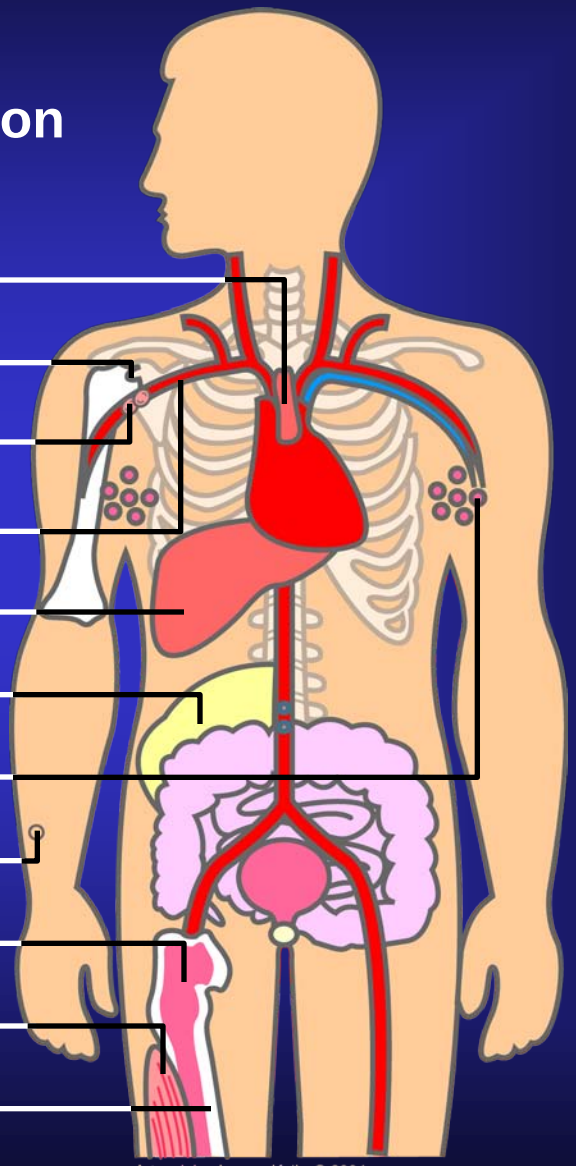
Some common sarcomas:

- Fat
- Bone
- Muscle

Naming Cancers

Cancer Prefixes Point to Location

Prefix	*Meaning*
adeno-	gland
chondro-	cartilage
erythro-	red blood cell
hemangio-	blood vessels
hepato-	liver
lipo-	fat
lympho-	lymphocyte
melano-	pigment cell
myelo-	bone marrow
myo-	muscle
osteo-	bone



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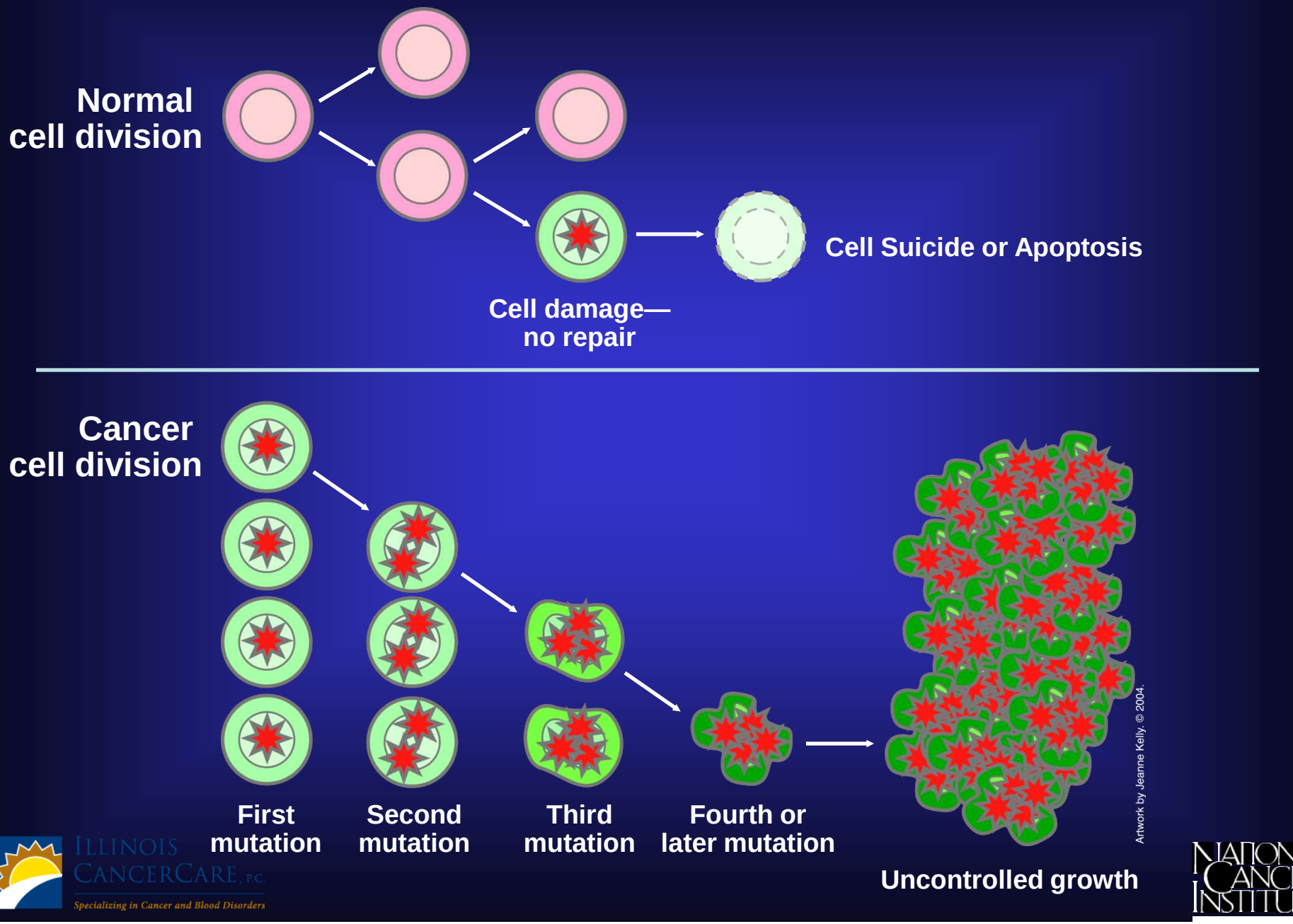
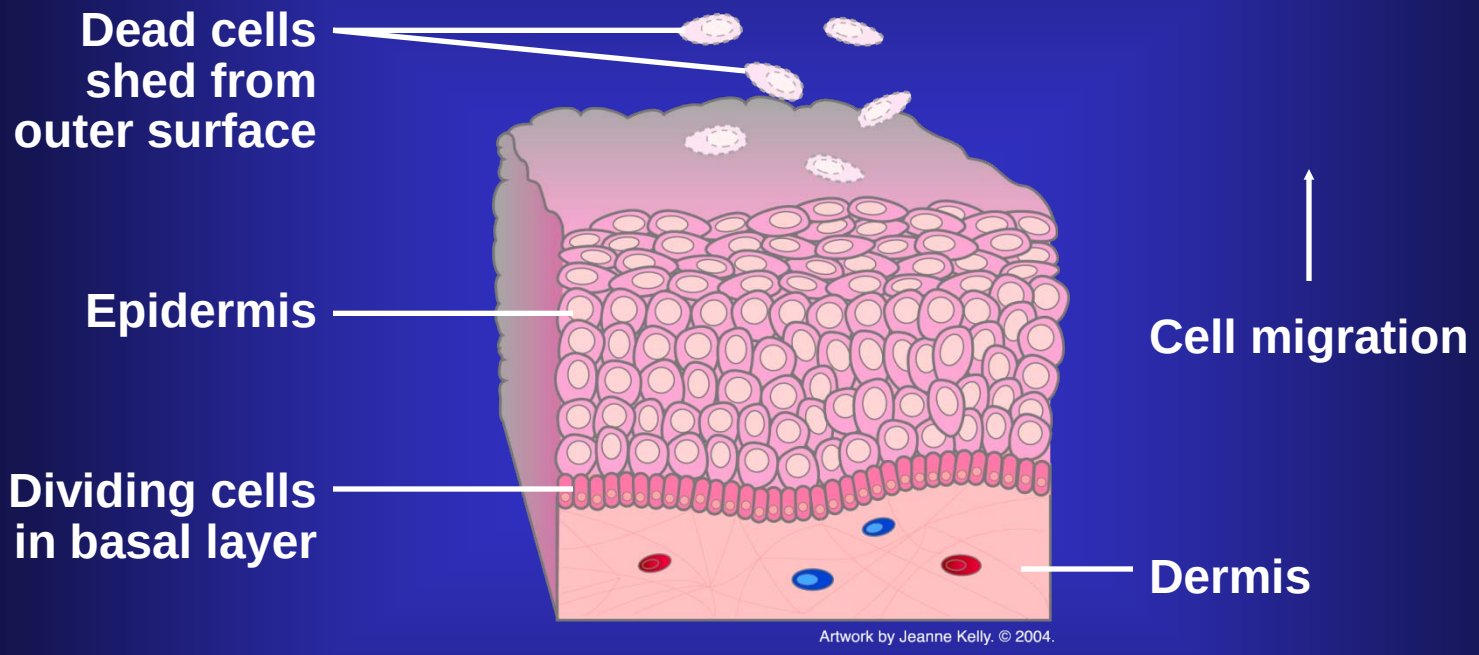
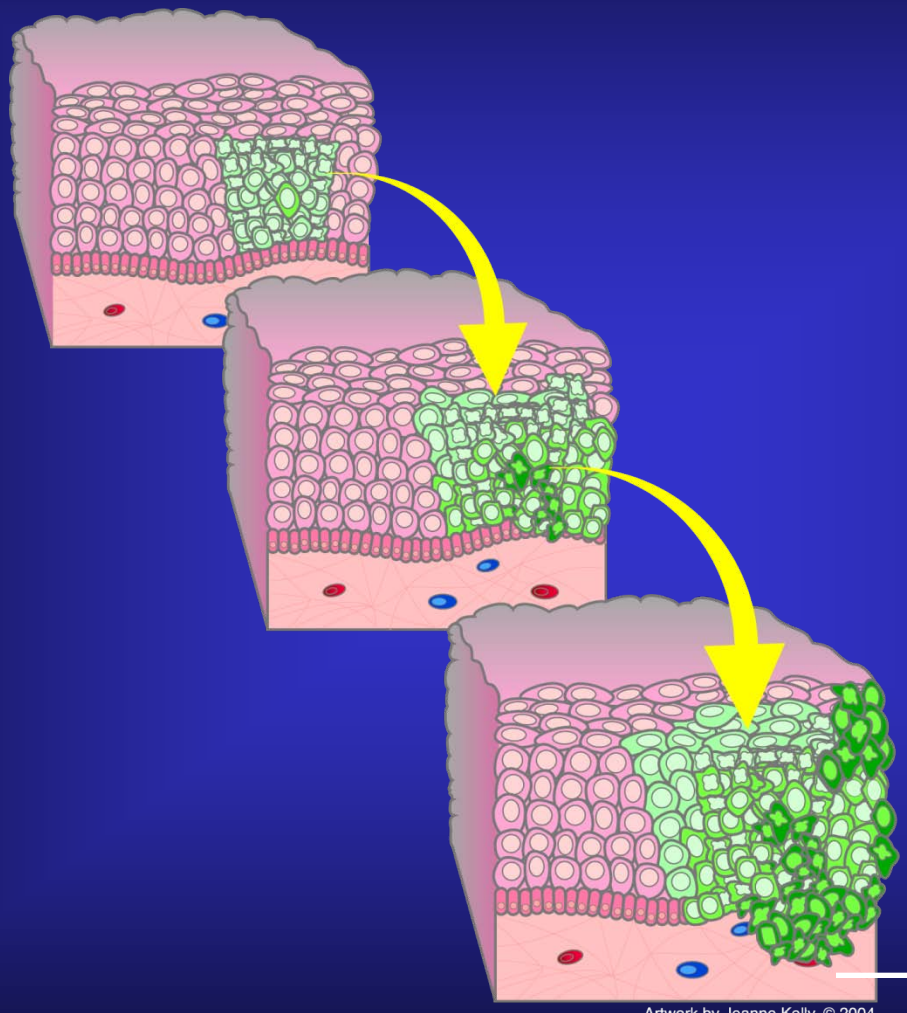
Loss of Normal Growth Control



Example of Normal Growth



Tumors (Neoplasms)



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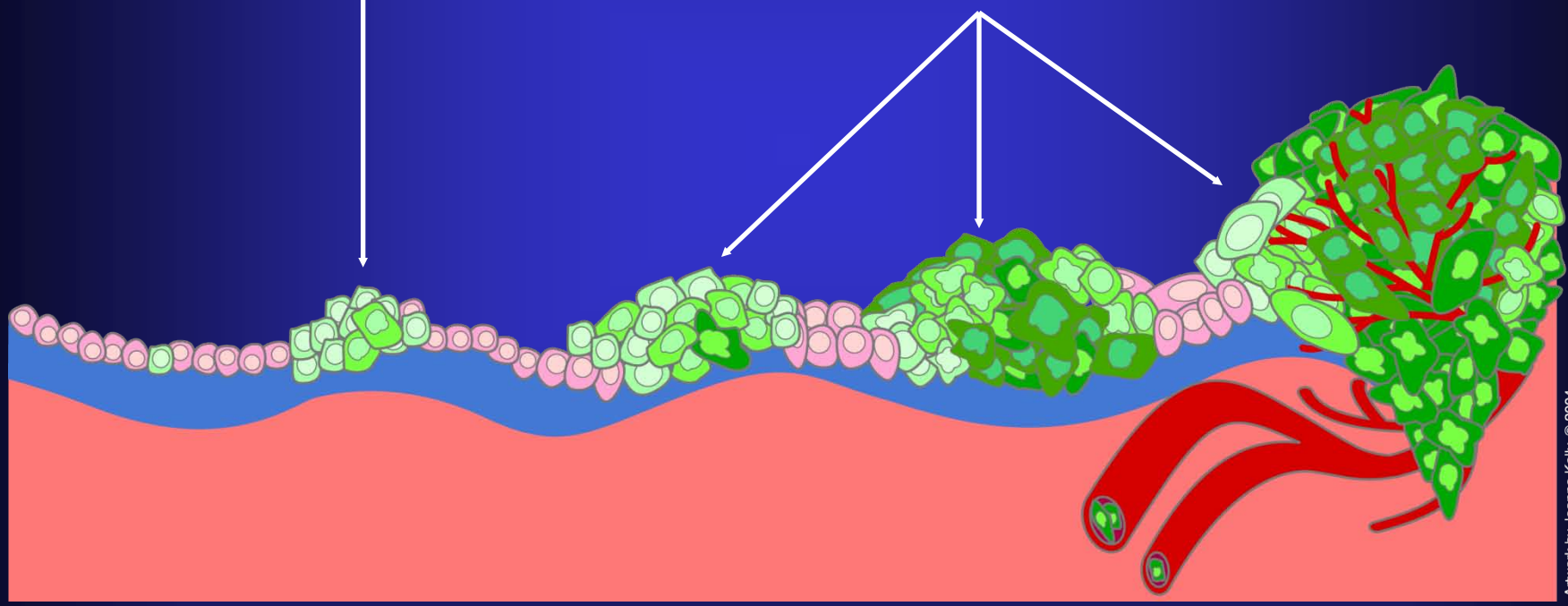
Malignant versus Benign Tumors

Benign (not cancer) tumor cells grow only locally and cannot spread by invasion or metastasis

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



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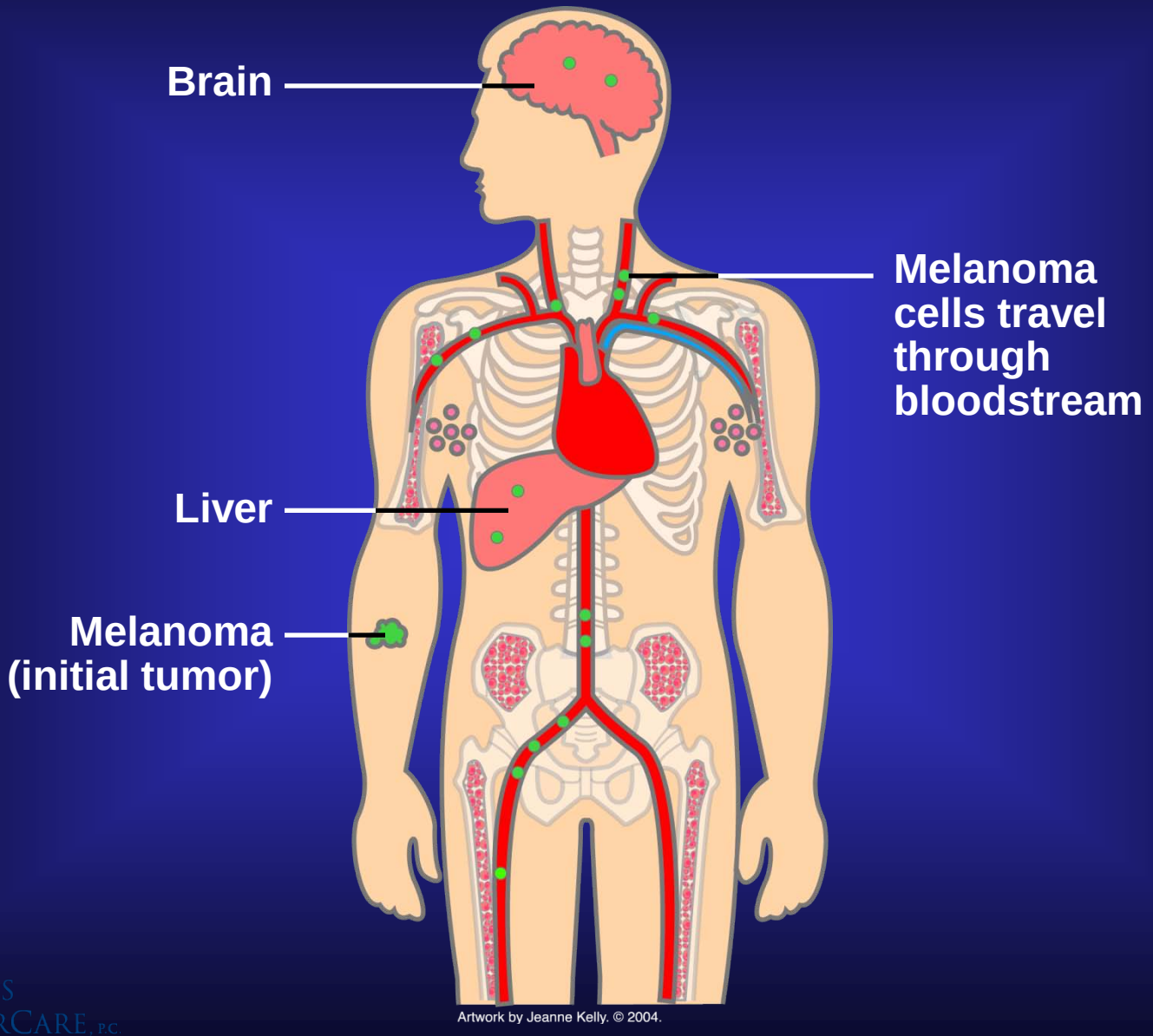
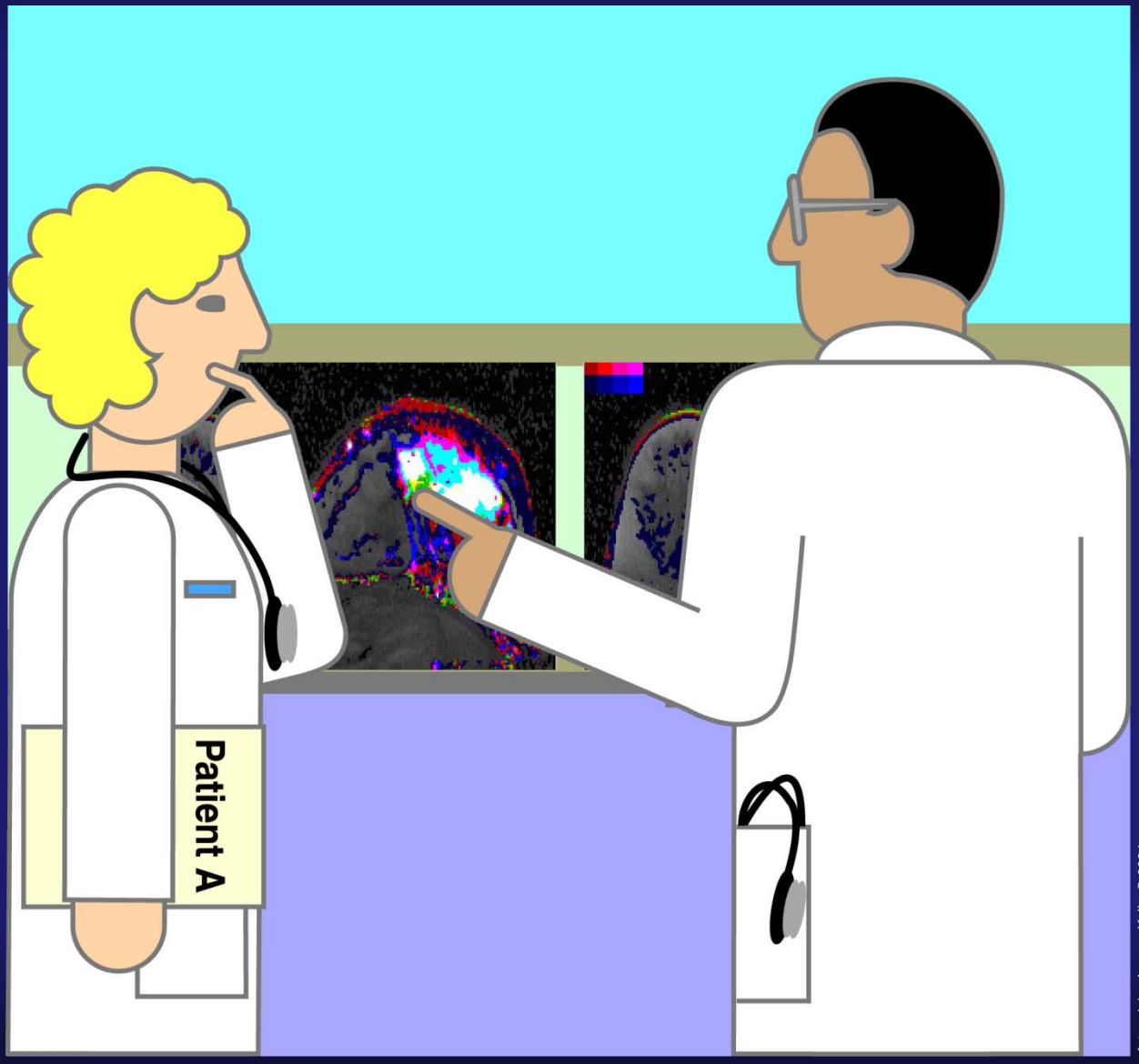
Time

Why Cancer Is Potentially Dangerous



Cancer Detection and Diagnosis



Early Cancer May Not Have Any Symptoms

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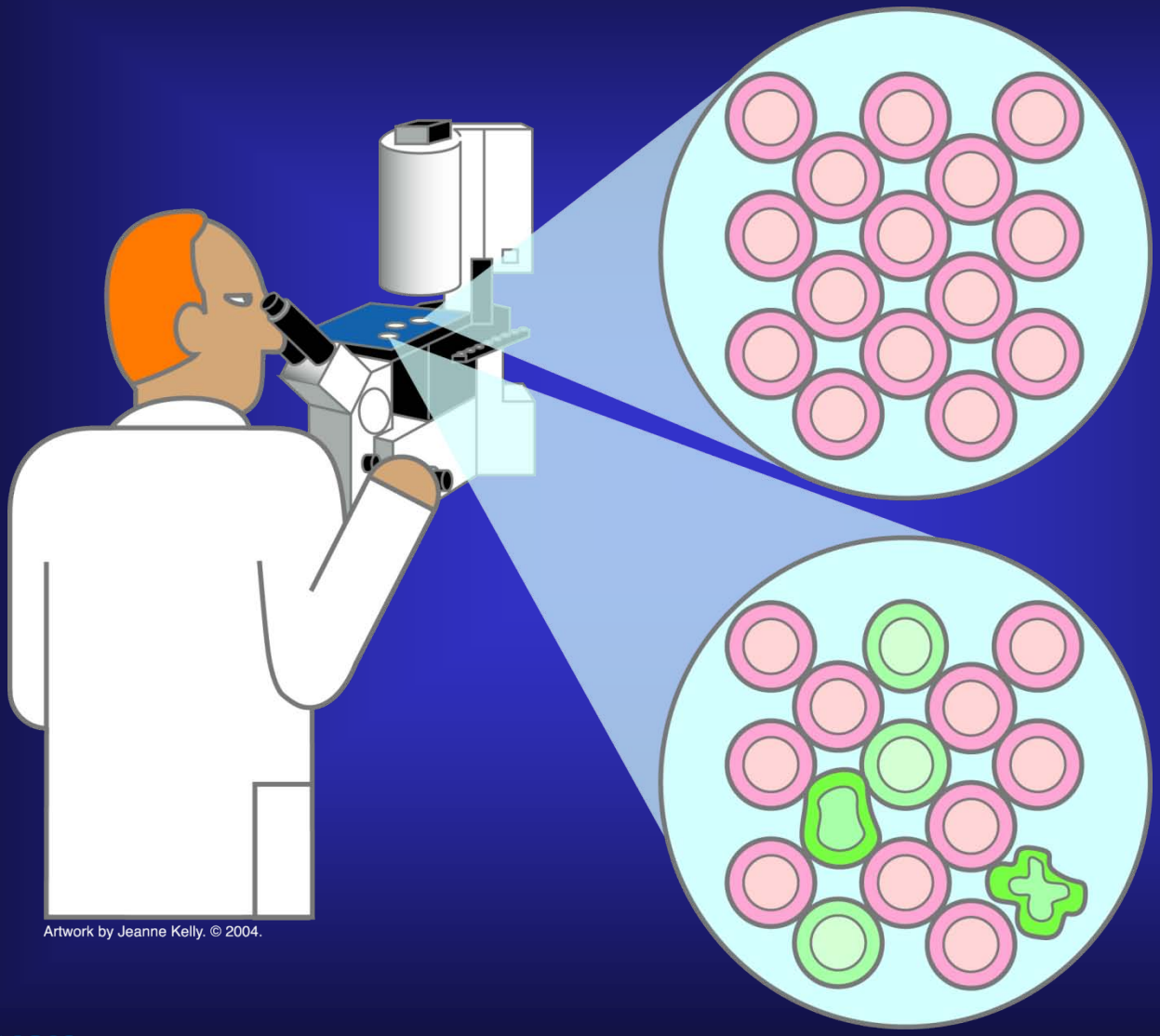
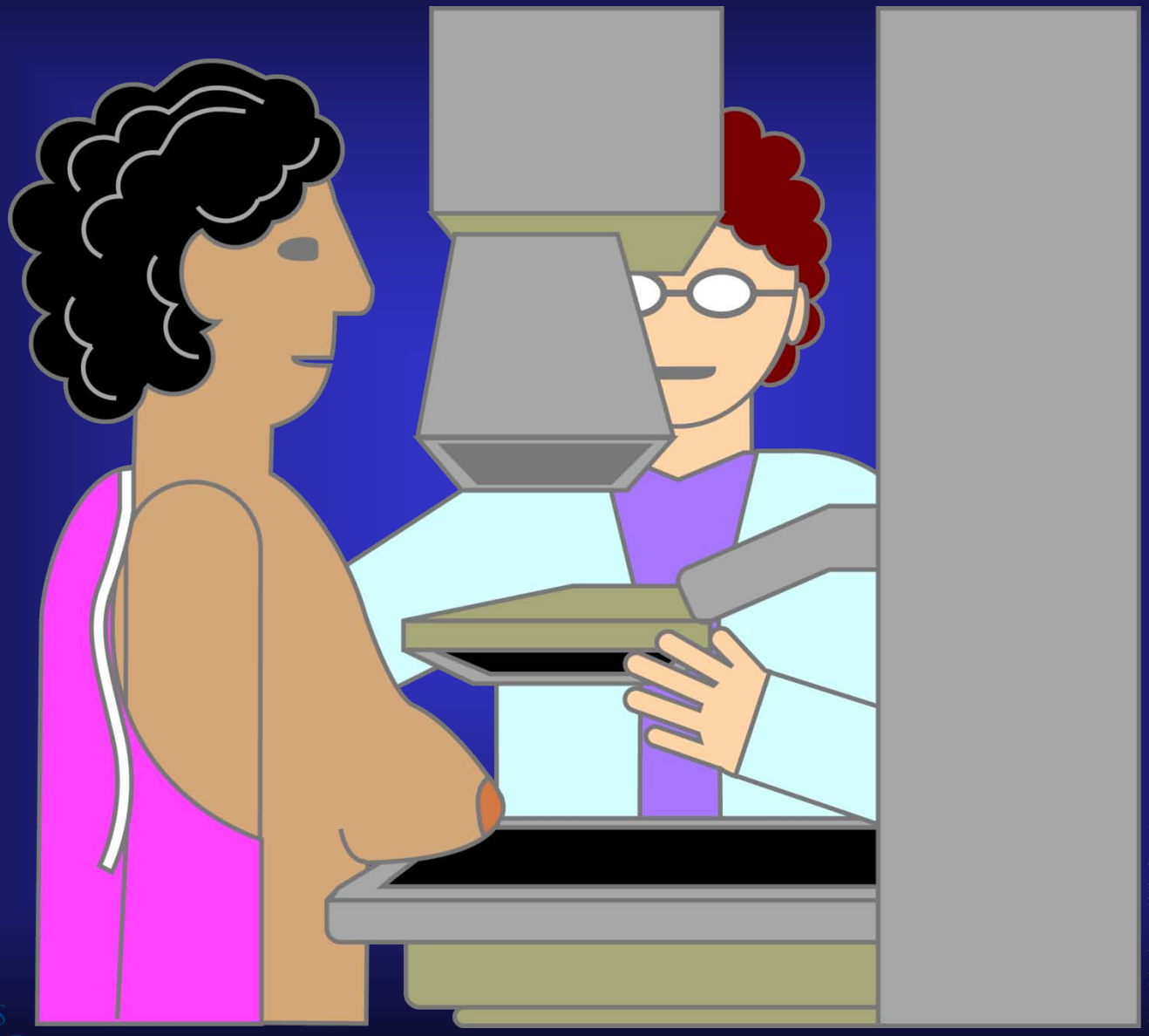
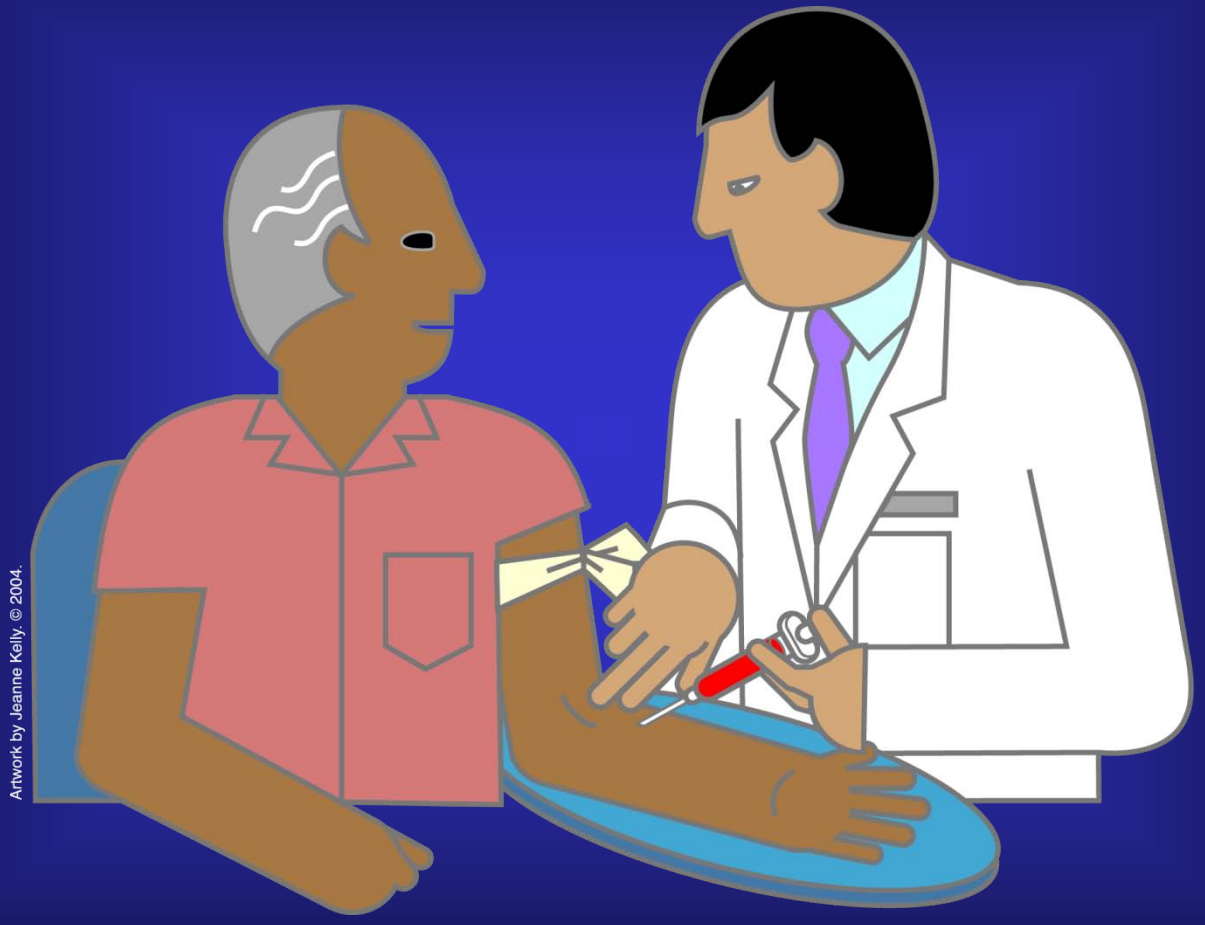
Cervical Cancer Screening



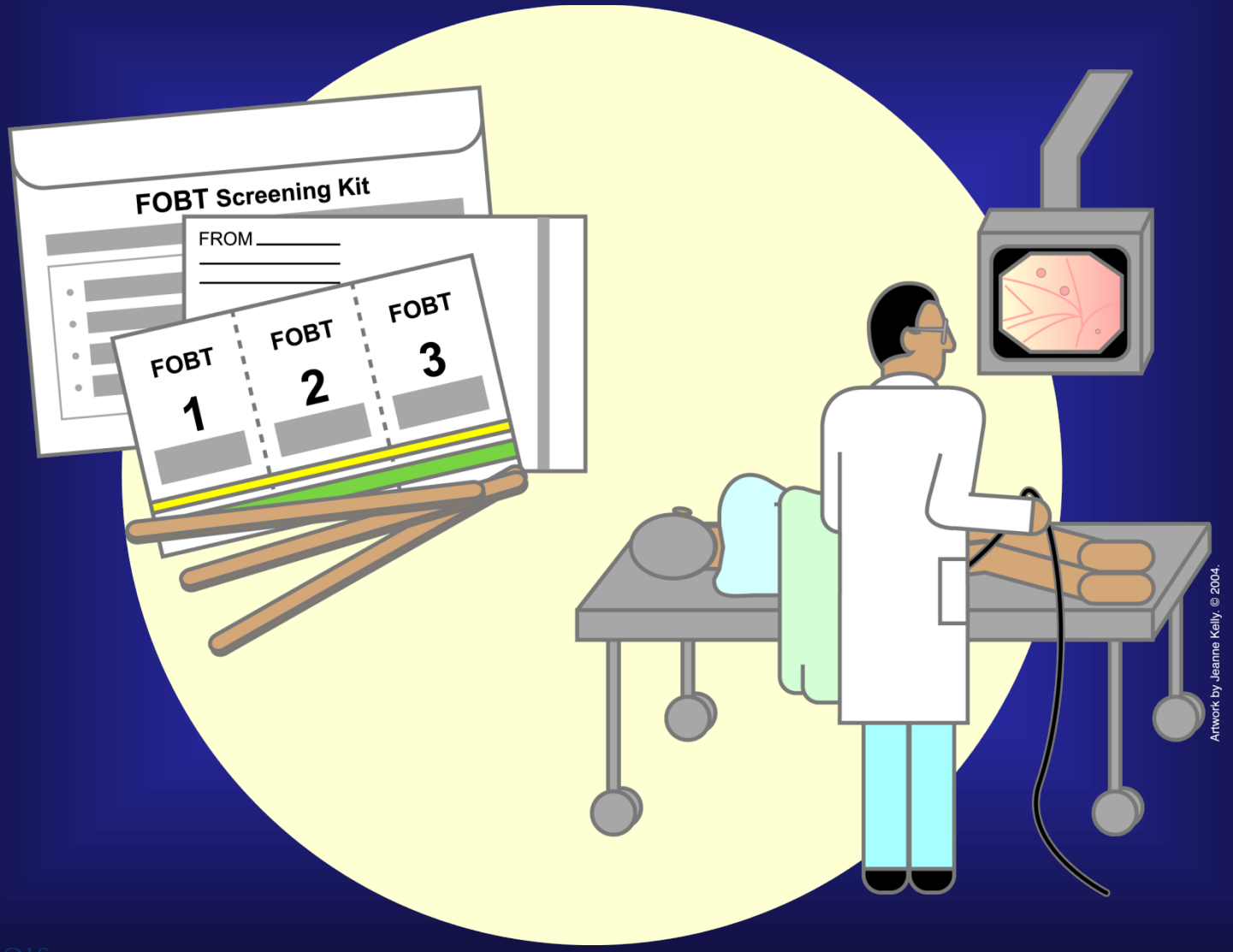
Breast Cancer Screening



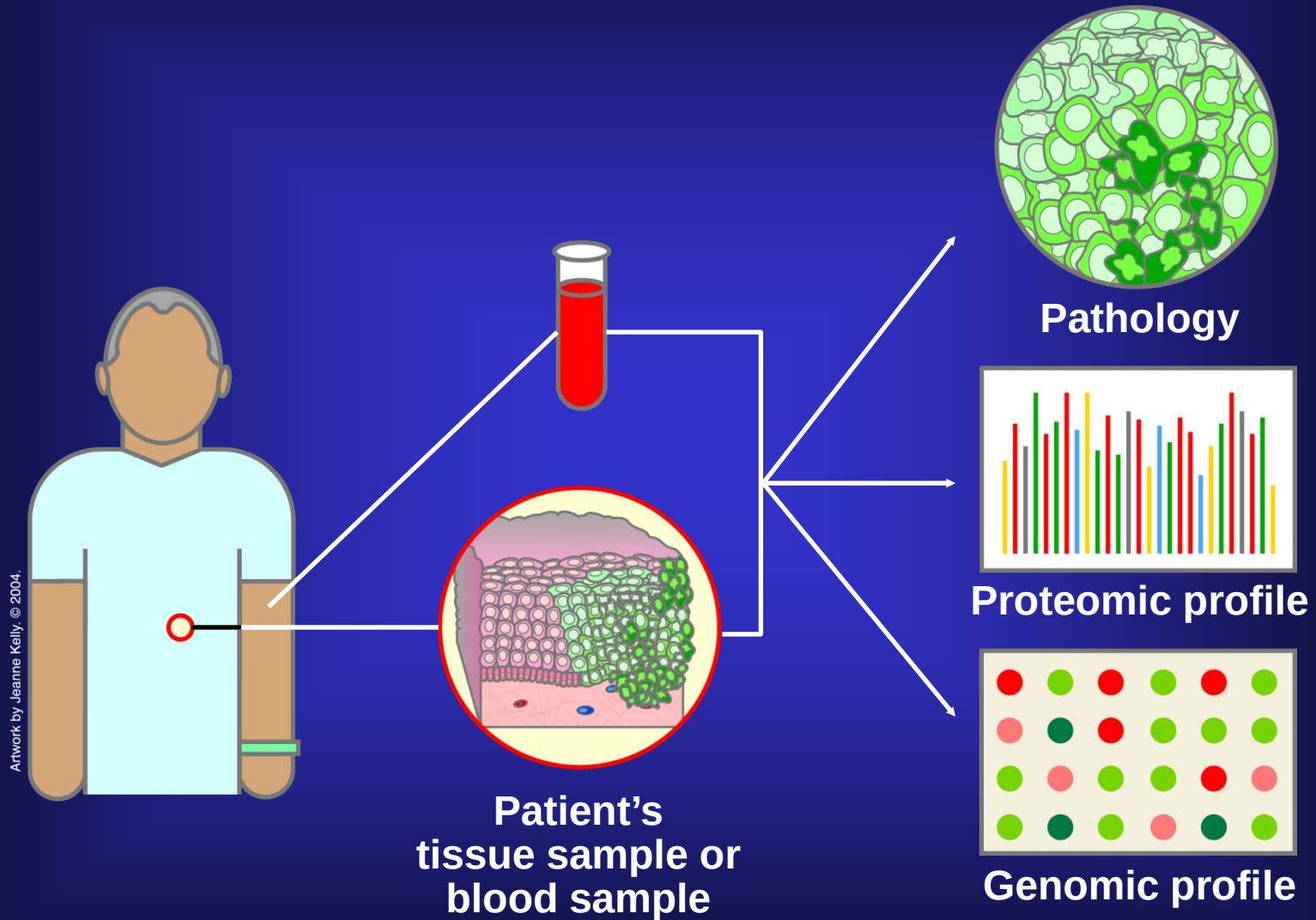
Prostate and Ovarian Cancer Screening



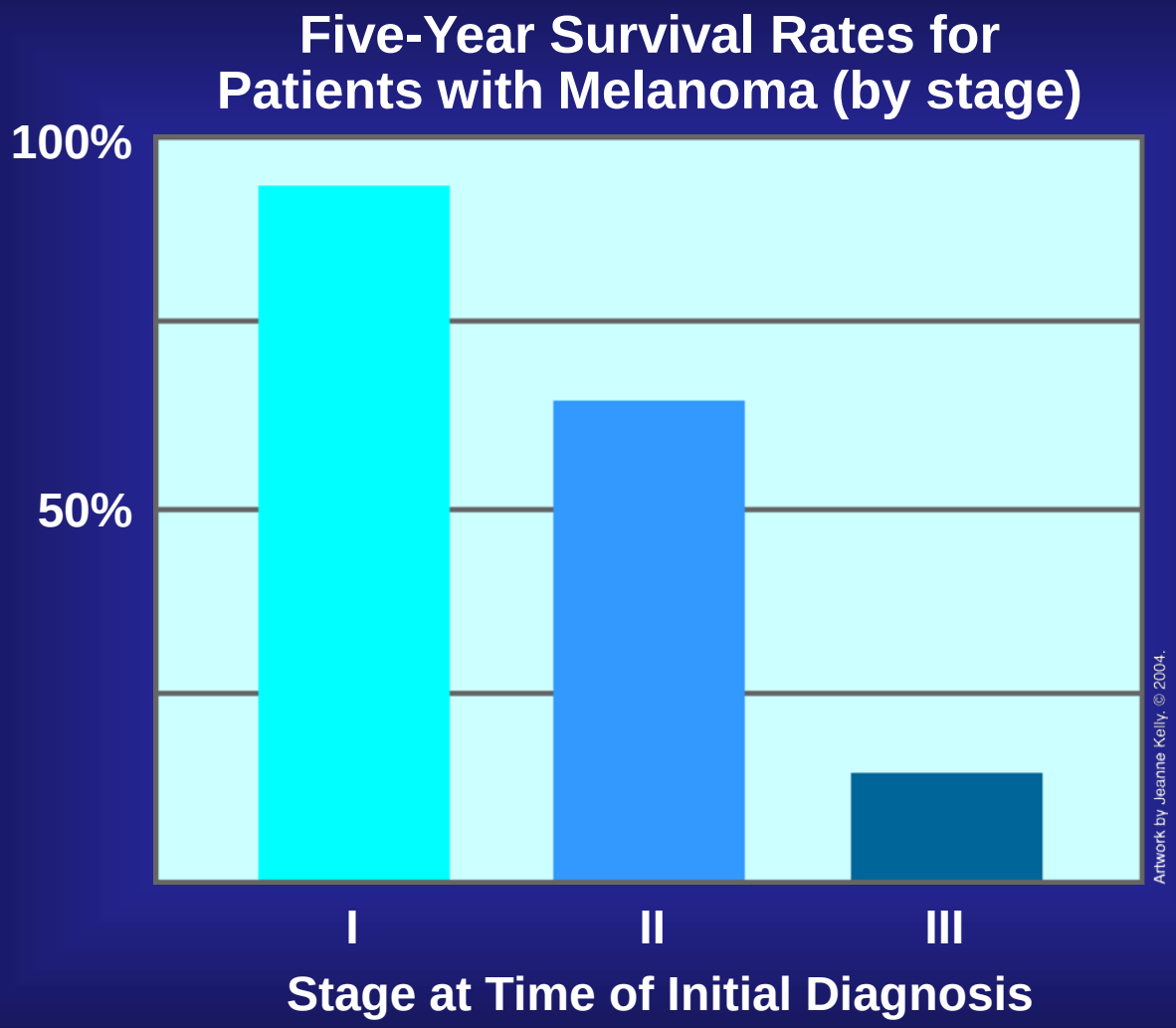
Colon Cancer Screening



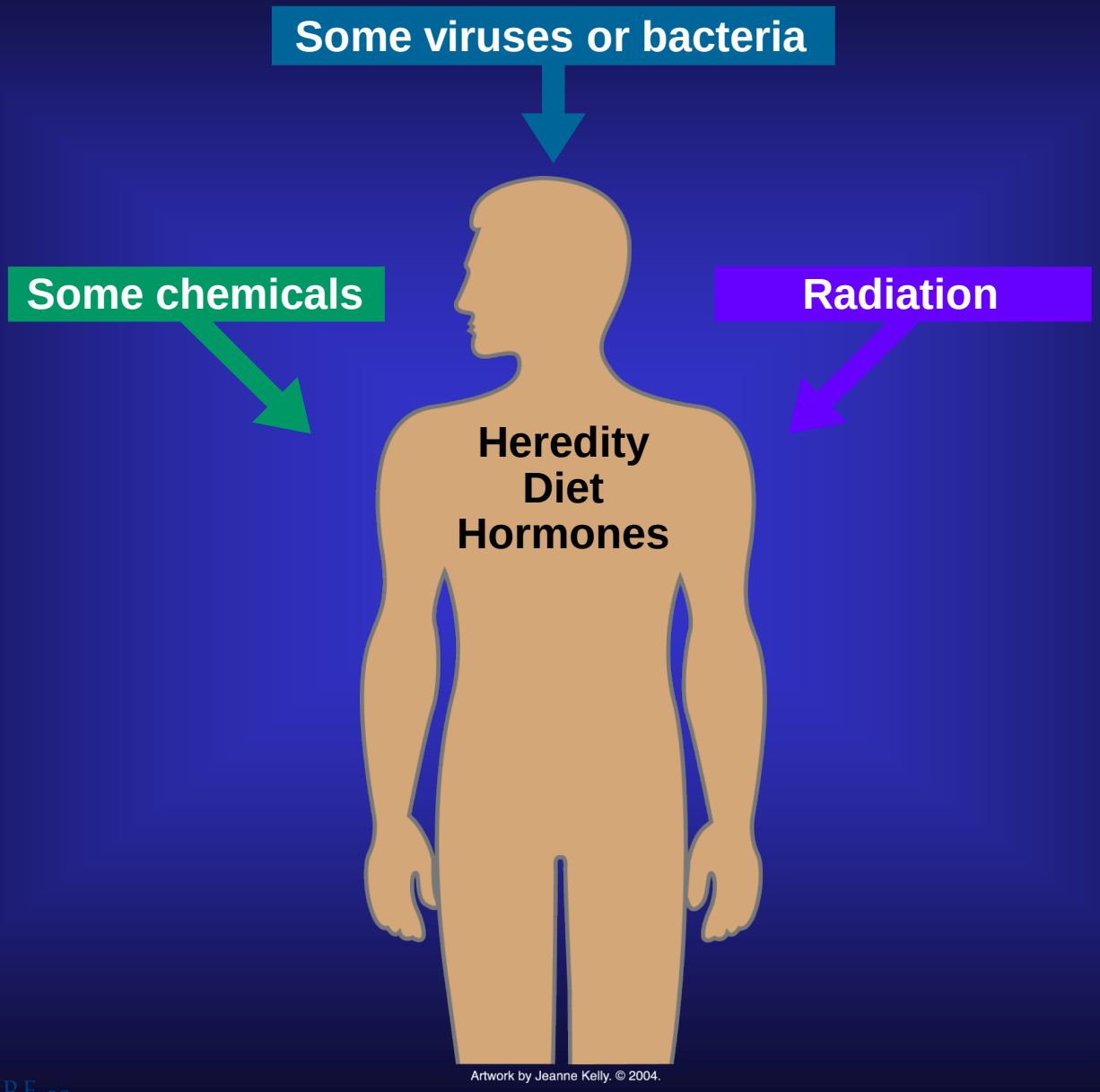
Biopsy



Tumor Staging

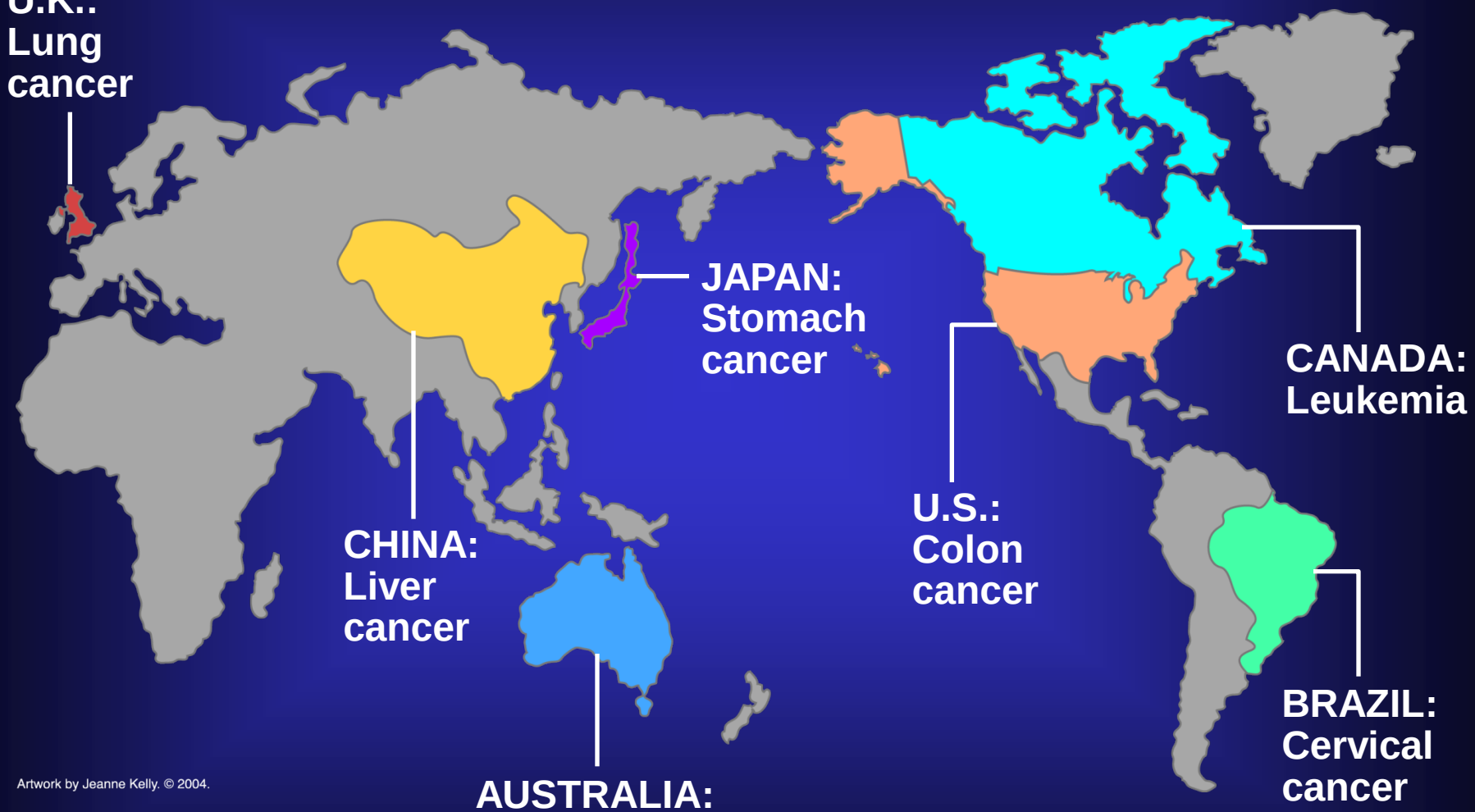


What Causes Cancer?

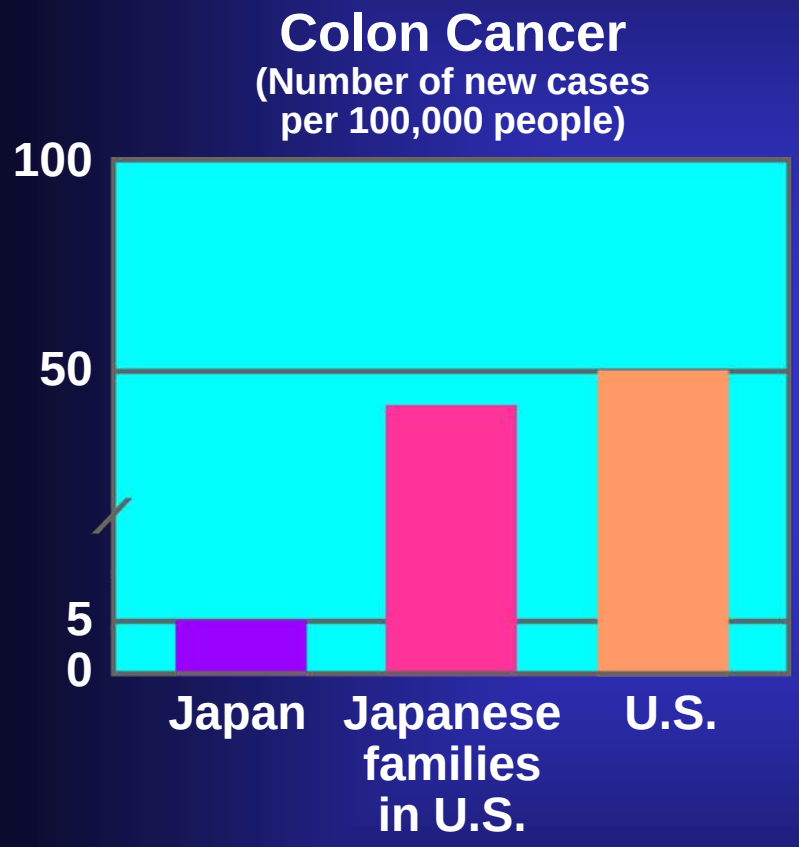


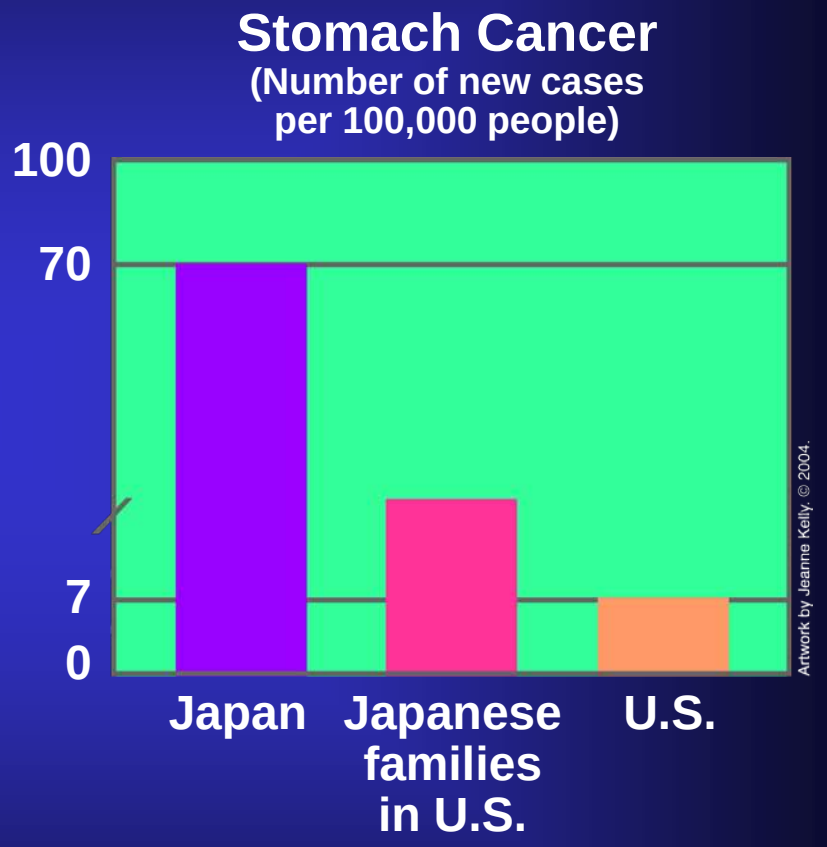
Population-Based Studies

Regions of Highest Incidence



Heredity? Behaviors? Other Factors?





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-dibutylnitrosamine
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-nitrosonornicotine
N-nitrosoanabasine
N-nitrosopiperidine
polonium-210

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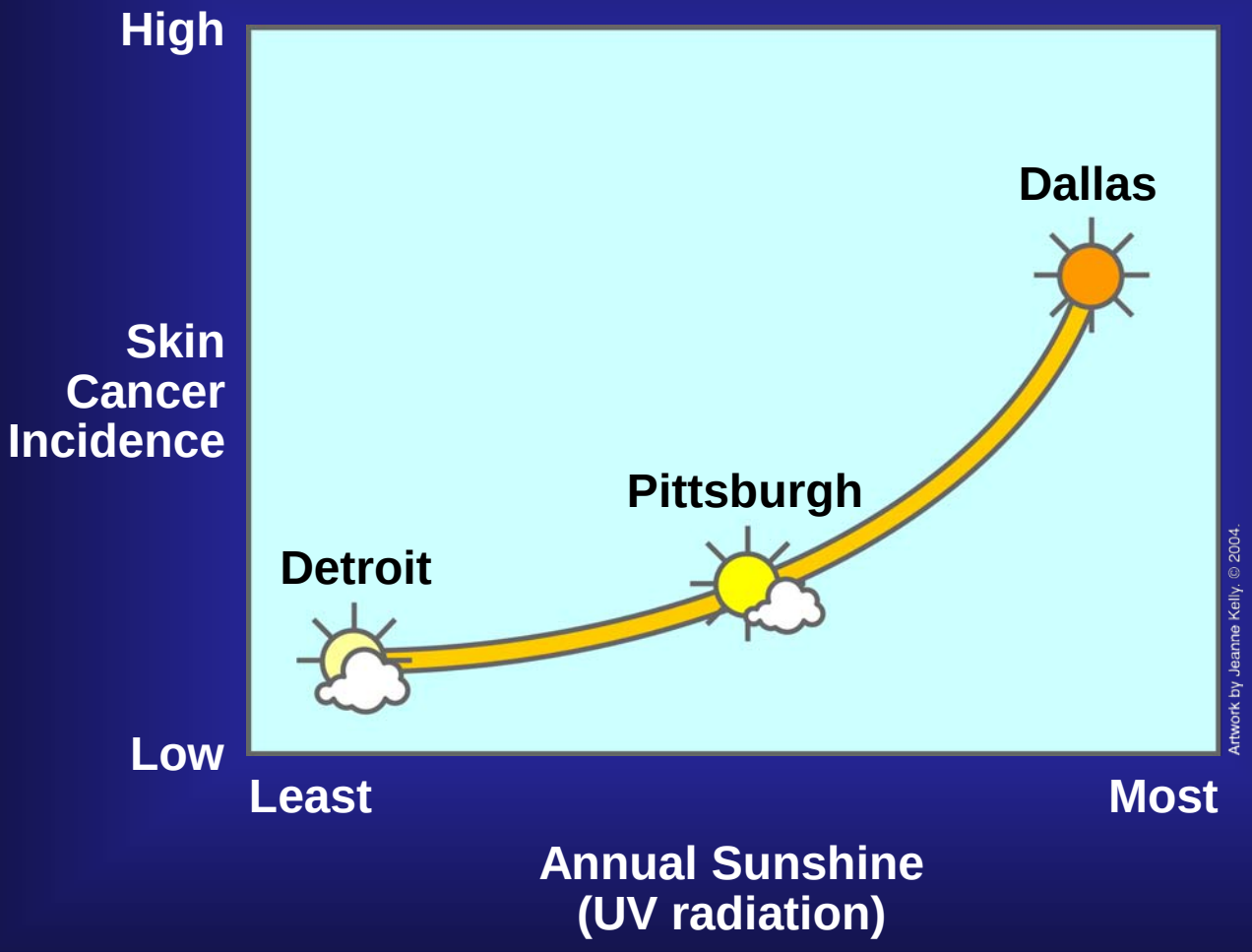
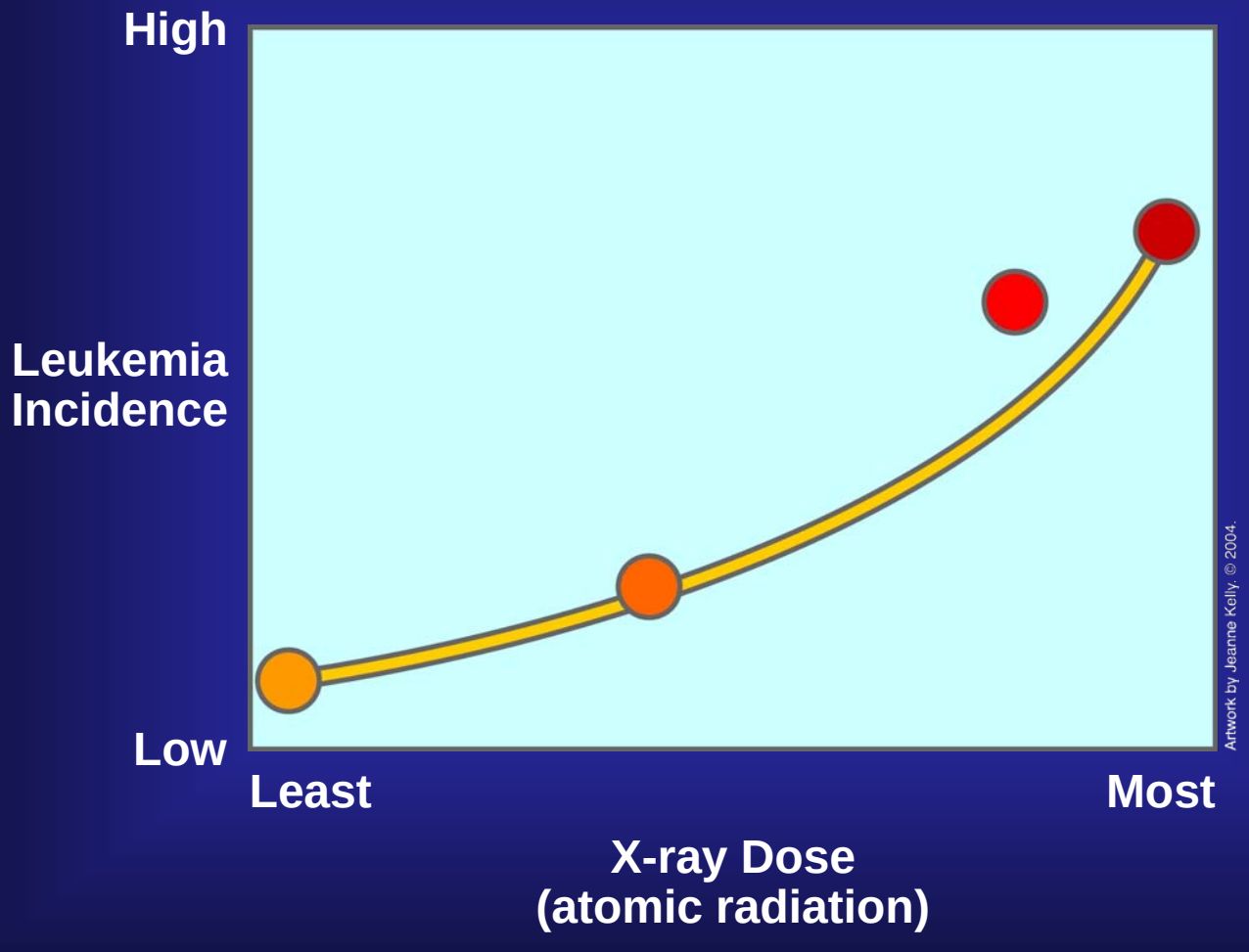
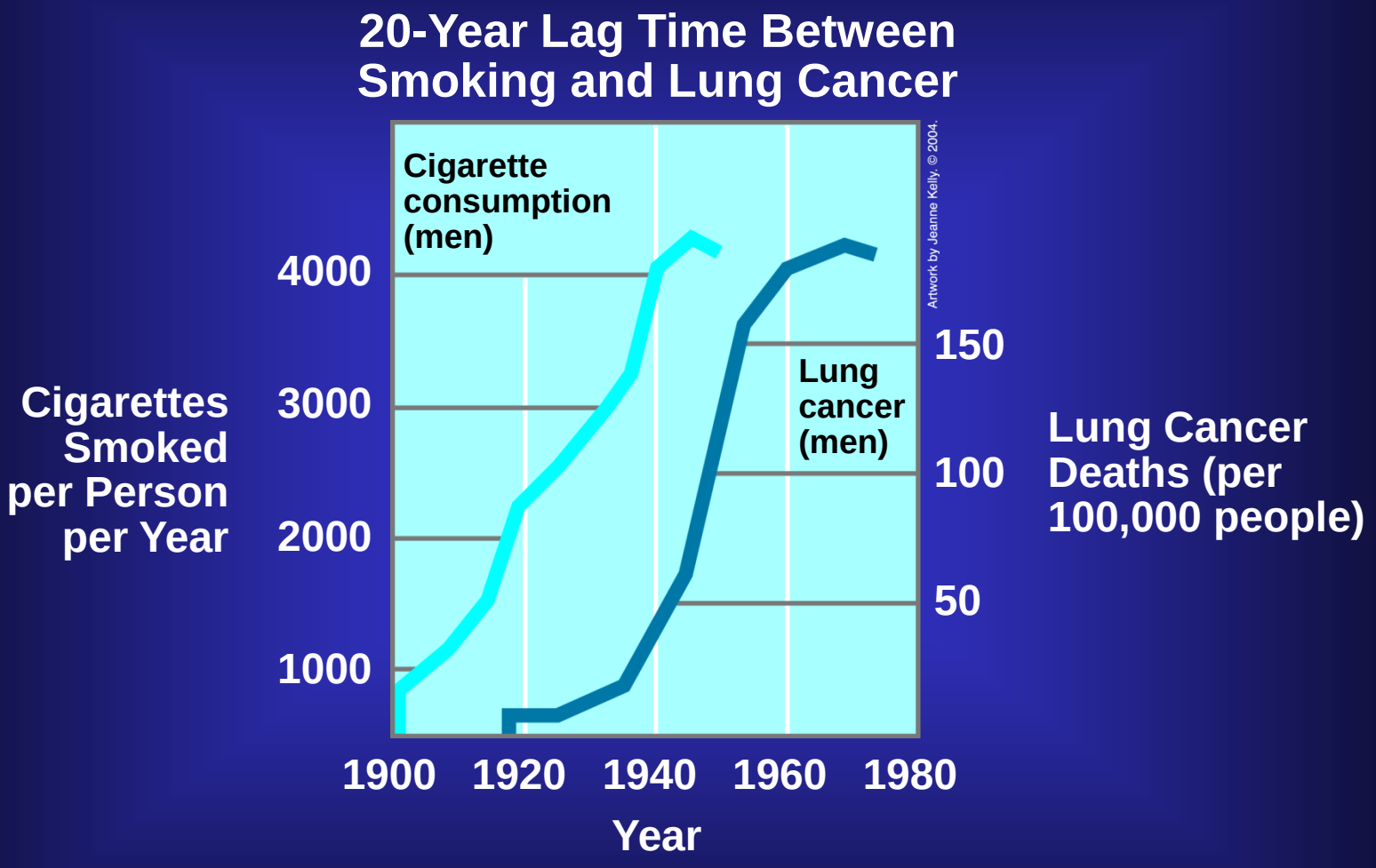
Low-Strength Radiation



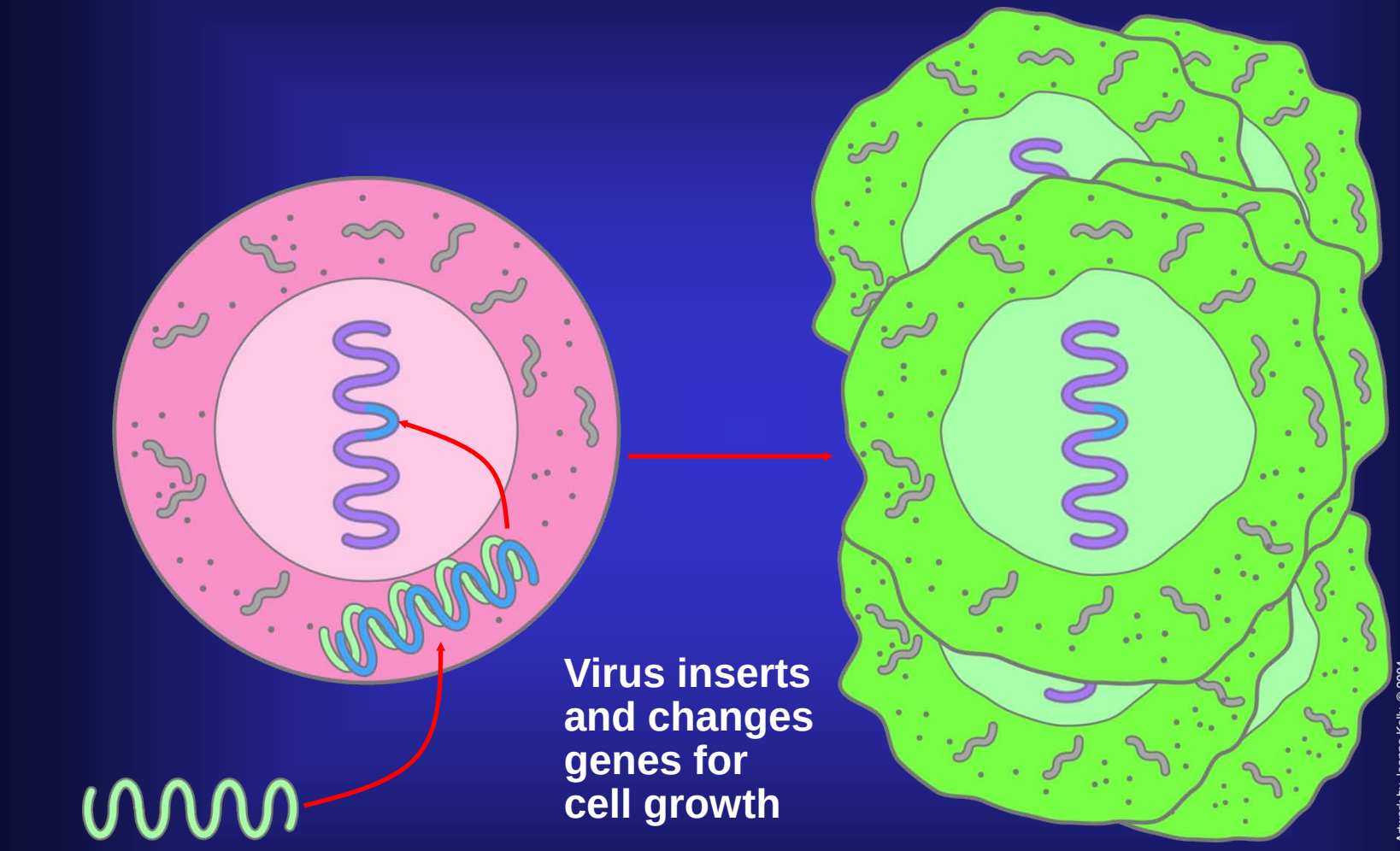
High-Strength Radiation



Lag Time



Viruses

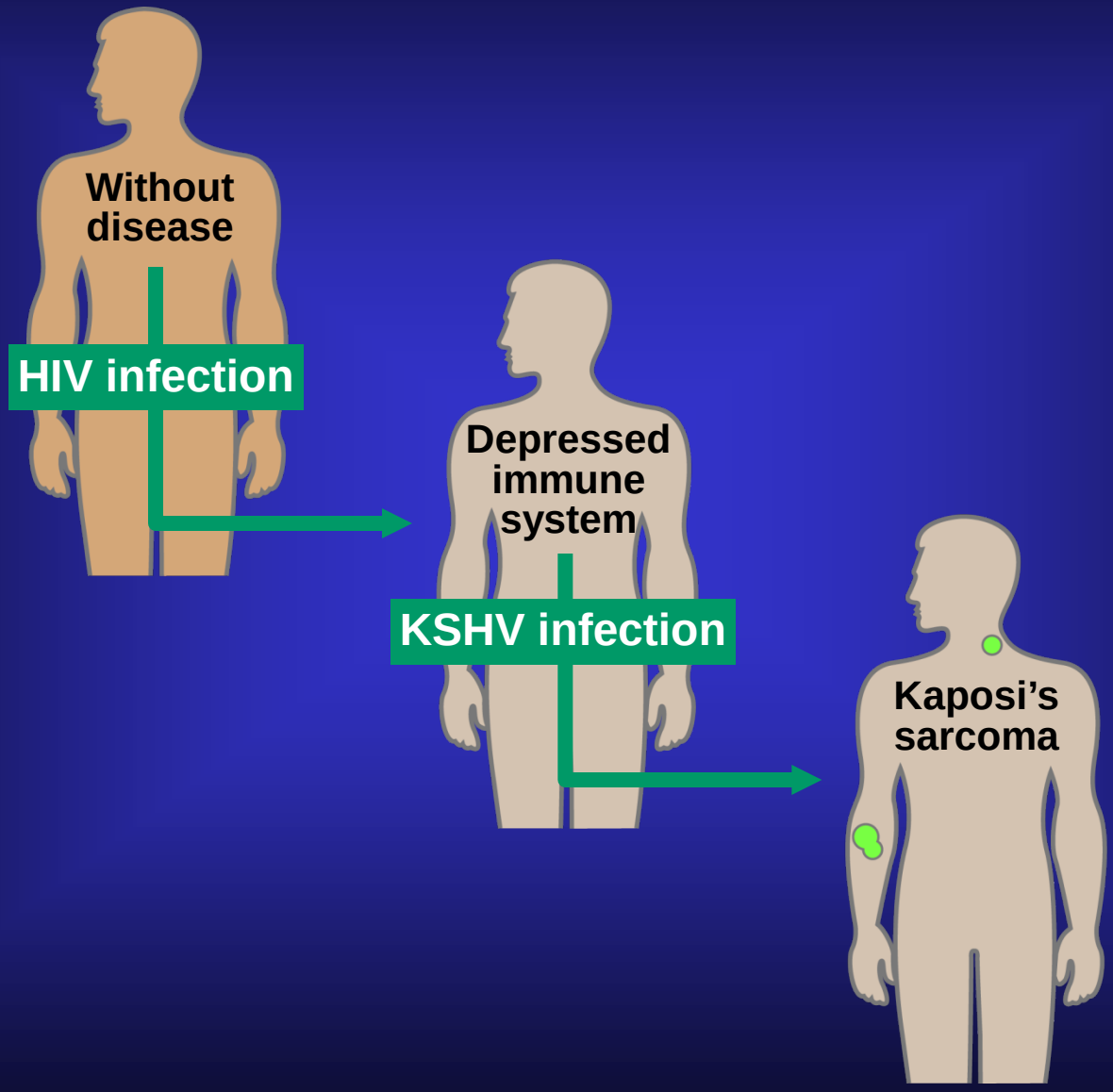


Examples of Human Cancer Viruses

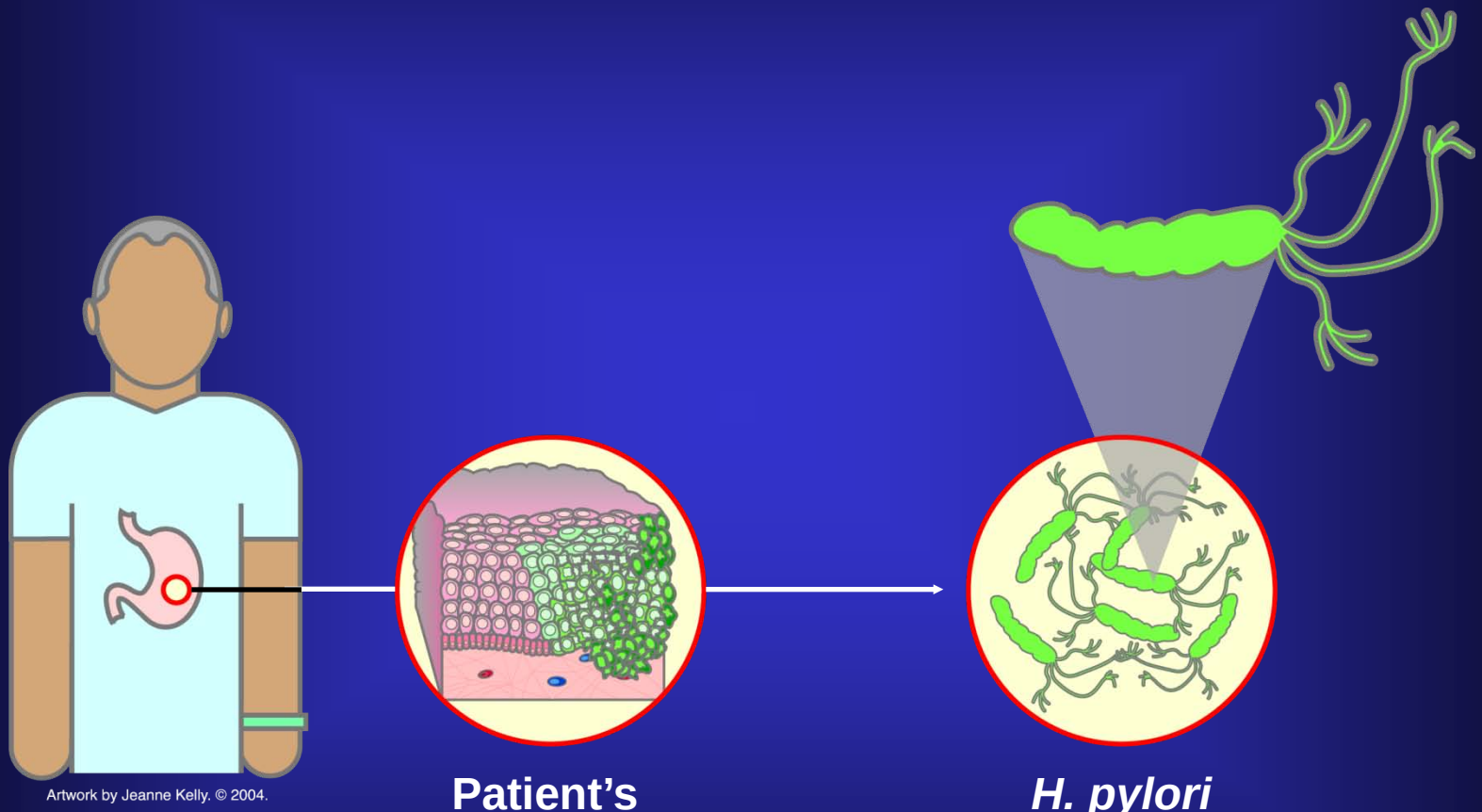
Some Viruses Associated with Human Cancers

Virus	*Type of Cancer*
Epstein-Barr virus	Burkitt's lymphoma
Human papillomavirus	Cervical cancer
Hepatitis B virus	Liver cancer
Human T-cell lymphotrophic virus	Adult T-cell leukemia
Kaposi's sarcoma-associated herpesvirus	Kaposi's sarcoma

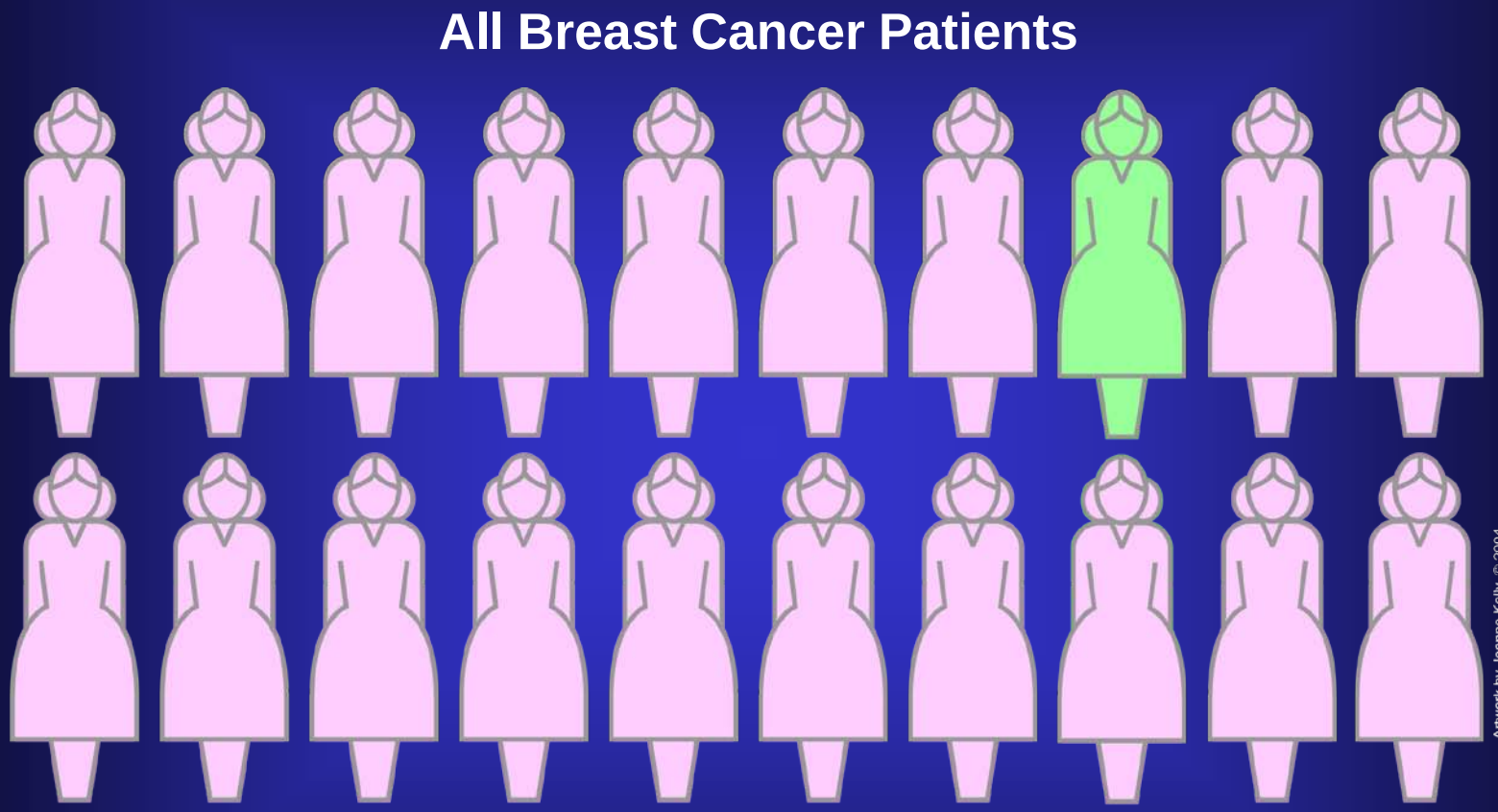
AIDS and Kaposi's Sarcoma



Bacteria and Stomach Cancer



Heredity and Cancer



Inherited factor(s)
Other factor(s)

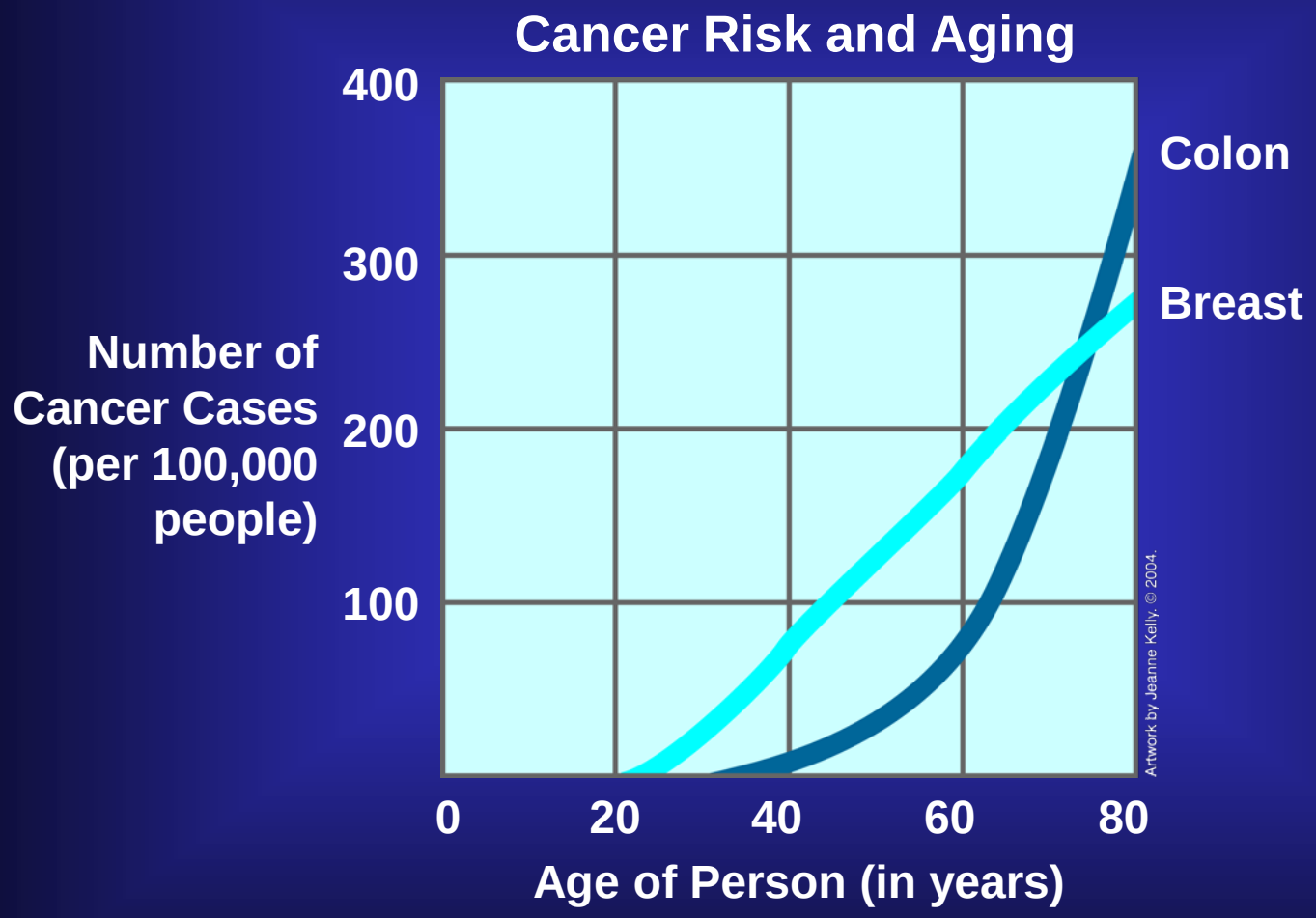
Heredity Can Affect Many Types of Cancer

Inherited Conditions That Increase Risk for Cancer

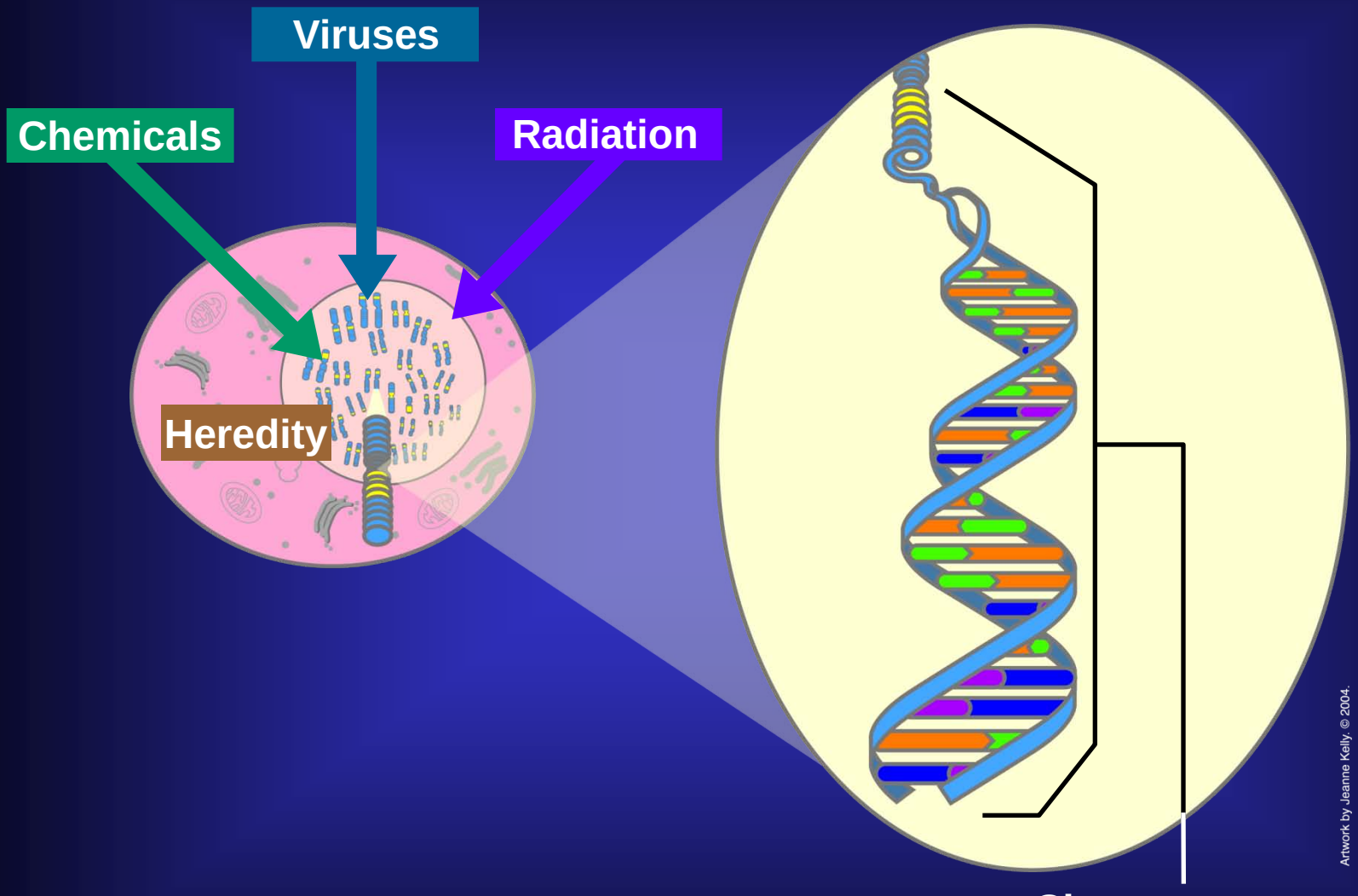
Name of Condition	*Type of Cancer*
Hereditary retinoblastoma	Retinoblastoma
Xeroderma pigmentosum	Skin
Wilms' tumor	Kidney
Li-Fraumeni syndrome	Sarcomas, brain, breast, leukemia
Familial adenomatous polyposis	Colon, rectum
Paget's disease of bone	Bone
Fanconi's aplastic anemia	Leukemia, liver, skin

Genetic Testing

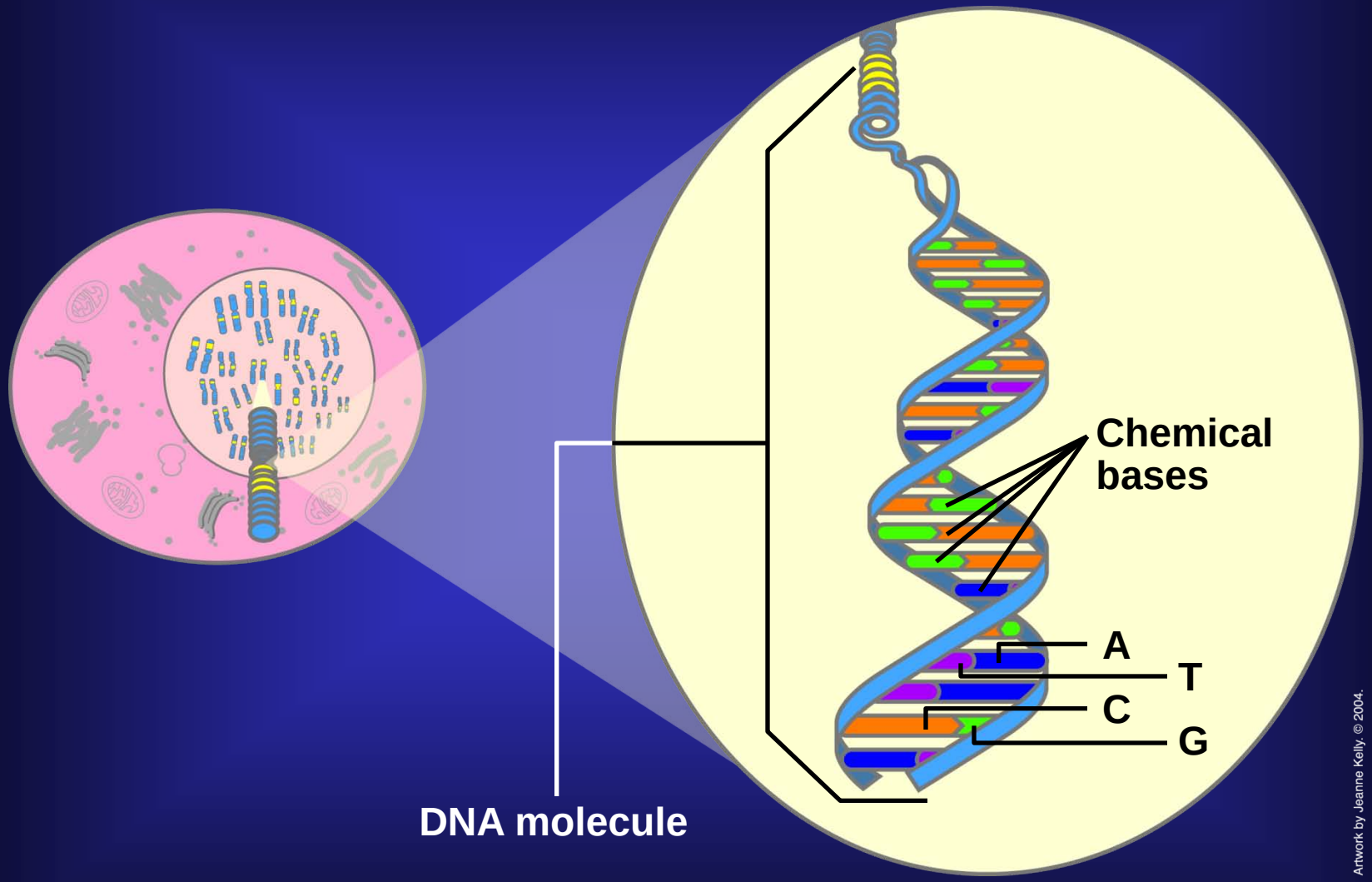
Cancer Risk and Aging



Genes and Cancer



DNA Structure



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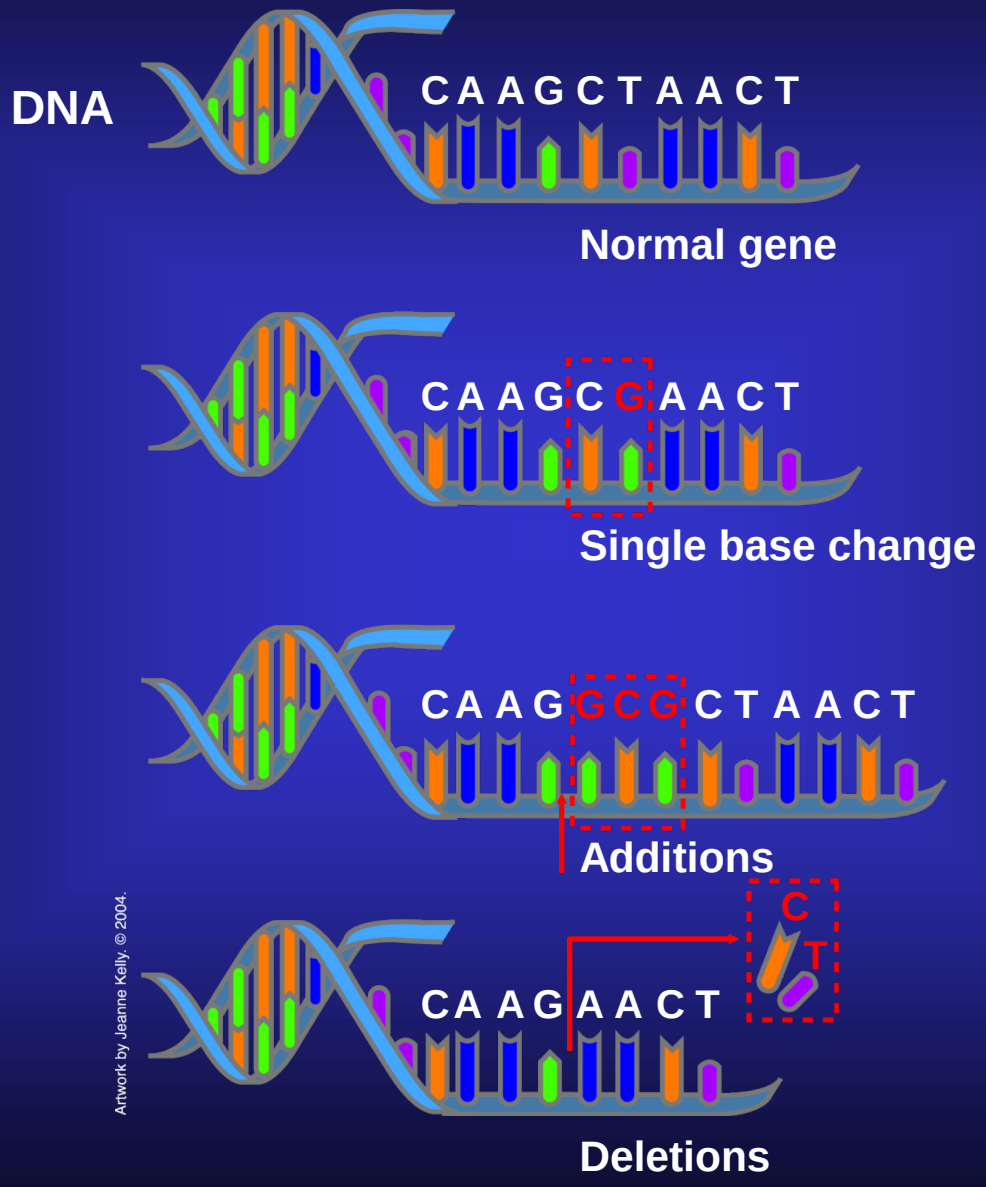
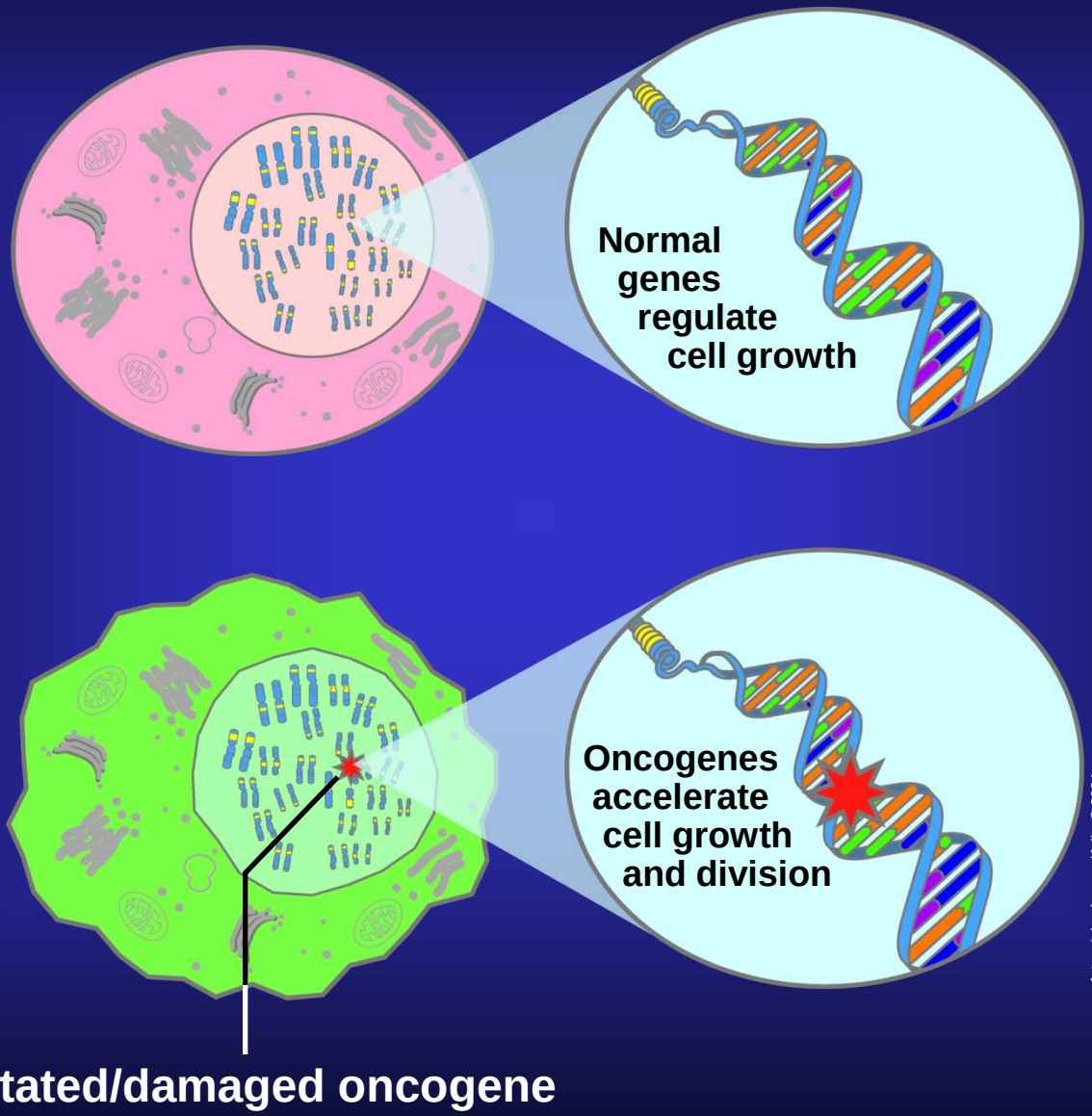
DNA Mutation

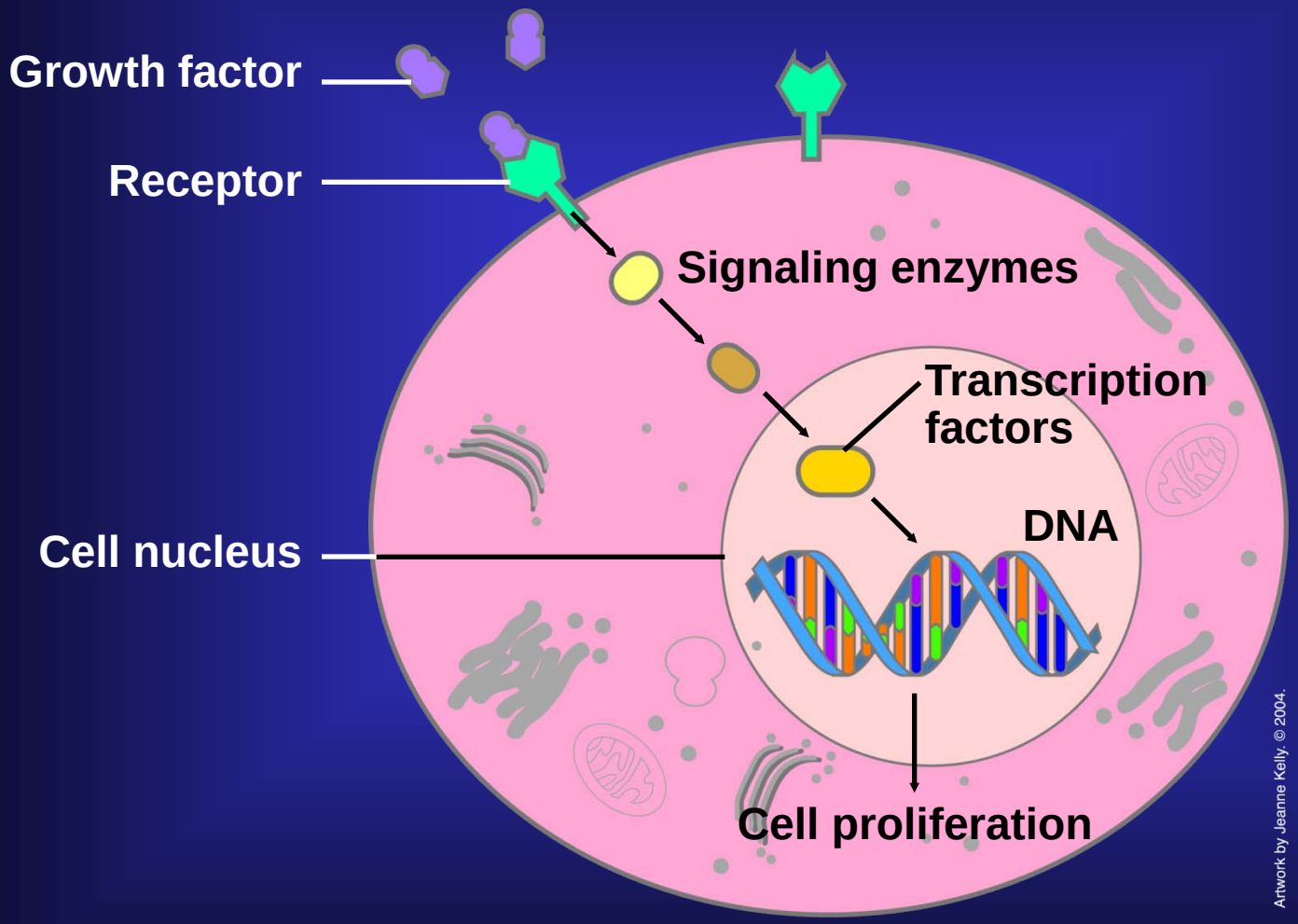


Oncogenes

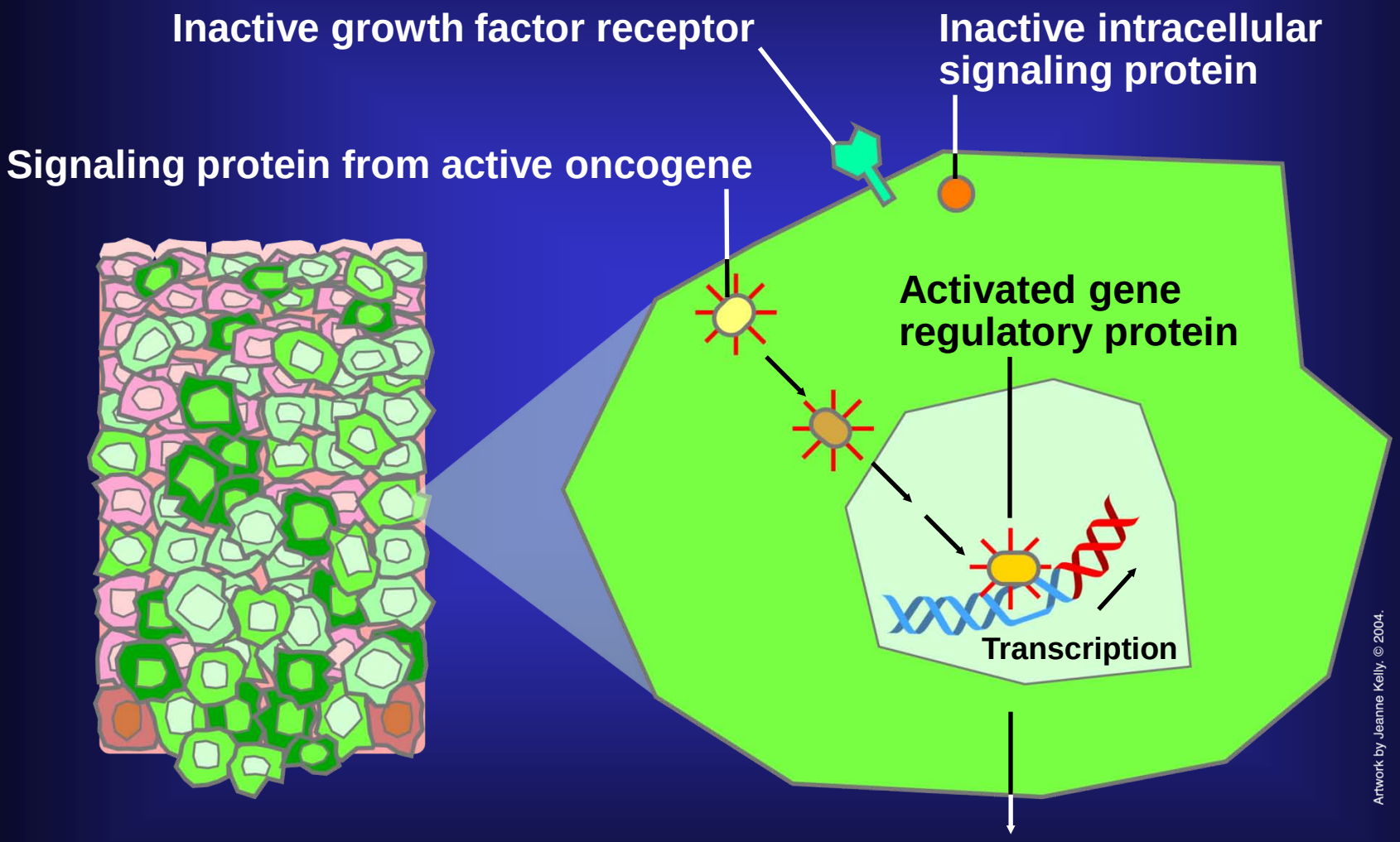


Proto-Oncogenes and Normal Cell Growth

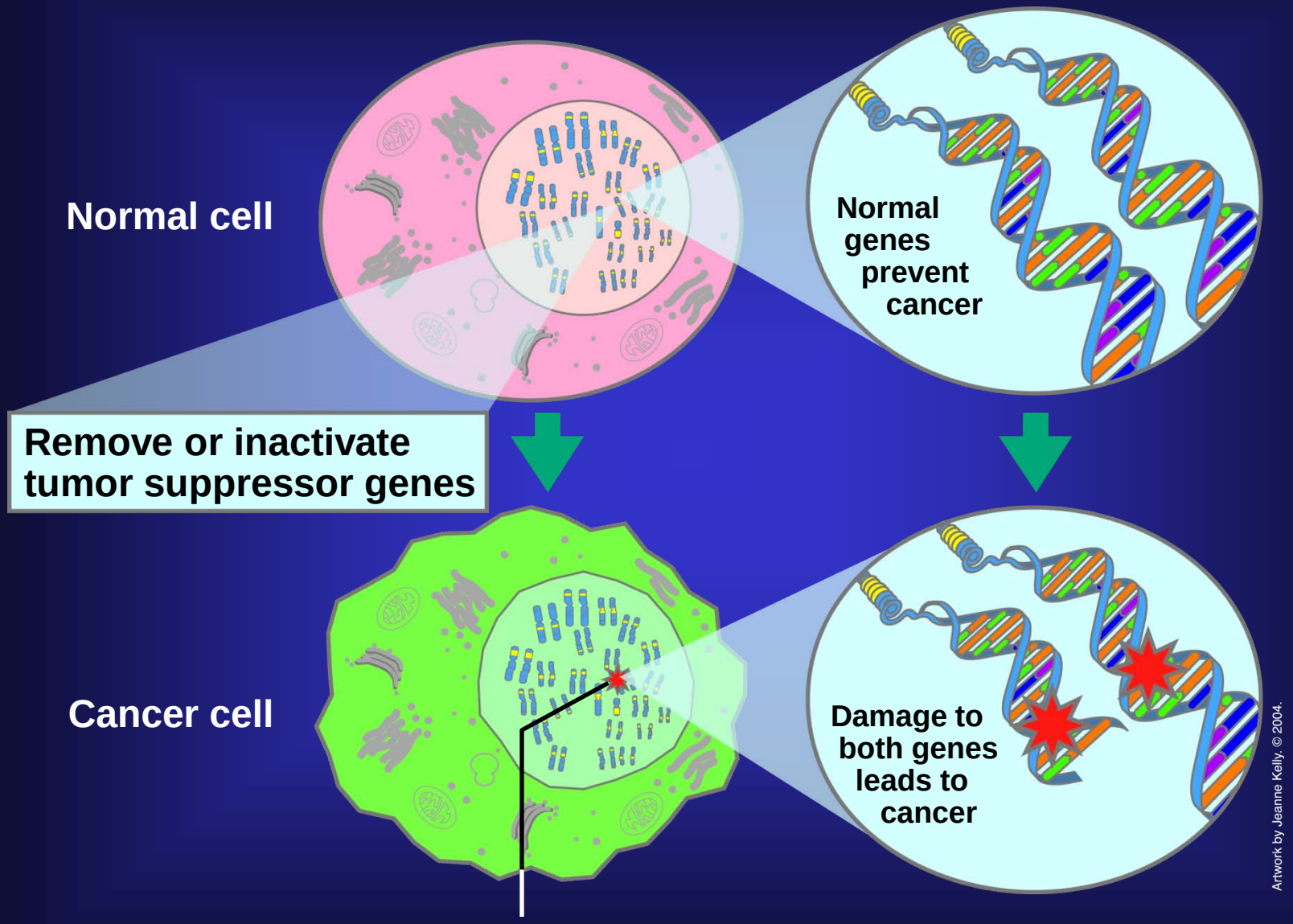
Normal Growth-Control Pathway



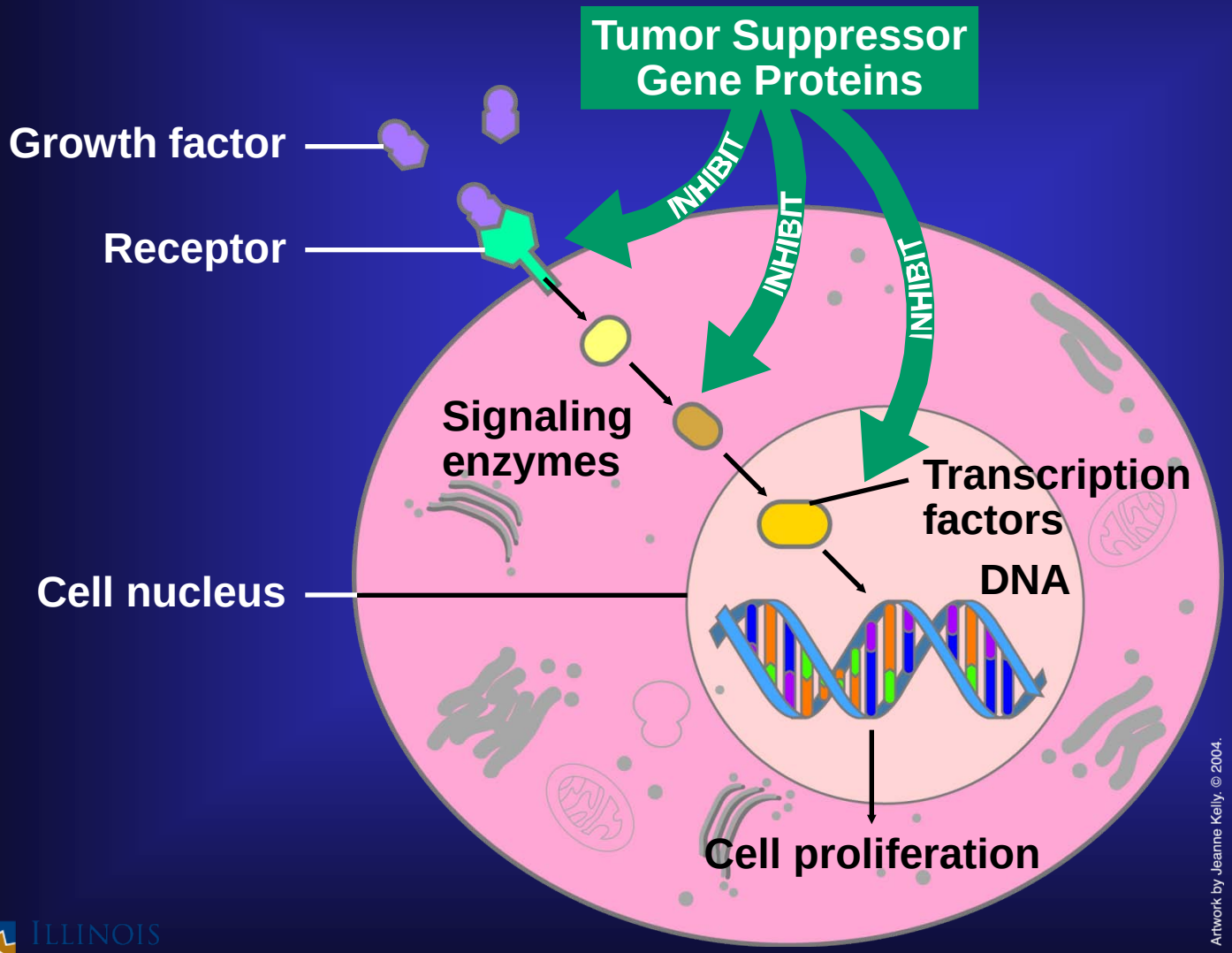
Oncogenes are Mutant Forms of Proto-Oncogenes



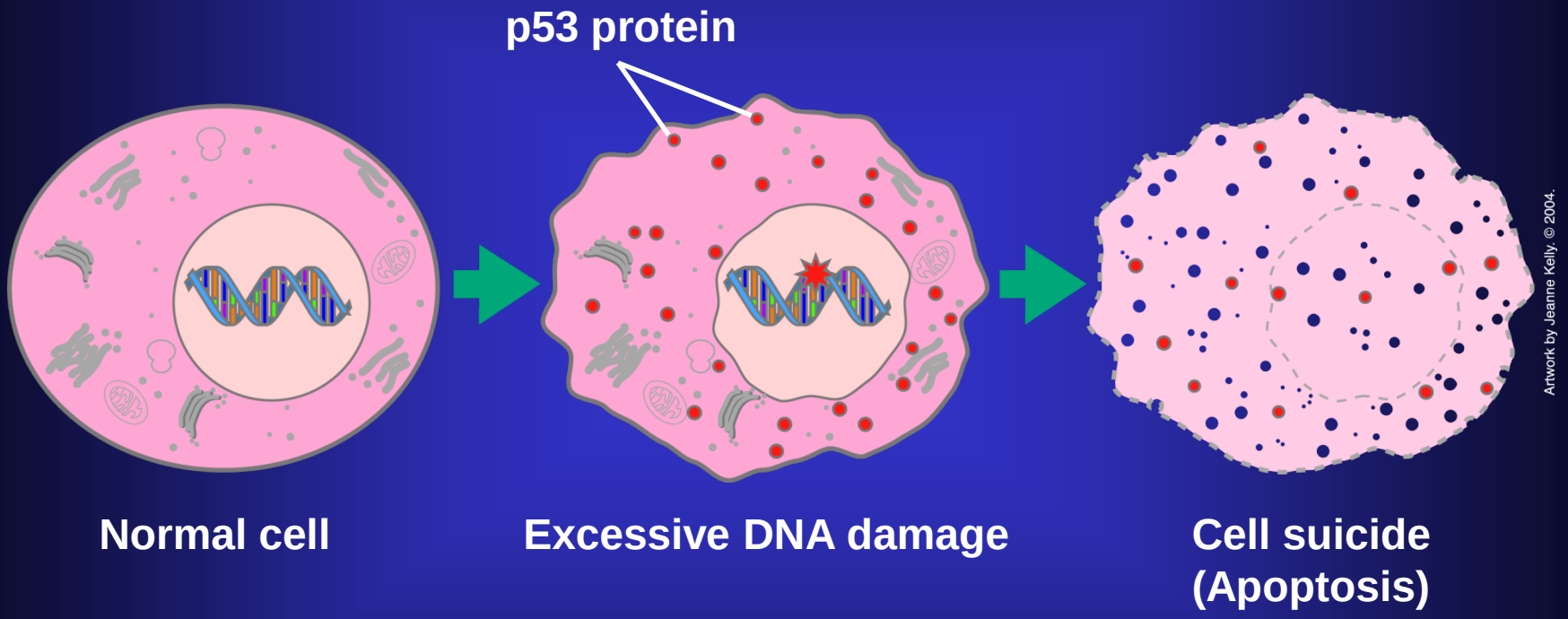
Tumor Suppressor Genes



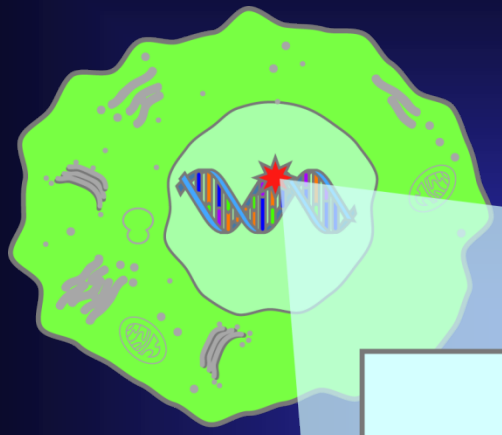
Tumor Suppressor Genes Act Like a Brake Pedal

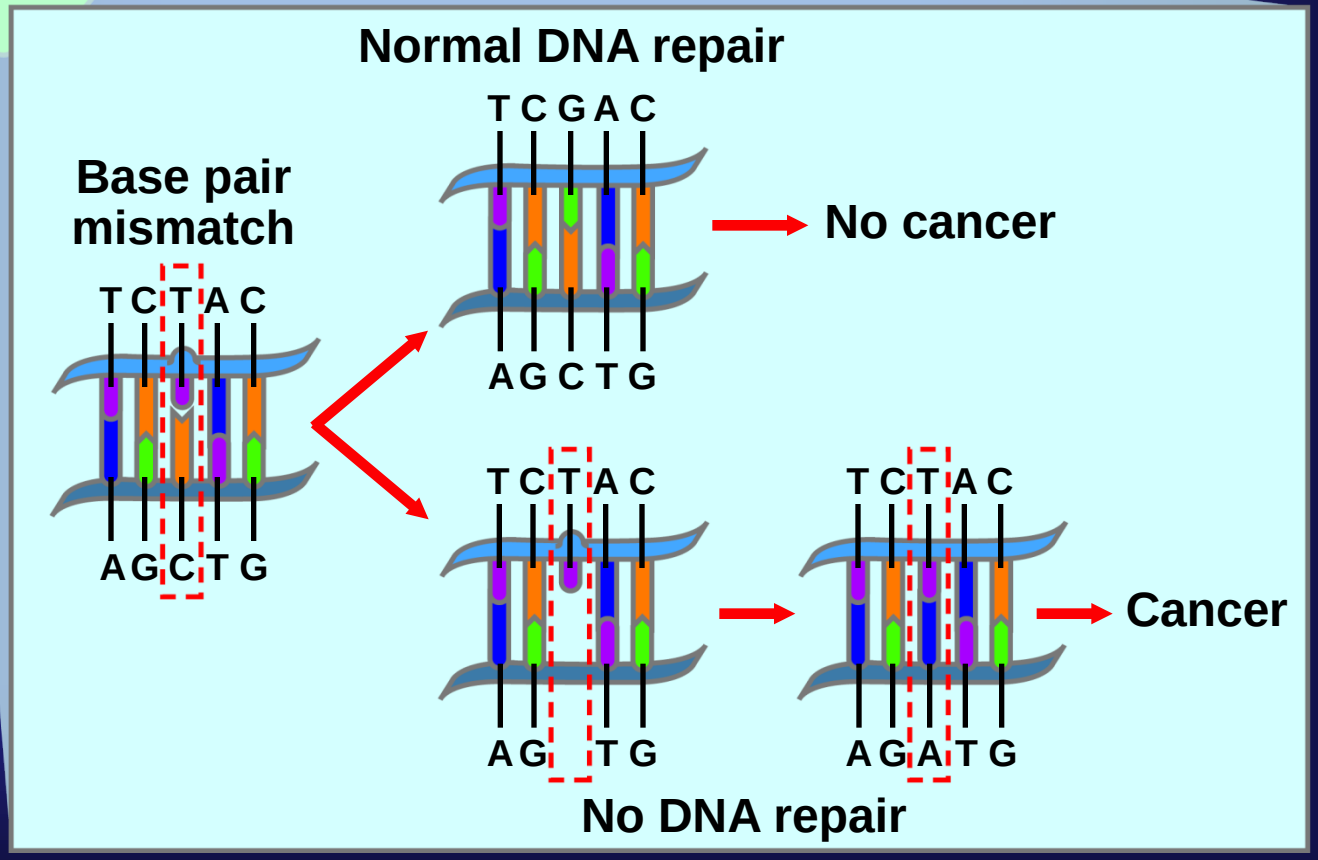


p53 Tumor Suppressor Protein Triggers Cell Suicide



DNA Repair Genes

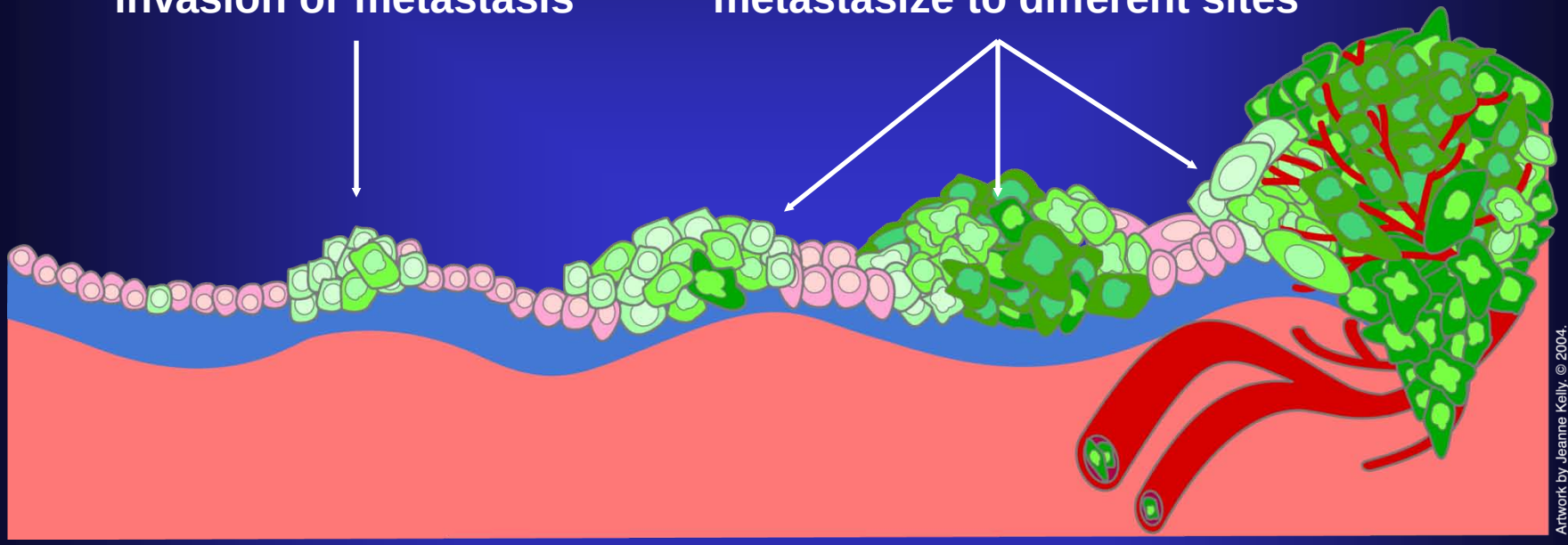




Cancer Tends to Involve Multiple Mutations

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

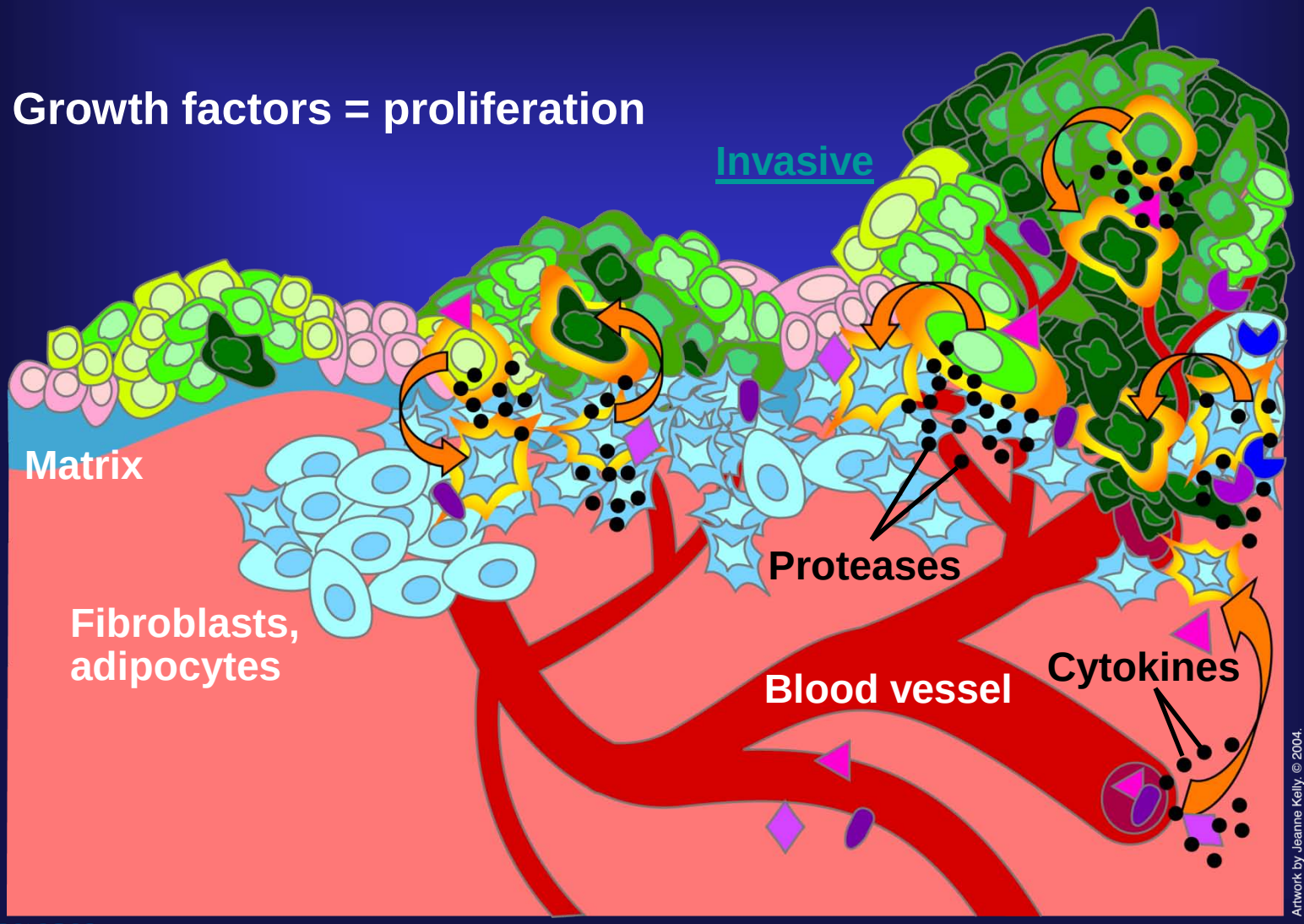
More mutations, more genetic instability, metastatic disease

Mutations and Cancer

Genes Implicated in Cancer

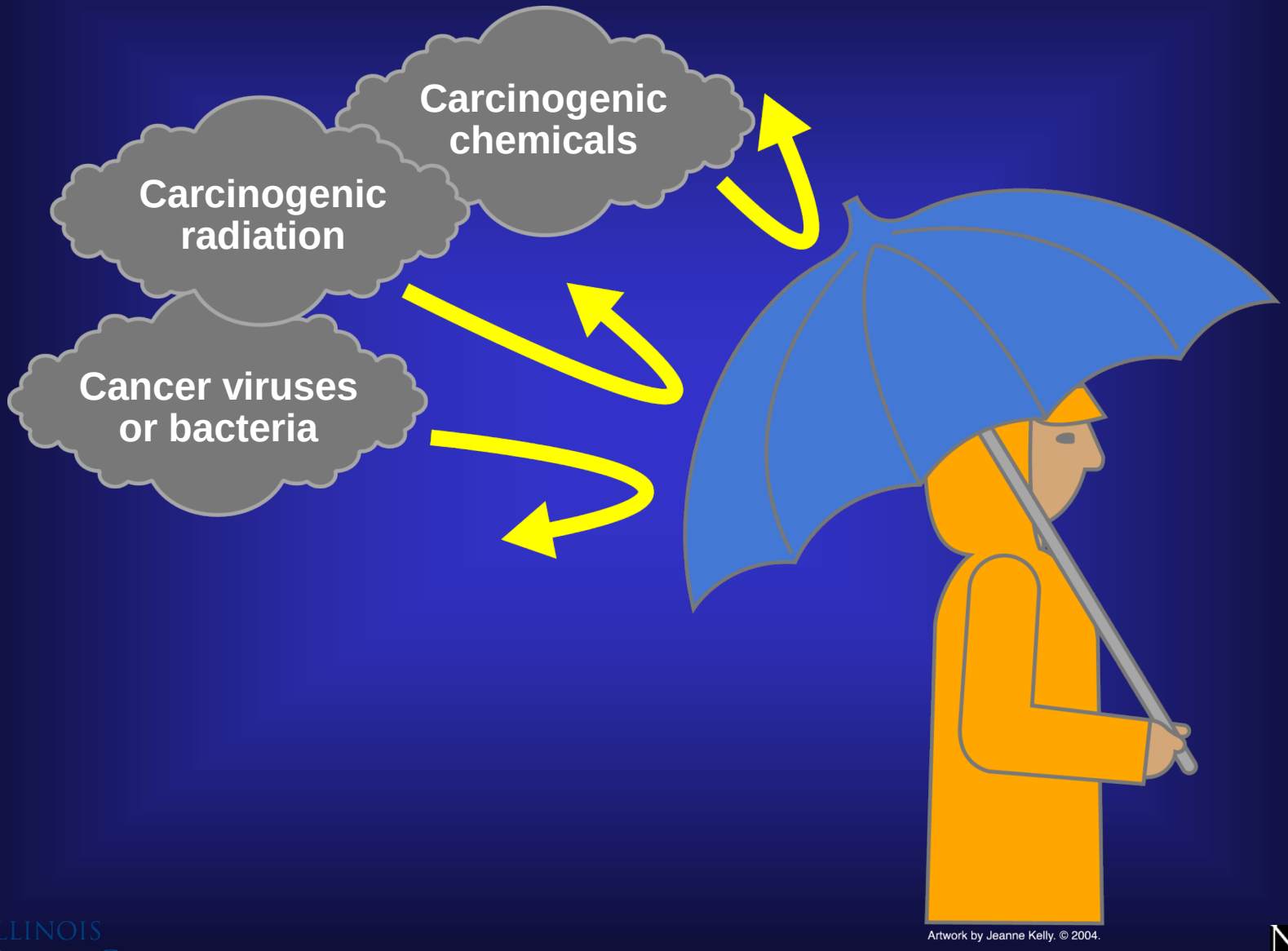
The prime suspects	*But*
Mutations in:	Other mutations also occur in:
■ Oncogenes	■ Cell death genes
■ Tumor suppressor genes	■ Cell signaling genes
■ DNA repair genes	■ Cell cycle checkpoint genes
	■ Cellular senescence genes
	■ Cellular differentiation genes
	■ Metastasis/invasion genes
	■ Carcinogen –activating genes –deactivating genes

Cancer Tends to Corrupt Surrounding Environment

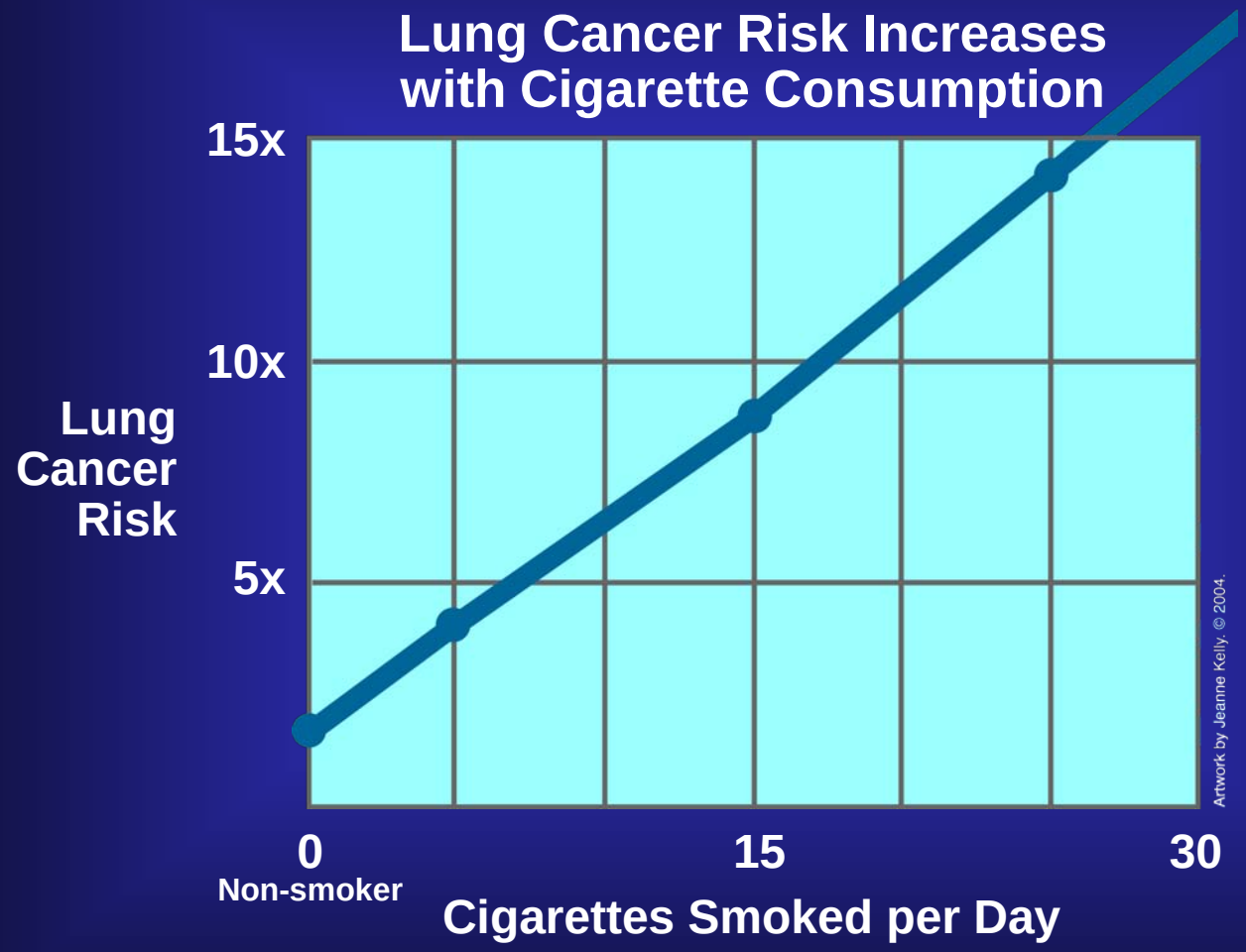


Cytokines, proteases = migration & invasion

Cancer Prevention



Avoid Tobacco



Protect Yourself From Excessive Sunlight

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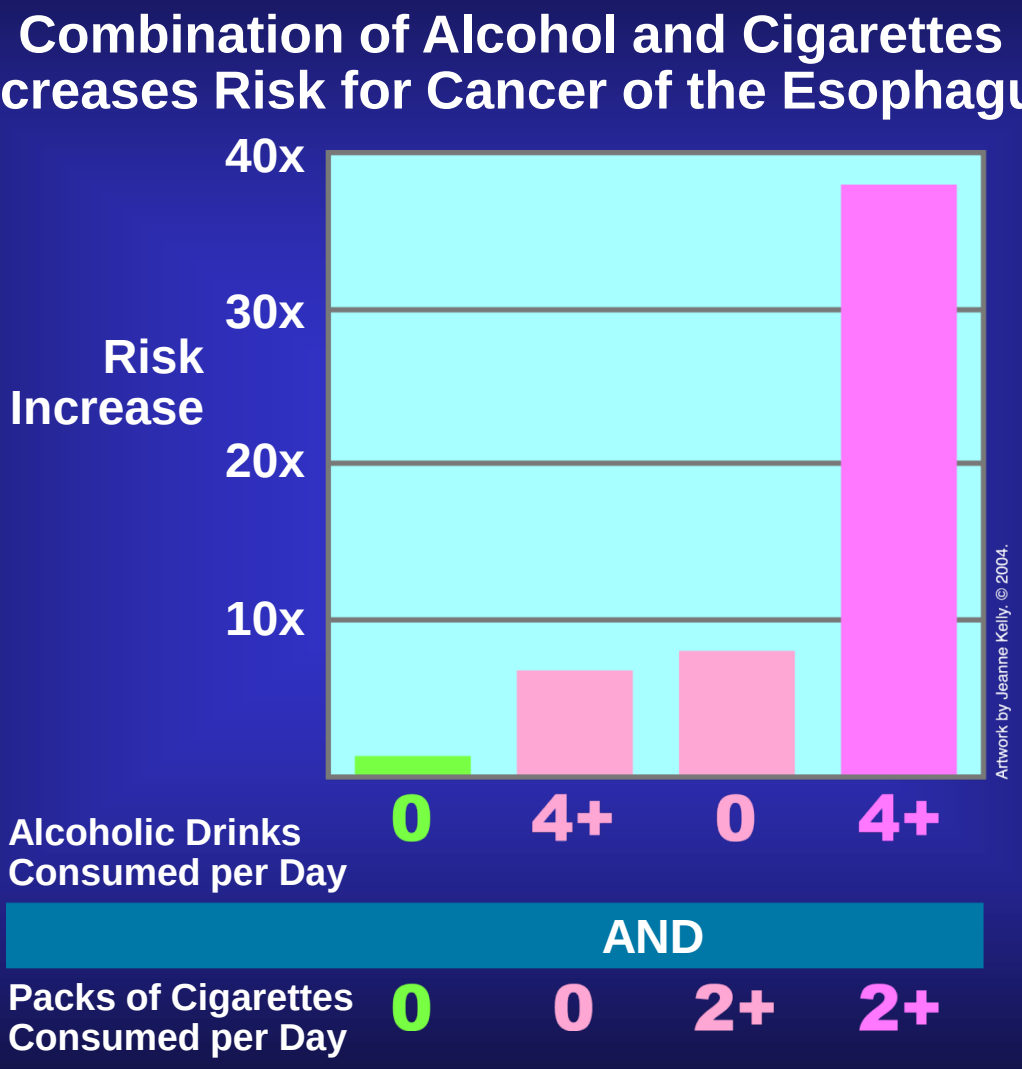
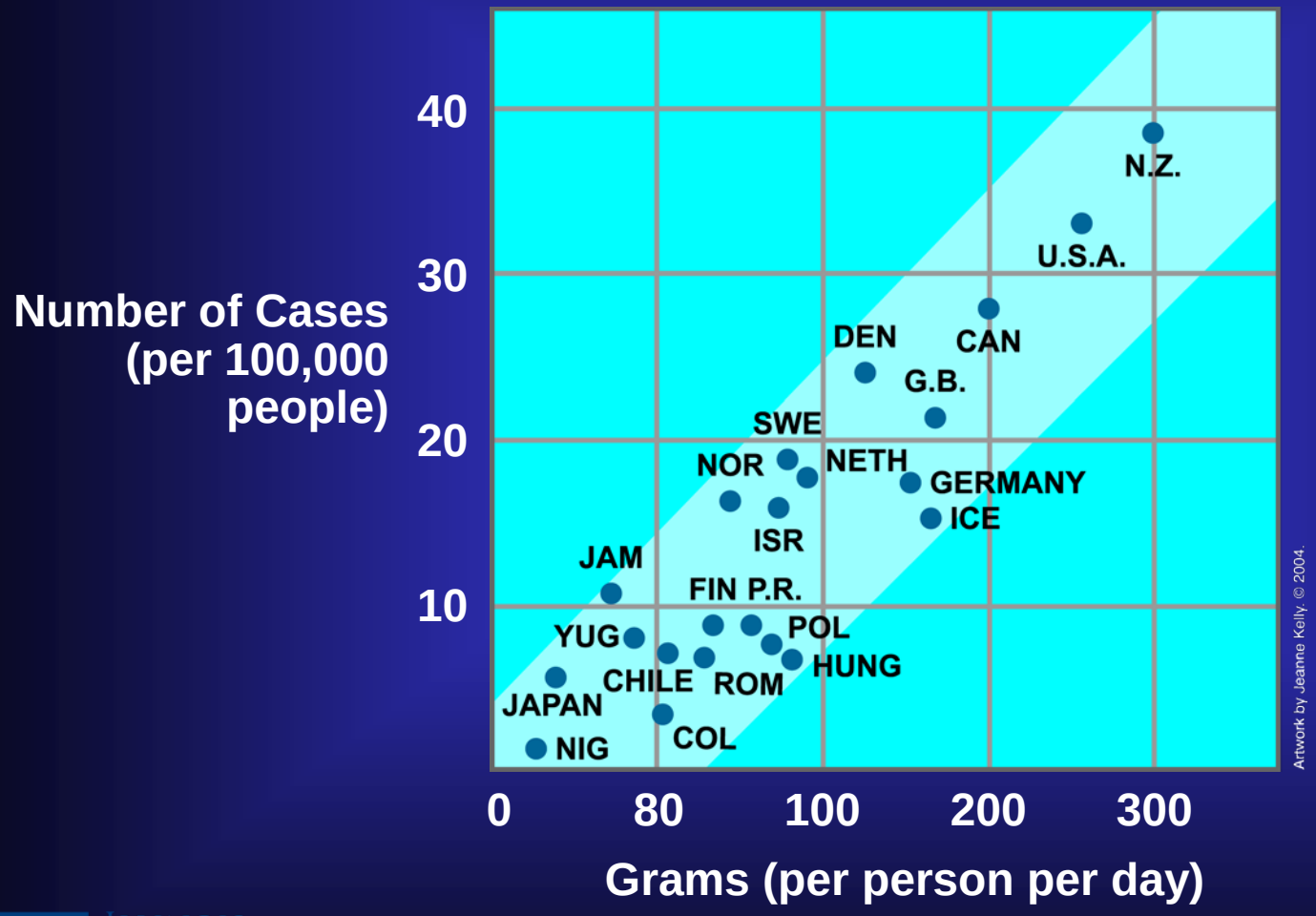
Limit Alcohol and Tobacco

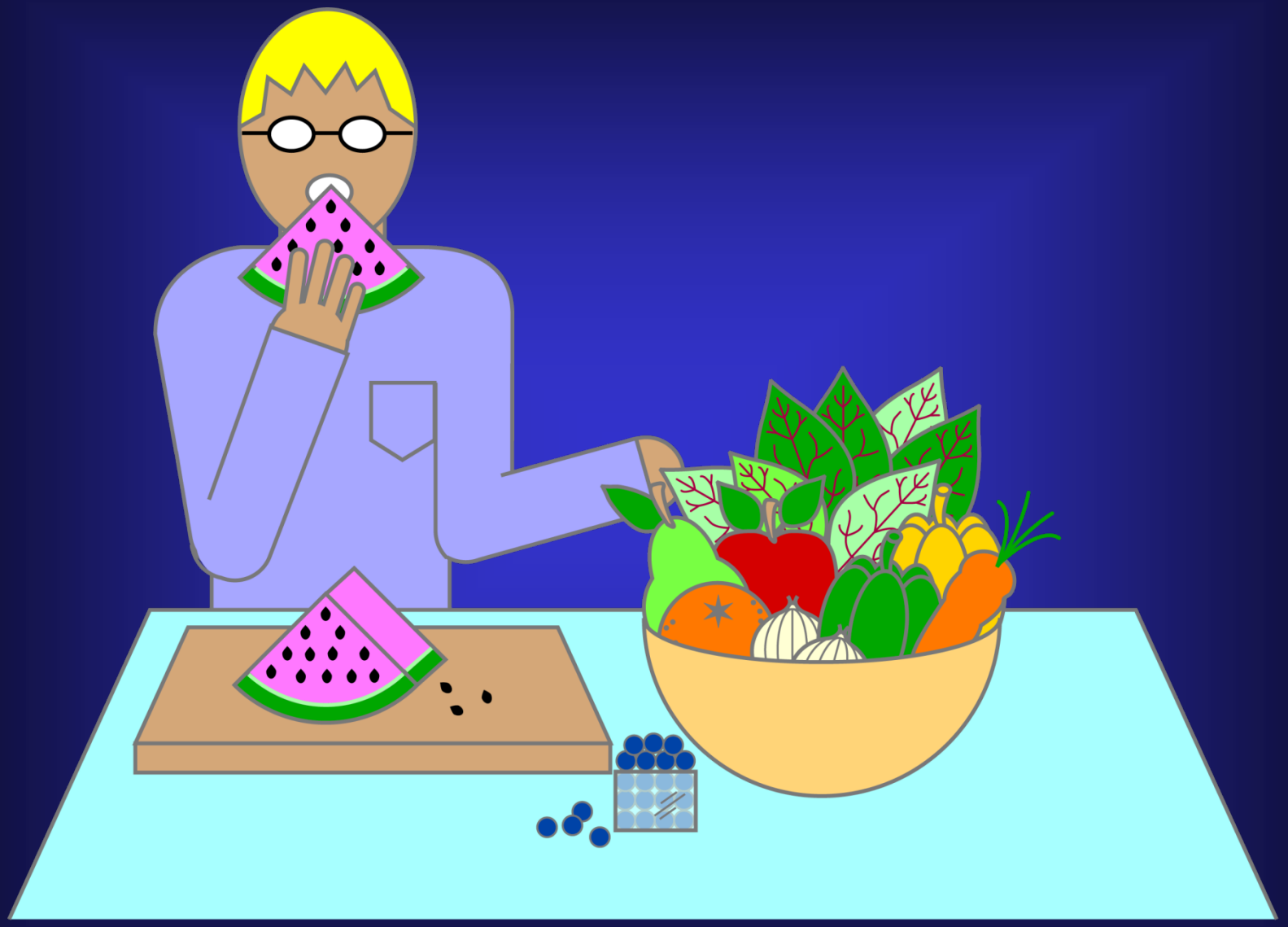


Diet: Limit Fats and Calories

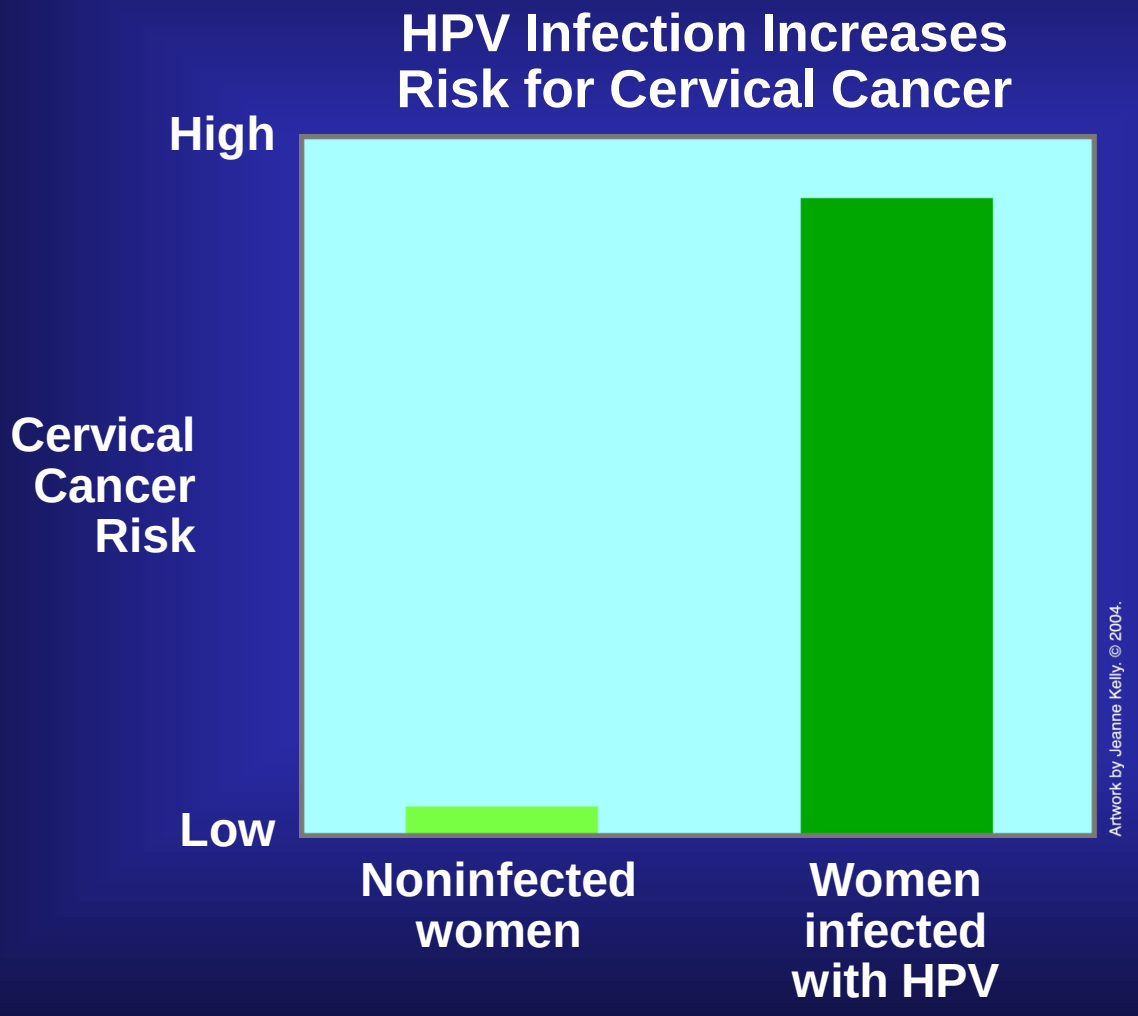
Correlation Between Meat Consumption and Colon Cancer Rates in Different Countries



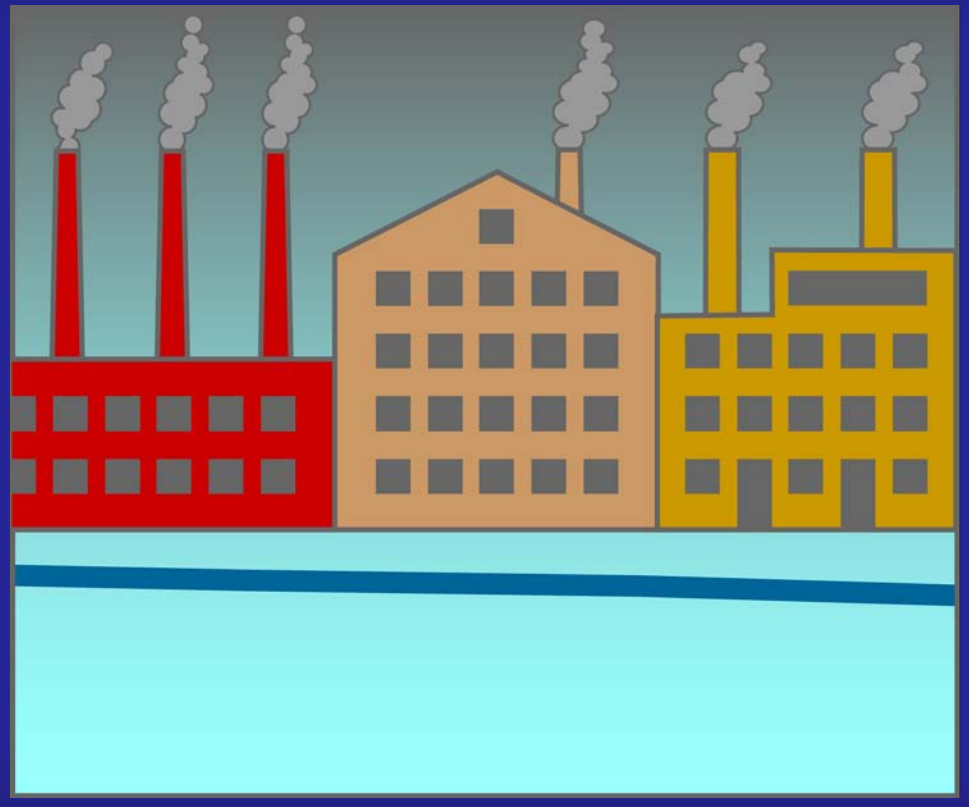
Diet: Consume Fruits and Vegetables



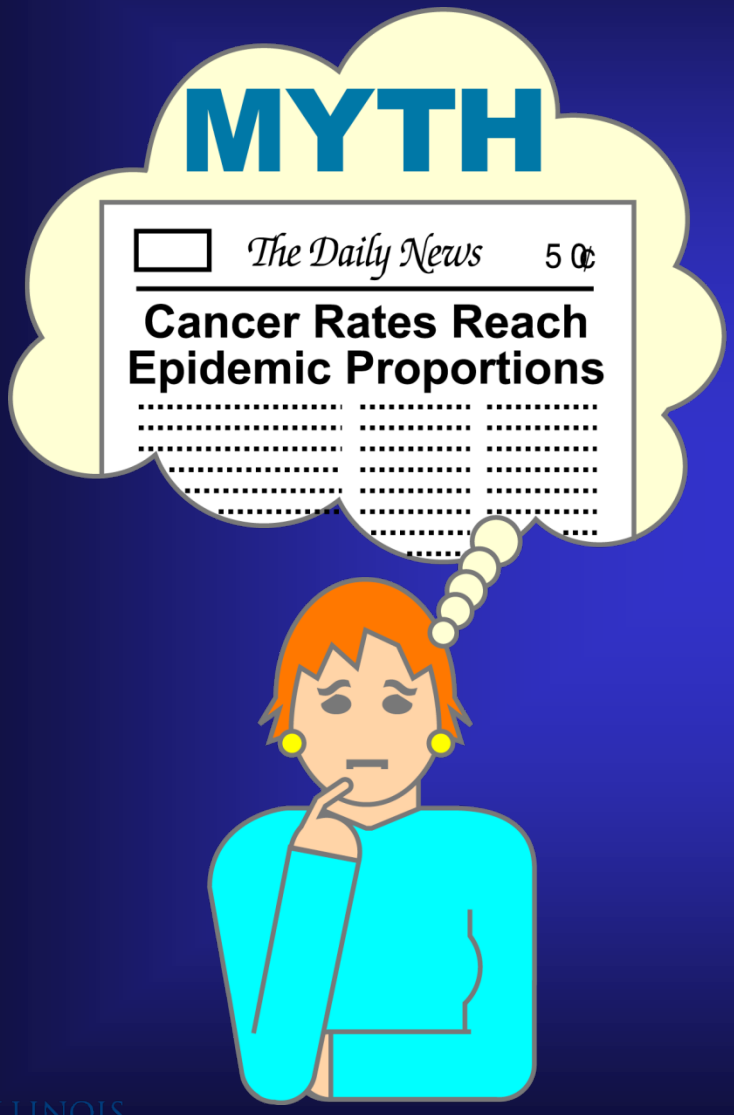
Avoid Cancer Viruses

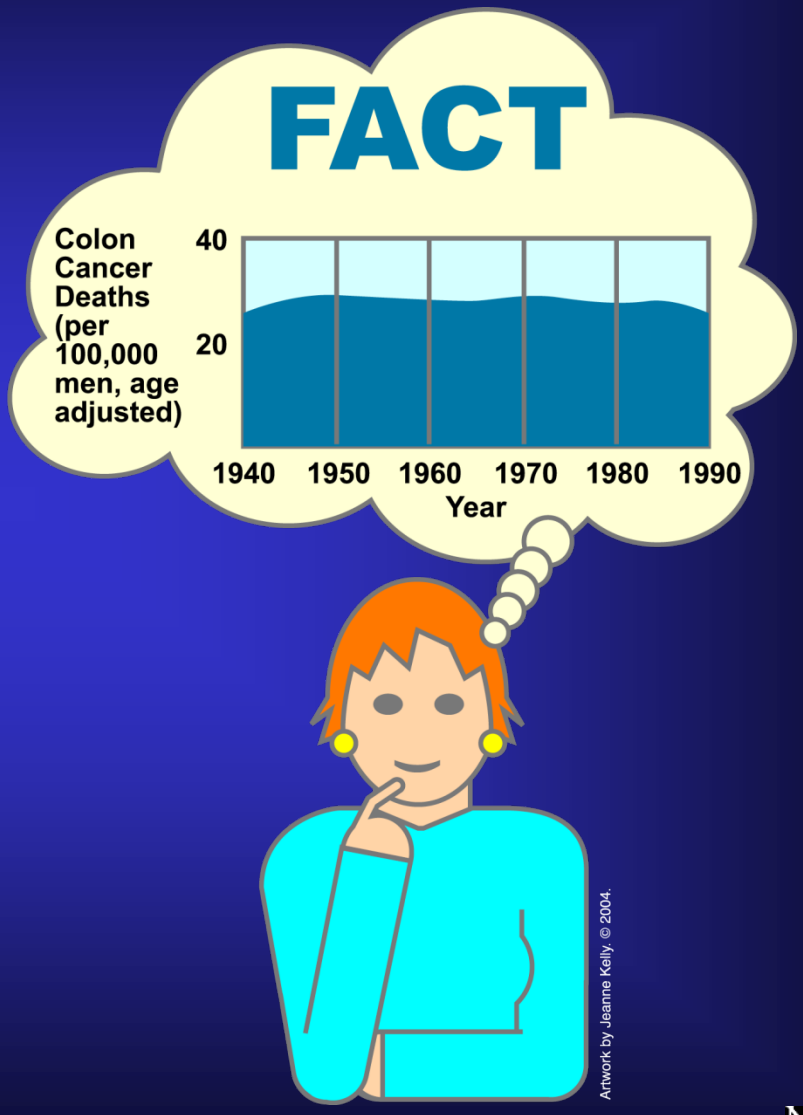


Industrial Pollution



Is There a Cancer "Epidemic"?





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