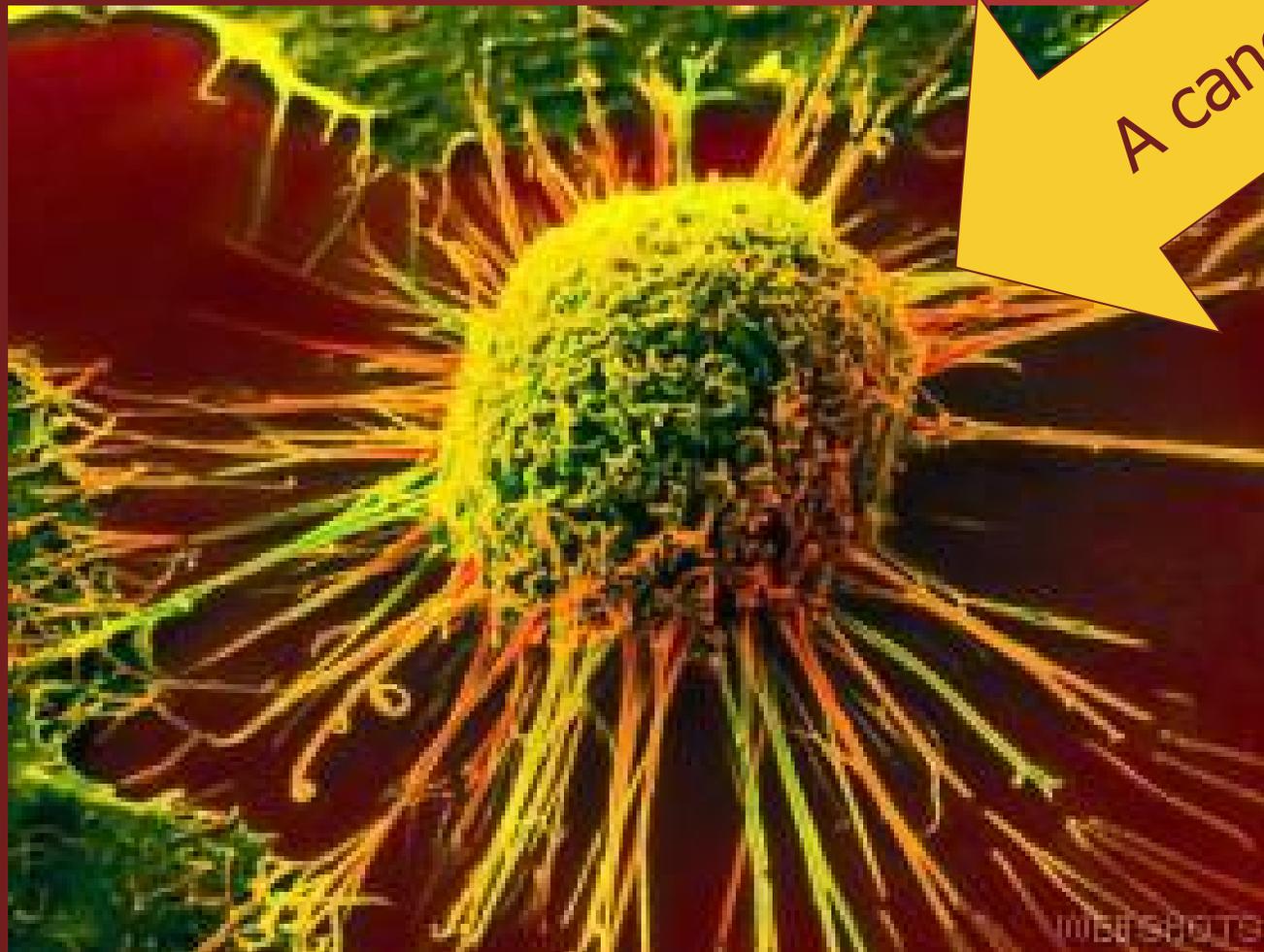


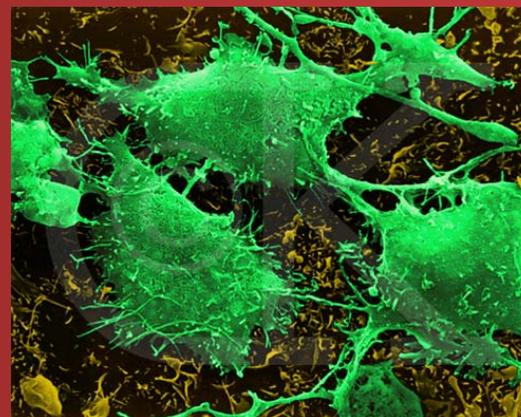
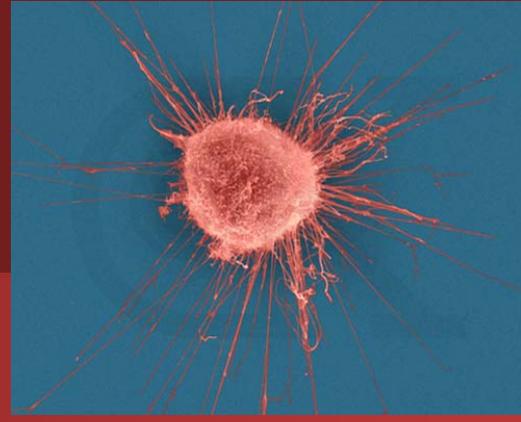
THE CANCER/MITOSIS CONNECTION



A cancer cell

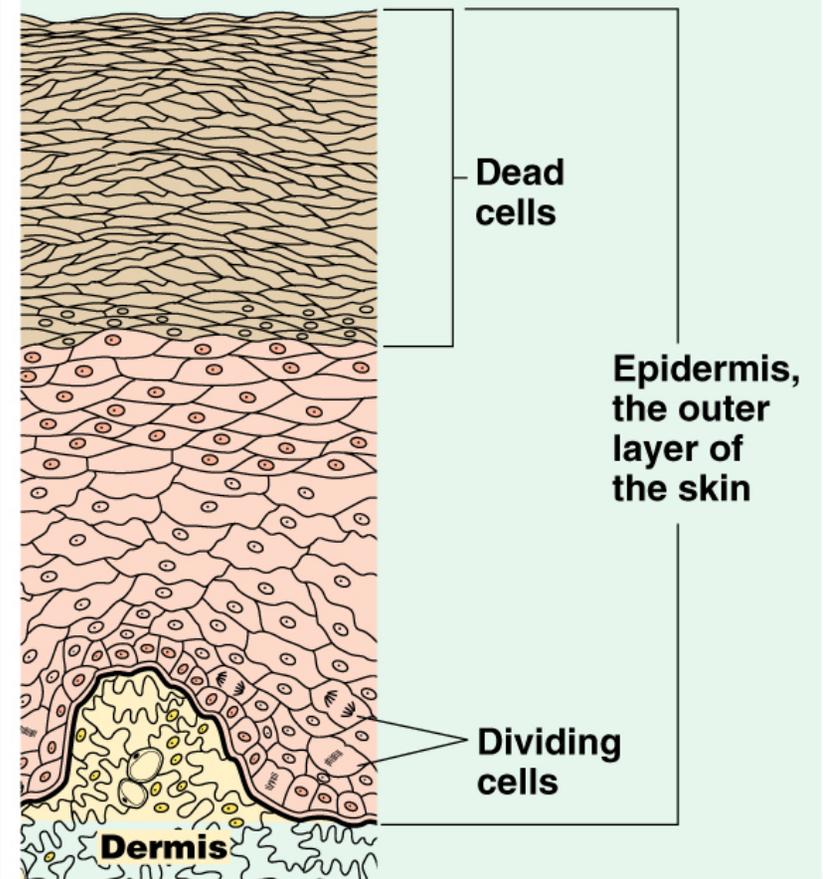
istockphoto

- All cells have a controlled rate of division that is appropriate for their role in the body.



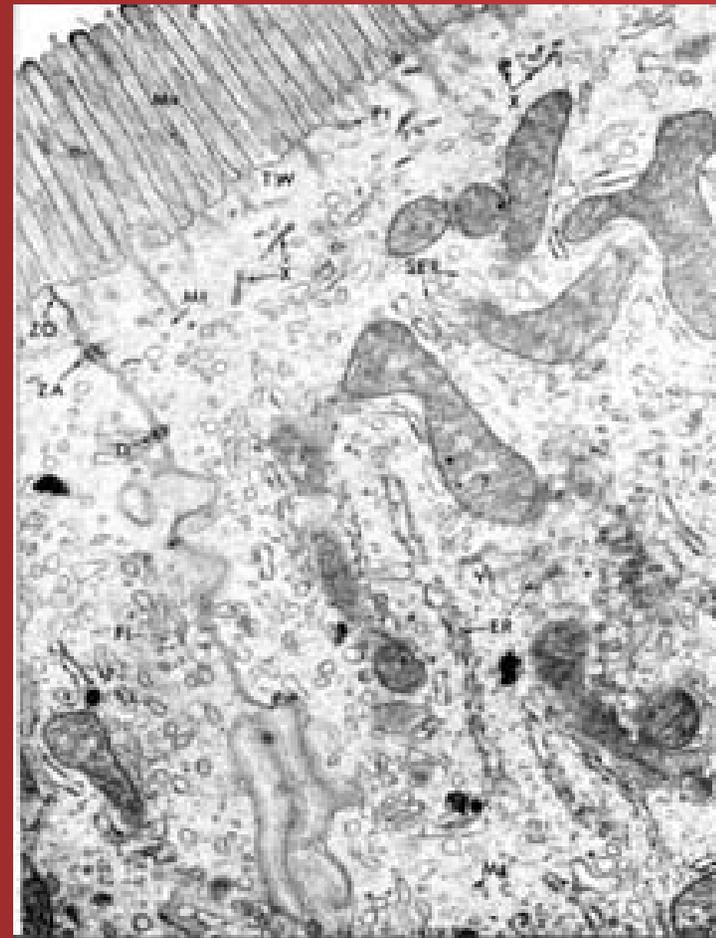
Rates of Division

- ex. The cells of the skin reproduces perfectly so that it does not become too thin or too thick



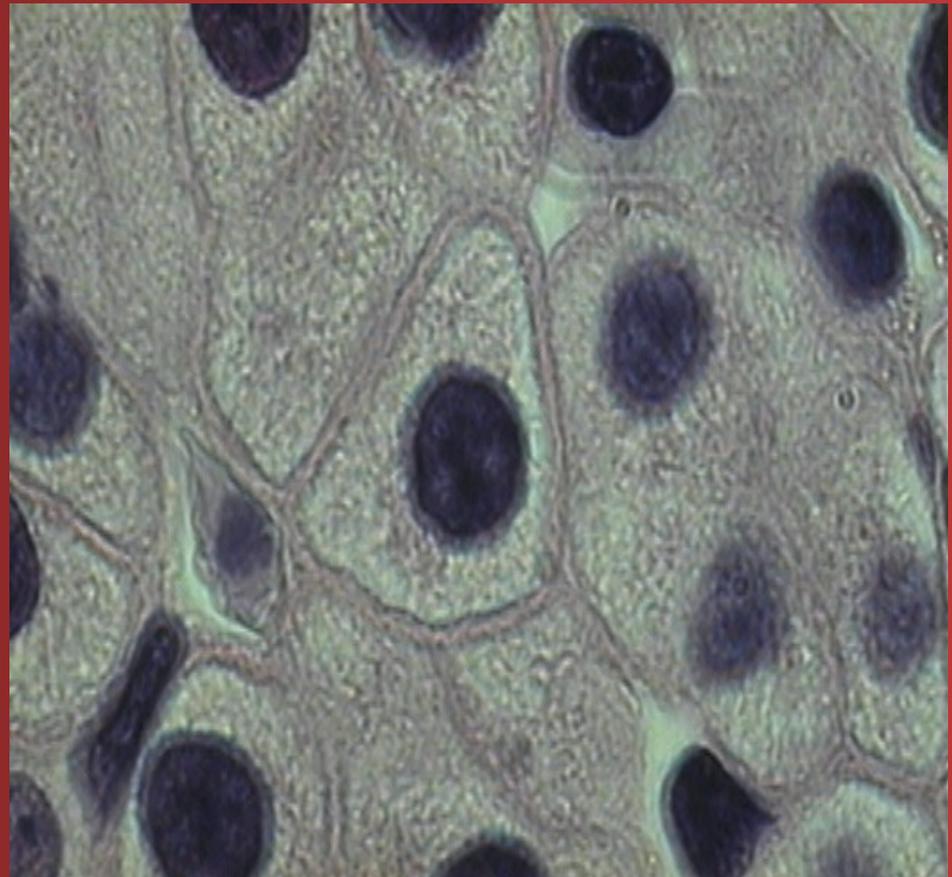
Rates of Division

- Ex. Cells that line the intestine complete the cell cycle in 24-28 hours



Rates of Division

- Ex. Liver cells reproduce only once a year



Rates of Division

- Ex. Nerve cells never reproduce



Rates of Division



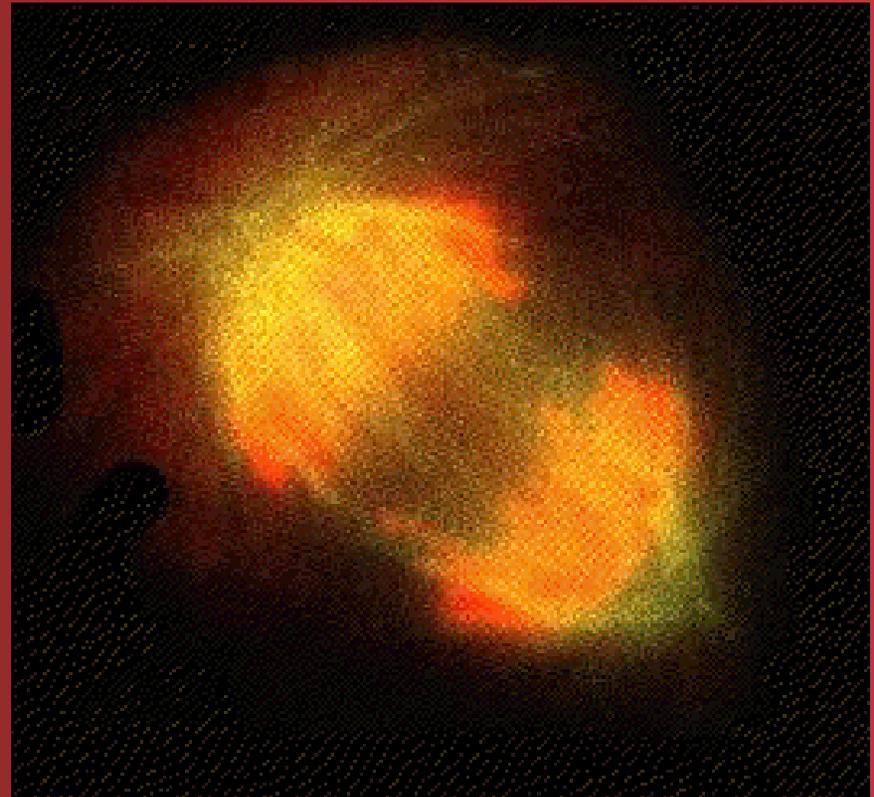
- Ex. Frog embryo cells reproduce in less than an hour

Rates of Division

- Cells spend most of their time in interphase.
- The mechanism for cell growth is highly regulated by genes (segments of DNA) in the cell so that you just get the new cells you need.

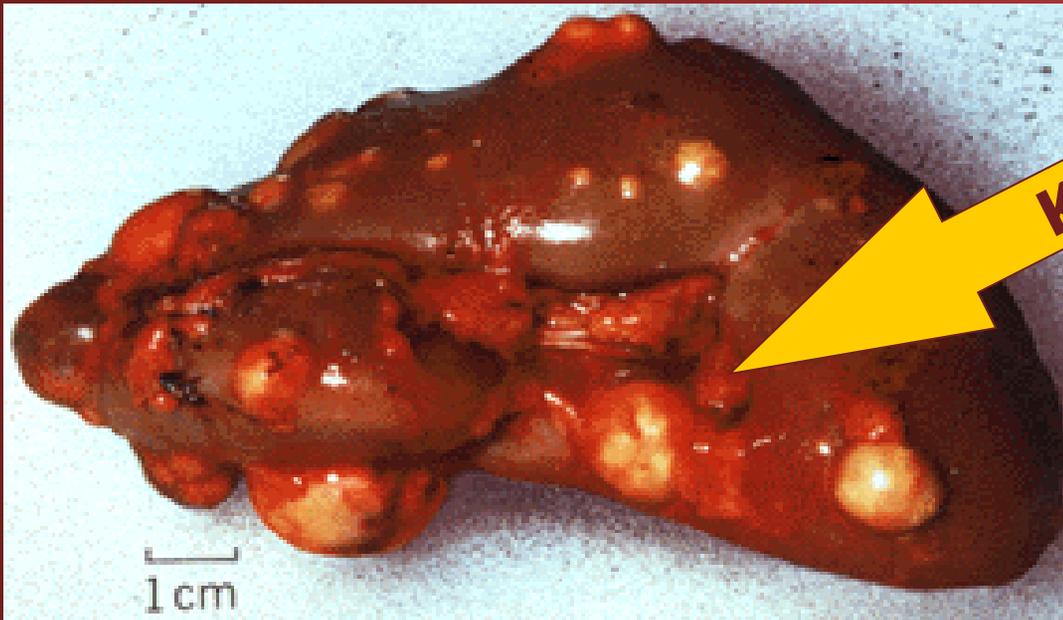
Rates of Division

- If the control mechanism for this process gets messed up, the rate of mitosis in that body tissue increases



Increased Mitosis ...

- Leads to
 - Accumulation of cells in that area known as a **TUMOR**



Kidney tumors

Increased Mitosis ...

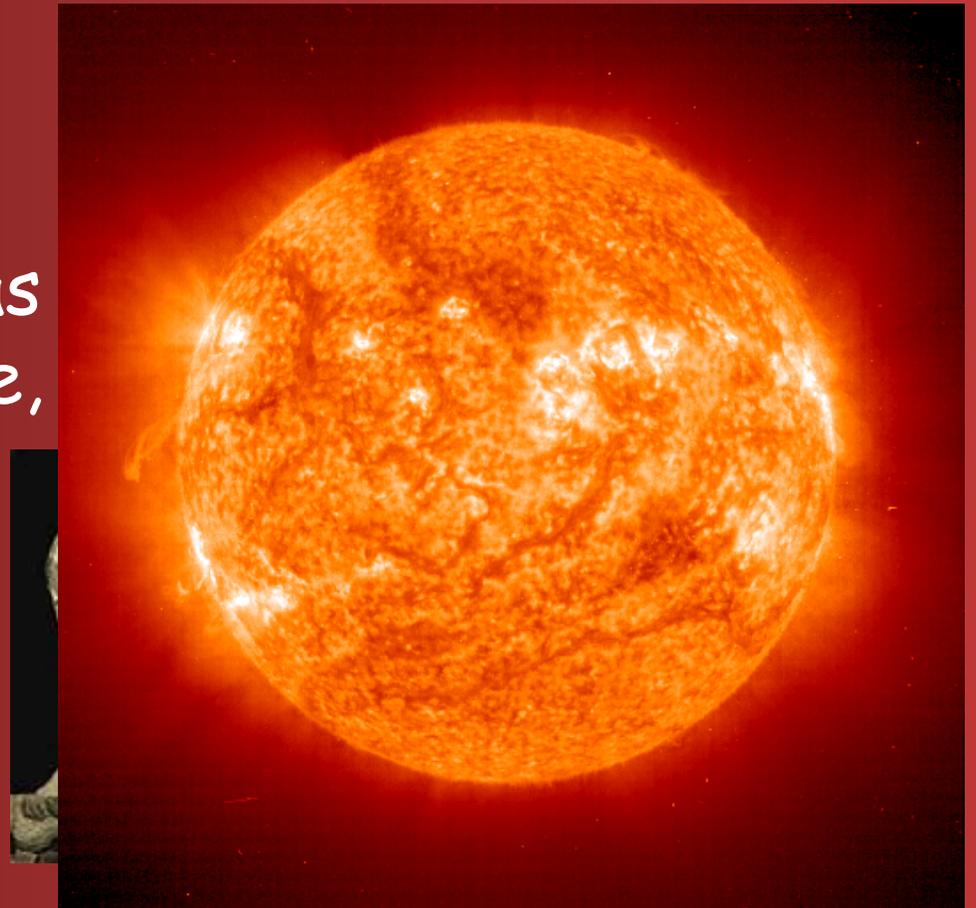
- Leads to
 - **CANCER**
 - A disorder of cells in which the genes which control growth have been damaged and the cells have the ability to spread throughout the body.

Ovary Cancer Cell



Causes of cancer:

- Viruses
- Chemicals (such as Nicotine, Benzene, Asbestos)
- Ultraviolet radiation

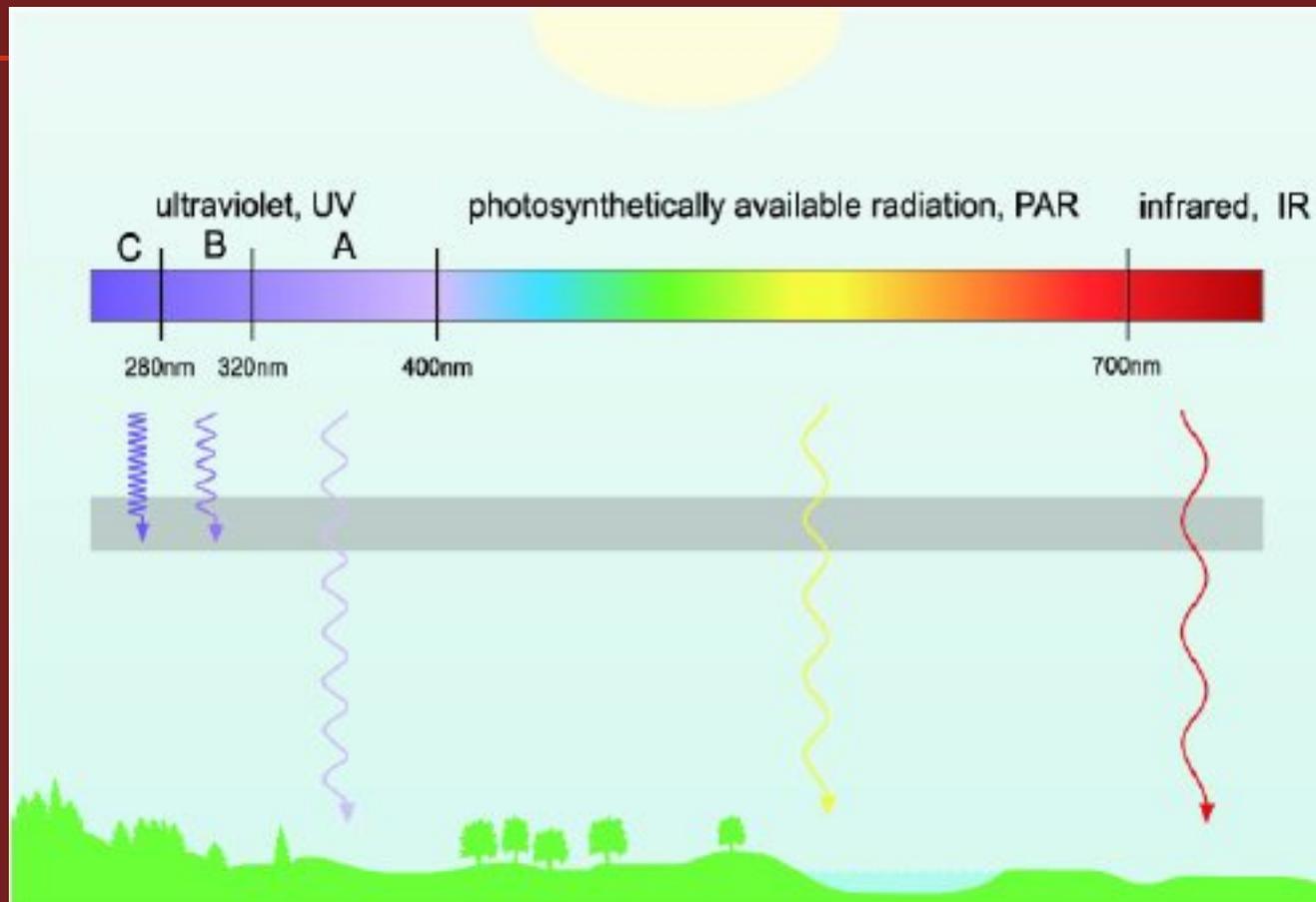


The ozone absorbs some, but not all of the types of UV radiation:

UVA: Not absorbed by the ozone layer.

UVB: Mostly absorbed by the ozone, but some does reach the Earth's surface.

UVC: Completely absorbed by the ozone layer and oxygen.



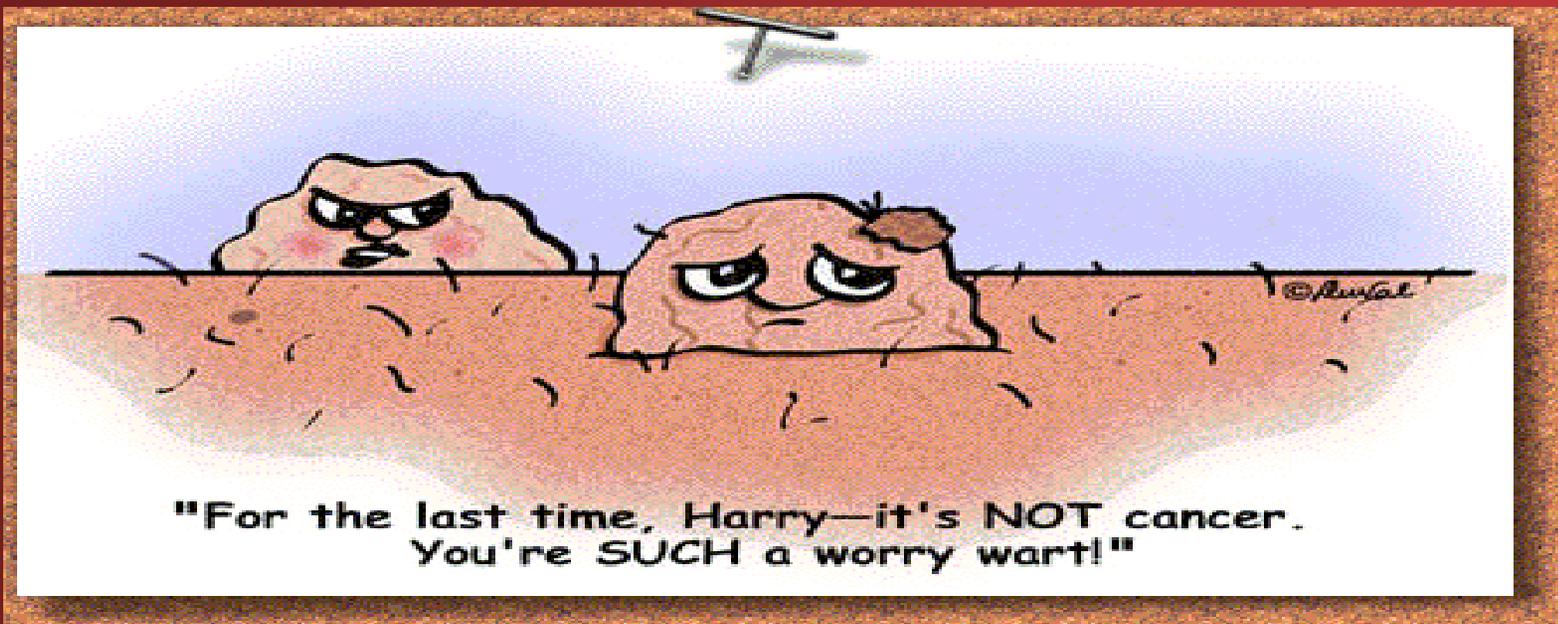
UVA and UVB that reach the Earth's surface contribute to serious health effects.

Causes of Cancer:

- These are called **CARCINOGENS**: cancer-causing agents (also called **MUTAGENS**)
 - Exposure to these Carcinogens is cumulative, meaning the longer you're exposed the greater your risk.
 - Carcinogens attack DNA and mutate the genes that controls cell division
 - These "control" genes are called **ONCOGENES**

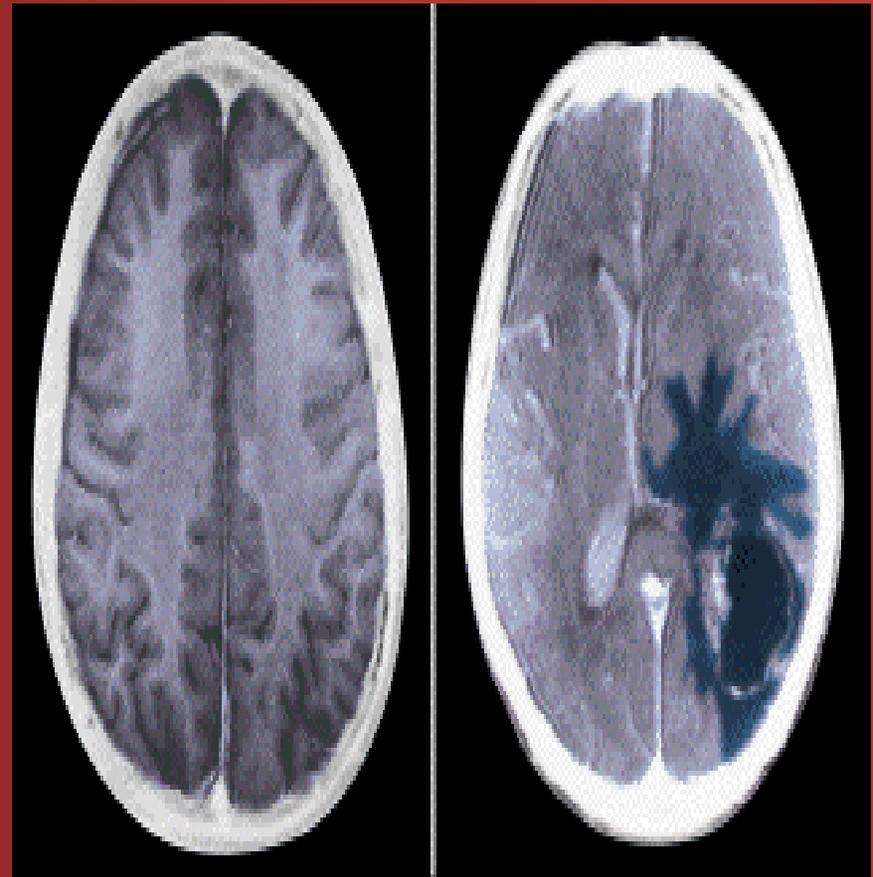
Kinds of tumors:

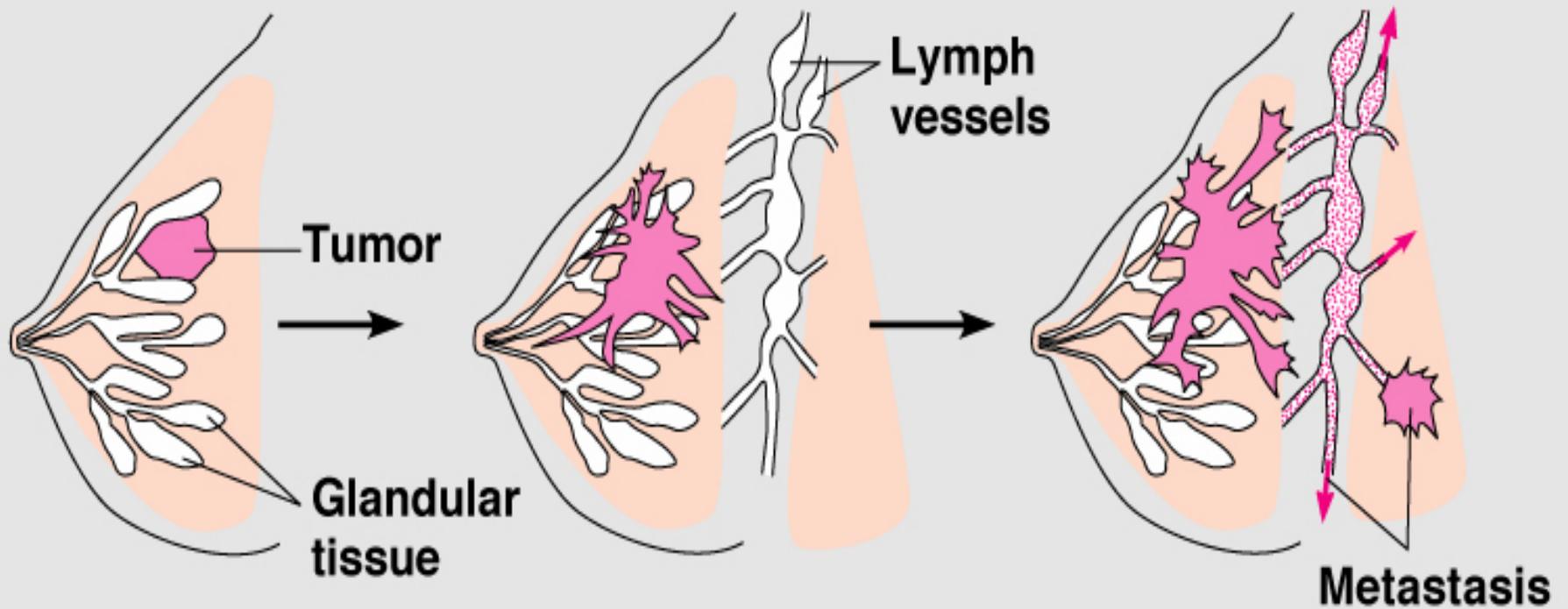
- **BENIGN:** Harmless because do not spread to other tissues of the body
 - Ex. Warts (caused by a virus)



Kinds of tumors:

- **MALIGNANT:**
 - = **CANCER**
 - Very dangerous
 - Spreads to different kinds of tissues (called **METASTASIS**)
 - interferes with organ function





A tumor grows from a single cancer cell.

Cancer cells invade neighboring tissue.

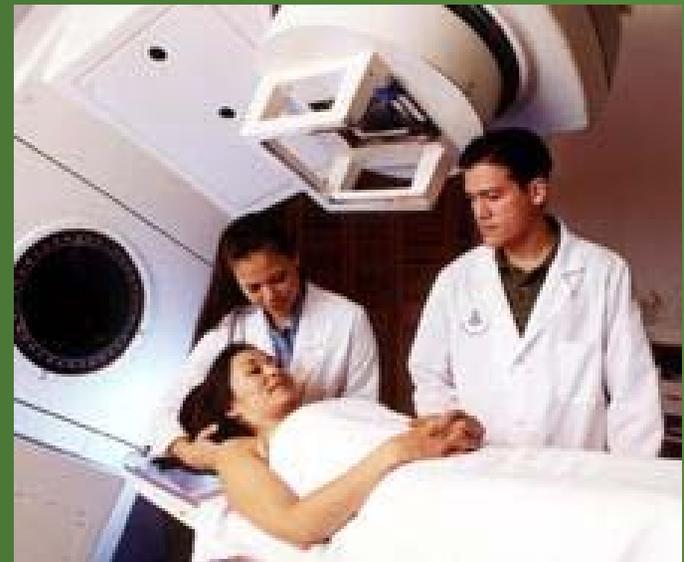
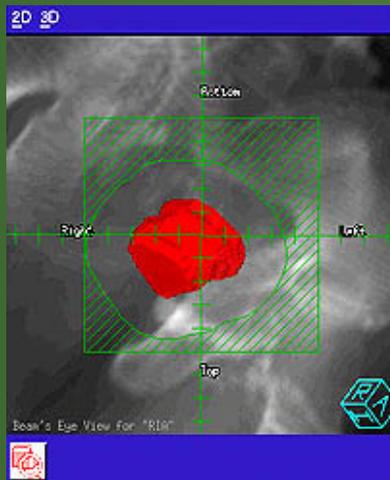
Cancer cells spread through lymph and blood vessels to other parts of the body.

Cancer

- Cancer cells do not carry on normal functions, all their energy goes into dividing.
- They also use up the nutrients for cells so they can't do their job as well.

Cancer Treatments

- **Surgery:** removal of cancerous cells, hopefully before it can spread.
- **Radiation Therapy:** burn and/or kill all cells in the area



Cancer Treatments

- **Chemotherapy:** medication that destroy all rapidly dividing cells (including cells that grow hair, line the gut, produce sperm, produce nails, produce blood cells)



So...

- There are many different forms of cancer, all with varying threat levels to a person's health. A person's susceptibility and ability to fight cancer depend on their health, physical activities, heredity, the environment they live in and access to health care.
- In short, Cancer, in all its various forms, is uncontrolled cell division that leads to a tumor with the ability to spread to different tissues in the body.

