

2012

Genetics and Cancer

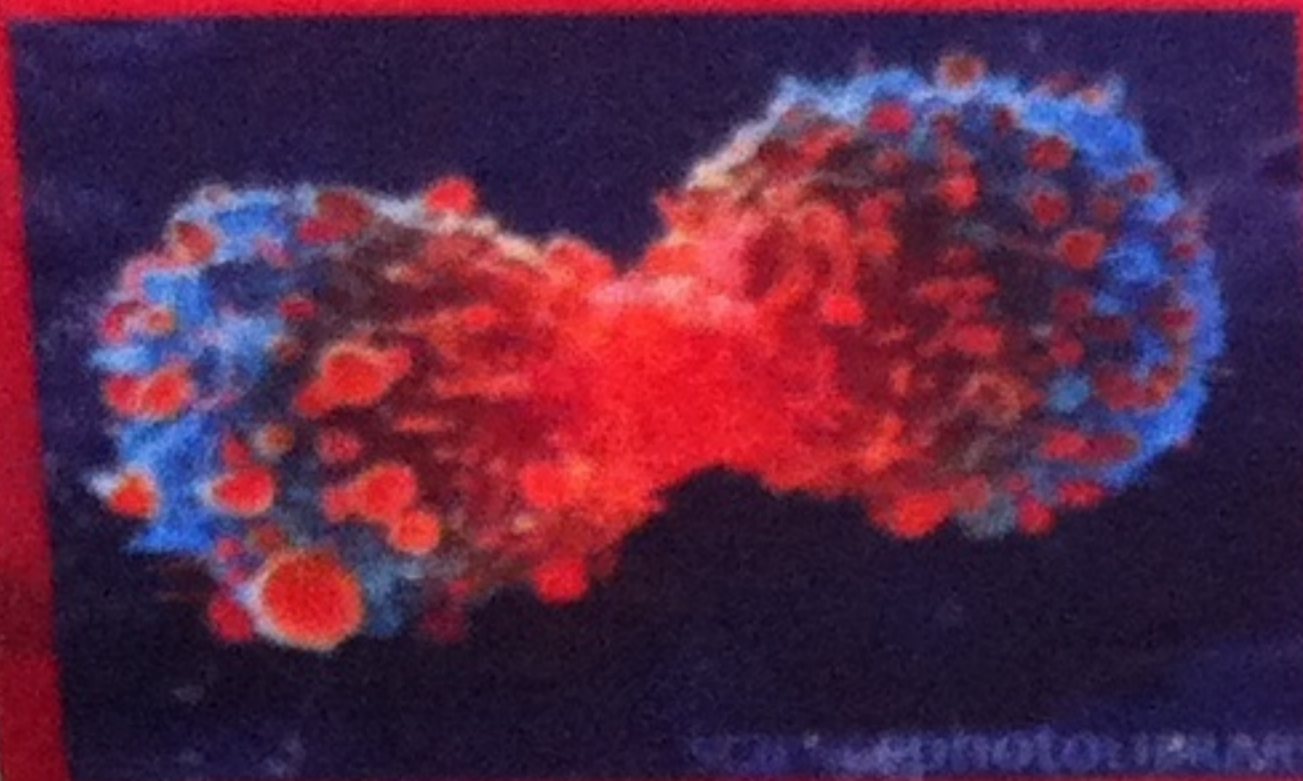
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Cancer Cells Dividing...



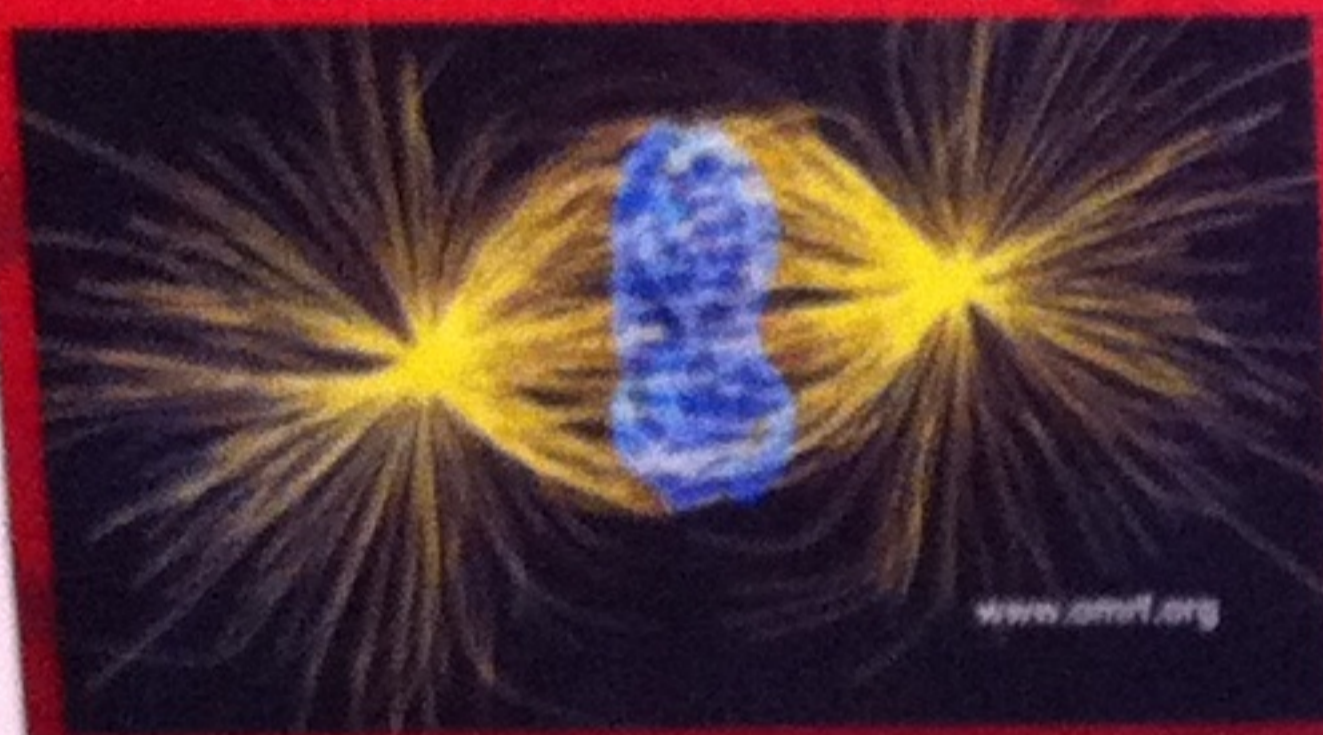
Genetics & Cancer

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Causes of Cancer



The Cancer & the Cell Cycle



Types of Mutations

- Change in genes at chromosomal or DNA level
- Effects of mutation may vary based upon:
 - Place of disease
 - Number of genes
- Germline Mutation (Meiosis)
- Somatic Cell Mutation (Mitosis)
- There are more types...

Types of Genes

- Oncogene:**
 - Can turn a normal cell into a cancer cell
 - Can be inherited or acquired
 - Can be activated by a mutation
- Tumor Suppressor Genes:**
 - Can turn a normal cell into a cancer cell
 - Can be inherited or acquired
 - Can be inactivated by a mutation
- DNA Repair Genes:**
 - Can turn a normal cell into a cancer cell
 - Can be inherited or acquired
 - Can be inactivated by a mutation

Cancer

- The Disease caused by uncontrolled division of cells
- Affects 1 in 3 people during their lifetime
- Only 10% are inherited (germline mutations)
- Rest are spontaneous **mutations** (somatic cell mutations)
- Breast Cancer: Most common for women
- Prostate Cancer: Most common for men

Characteristics of Cancerous Cells

- Loss in Fibrous **Checkpoints**
- Failure to **pause** for DNA repair
- Production of **Telomerase** enzyme to prevent telomere length - **immortal** division and round - **Lack contact inhibition**
- Secrete enzymes to stimulate their own blood vessels (Angiogenesis)
- Migrate, and do not adhere - **Metastasis**
- Various types and number of antigens, evades immune system
- All Daughter cells are **cancerous**

Prevention, Treatment & Cure

- Gene therapy** & stimulate cells to regain apoptosis
- Inhibit Telomerase**
- Induce apoptosis** of cancerous cells
- Inhibit angiogenesis** (cut the blood supply)
- Lifestyle modifications**



Telomere

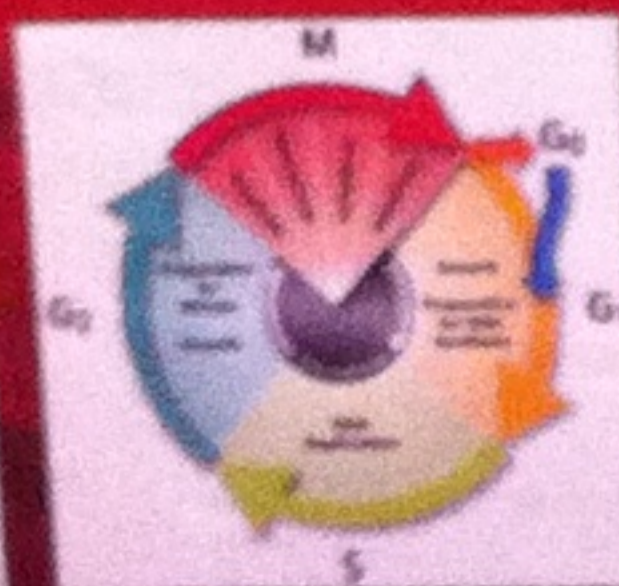
- '**Fountain of Youth**'
- Signals Cell how many times to divide
- No signals to control Telomere in cancerous cells
- Hence **unstoppable** division



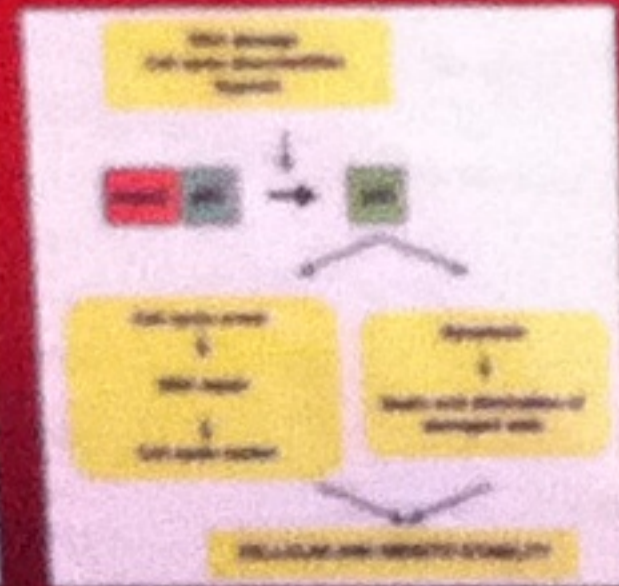
Telomere (Pink Dye)
www.communities.washingtontimes.com

The Cancer & the Cell Cycle...

The Cell Cycle



Functions of p53 gene



Works Cited

- <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1450442/>
- <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1450442/>
- <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1450442/>
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Dietary Sources of Naturally-Occurring Antiangiogenic Substances

Green tea	Red grapes	Lavender
Strawberries	Red wine	Pumpkin
Blackberries	Bok choy	Sea Cucumber
Raspberries	Kale	Tuna
Blueberries	Soy beans	Parsley
Oranges	Ginseng	Garlic
Grapefruit	Maitake mushroom	Tomato
Lemons	Licorice	Olive oil
Apples	Turmeric	Grape seed oil
Pineapple	Nutmeg	Dark chocolate
Cherries	Artichoke	Others

Source: Angiogenesis Foundation (www.angi.org)