

Exploring Cancer

Examining the Role of Biology, Race, Class, and Socioeconomics



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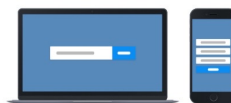


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Exploring Cancer

Examining the Role of Biology, Race, Class, and Socioeconomics



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A collaboration between



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Exploring Cancer

Examining the Role of Biology, Race, Class, and Socioeconomics

Fridays

11:00 - 11:50 AM EST/EDT

August 25

Welcome to Cancer(s) and Health Disparities 101 - The Introduction

October 13

Breast Cancer Health Disparities

November 10

Precision Medicine and Immunotherapy

September 1

Radiation Oncology

October 20

Pancreatic Cancer

November 17

Expanding Cancer Care Quality and Delivery in Sub-Saharan Africa: a collaborative approach

September 8

New Strategies in Treating GI Cancers

October 27

Career Panel

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Exploring Cancer

Examining the Role of Biology, Race, Class, and Socioeconomics

August 25, 2023

Welcome to Cancer(s) and Health Disparities 101 - The Introduction



Antonio T. Baines, PhD

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Antonio Baines, PhD

Science was always one of the courses that Dr. Antonio (Tony) Baines excelled in throughout school. It was this love for science that led him to major in biology as an honor student at Norfolk State University in Norfolk, Virginia. As a college student, Tony attended scientific conferences and participated in summer internships at NASA's Kennedy Space Center in Florida and the University of Arizona.

After graduating with a bachelor's degree in biology in 1995, Tony was admitted to the Ph.D. program in pharmacology and toxicology at the University of Arizona in Tucson, Arizona. As a graduate student, he studied potential treatments against colon cancer in the Arizona Cancer Center. In 2001, Tony received his Ph.D. in Pharmacology and Toxicology, becoming the 2nd African American to graduate from the department in its approximately 30 years of its existence.

Afterwards, Tony received a postdoctoral fellowship at the University of North Carolina at Chapel Hill (UNC-CH) to study pancreatic cancer in the Dept of Pharmacology and the Lineberger Comprehensive Cancer Center. In addition to research, Tony received training in pedagogy and taught biology for a year at Fayetteville State University.

In August 2006, Tony accepted a faculty position in the Department of Biology at North Carolina Central University (NCCU) in Durham, North Carolina where he currently teaches and conducts research on potential targeted therapies for pancreatic cancer. In addition, he is an adjunct faculty member in the Department of Pharmacology and a member in the Curriculum in Toxicology and Environmental Medicine at UNC-CH. At both institutions, Tony encourages students to pursue advanced degrees in STEM.

During his free time, Tony likes to jog, practice martial arts, watch movies, read, travel, and most importantly, spend quality time with his family.

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Professional Highlights

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Professional Highlights

- 5.** Dr. Baines is a proud graduate of an HBCU - Norfolk State University - Behold, the Green and Gold!!

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- 5.** Dr. Baines is a proud graduate of an HBCU - Norfolk State University - Behold, the Green and Gold!!
- 4.** He has a PhD from the U of AZ in Pharmacology and Toxicology

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- 3.** He is a proud NCCU Eagle Faculty! EAGLE PRIDE AMPLIFIED!

10

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- 2.** The Eagle is no common, ordinary barnyard fowl"! Again, "The Eagle is no common, ordinary barnyard fowl

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Professional Highlights

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- 3.** He is a proud NCCU Eagle Faculty! EAGLE PRIDE AMPLIFIED!
- 2.** The Eagle is no common, ordinary barnyard fowl"! Again, "The Eagle is no common, ordinary barnyard fowl
- 1.** He is passionate about helping to increase the diversity of students going into STEM careers!

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What do you think this is?



Nobody has responded yet.
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Liver Metastases from Pancreatic Cancer



By Haymanj - Self-photographed, Public Domain,
<https://commons.wikimedia.org/w/index.php?curid=3662694>

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Question

- How many of you know someone who has or has had cancer?

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Welcome to Cancer(s) and Health Disparities 101: The Introduction

Antonio T. Baines, Ph.D.

Associate Professor
Department of Biological and Biomedical Sciences
Cancer Research Program
JLC-Biomedical/Biotechnology Research Institute
College of Health & Sciences
North Carolina Central University

Adjunct Associate Professor
Department of Pharmacology
Member, Curriculum in Toxicology and Environmental Medicine
School of Medicine
University of North Carolina-Chapel Hill

08/26/23

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Learning Outcomes

- Define “cancer” and list some of the causes
- Describe the terms “health disparity” and “health equity”
- Discuss why more need to be done to improve healthcare for all people

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Outline

- A Career in Cancer Research
- Important details about Cancer: including statistics, definition, causes, and treatments
- My Research Interests in Pancreatic Cancer
- What is Health Disparity and Health Equity?
- What can we do to prevent Cancer?

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Outline

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- **What can we do to prevent Cancer?**

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Do you like to ask Questions? Do you like to find out Answers?
Do you want to Help people?

Let's talk about being a CANCER RESEARCHER



Dr. Antonio (Tony) Baines, Ph.D.

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Careers in Cancer Research:

University Professor (Teach and Conduct Research)

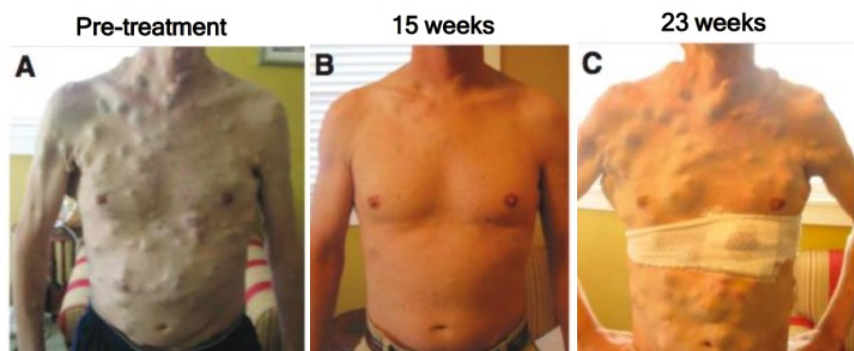
Cancer Biology

Cancer Pharmacology –

**study normal cell machinery and cellular processes,
interested in developing novel drugs to treat cancer cells**

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Why Do We Need Novel Drugs Against Cancer?



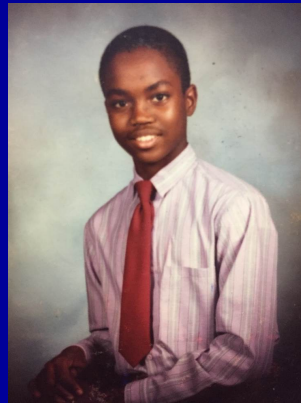
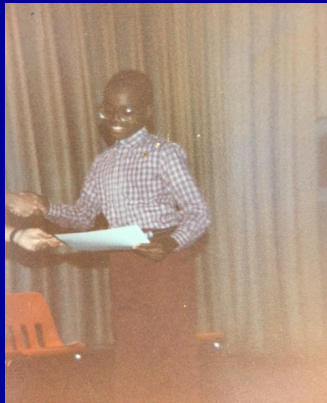
Combination of different cell signaling inhibitors may improve treatment

Wagle N *et al.* 2011, *Journal of Clinical Oncology* 29: 3085-3096

PANCREATIC
CANCER
ACTION
NETWORK

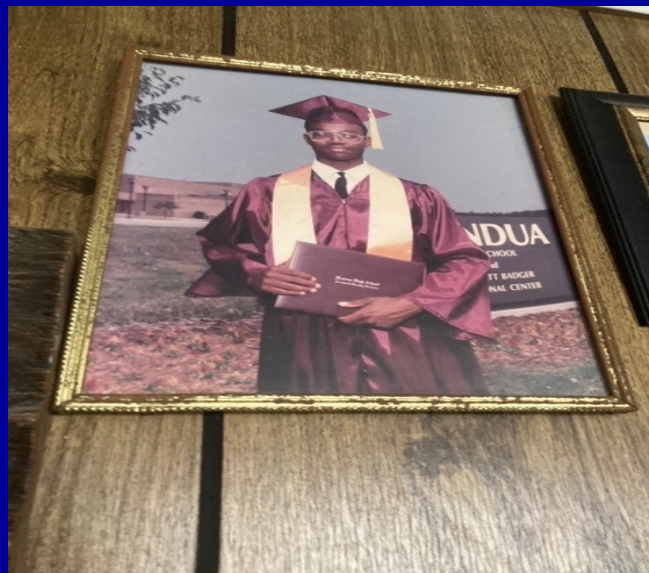
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The younger 'Tony' from New Jersey who grew up in rural Eastern Shore of Virginia




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The high school honors graduate who loved science



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The trip that changed my life and helped to chart my path

	<h1>Society of Toxicology</h1> <p>1101 FOURTEENTH STREET, N.W., SUITE 1100, WASHINGTON, D.C. 20005-5601 Tel: (202) 371-1393 FAX: (202) 371-1090</p> <p>December 15, 1992</p> <p>Mr. Antonio Baines c/o Dr. Maxwell A. Bempong Biology Norfolk State University 2401 Corpew Avenue Norfolk VA 23504</p> <p>Dear Mr. Baines:</p> <p>Congratulations! You have been selected to receive a Minority Student Travel Award for the 1993 Annual Meeting of the Society of Toxicology, March 14-18 in New Orleans, Louisiana. This travel grant was generously funded by the National Institutes of Health and the R.W. Johnson Pharmaceutical Research Foundation.</p> <p>The Society of Toxicology will make your travel arrangements to and from the meeting and provide you a sleeping room for the evenings of the 13th, 14th and 15th (roommates will be assigned). In addition, a modest stipend will be sent to you prior to the meeting to cover your home city airport transfers and other incidentals. In order to complete our travel arrangements, we ask that you complete and return the enclosed acceptance form by January 8, 1993. Further details of the meeting (the preliminary program) will be sent to you sometime this month.</p> <p>You will be met at the New Orleans airport Saturday, March 13 and given instructions about transportation to the Doubletree Hotel.</p>
<p>1992-93 COUNCIL</p> <p>PRESIDENT John L. Emmerson, Ph.D. Eli Lilly & Company</p> <p>VICE PRESIDENT I. Glenn Sipes, Ph.D. University of Arizona</p> <p>VICE PRESIDENT-ELECT Meryl H. Karol, Ph.D. University of Pittsburgh</p> <p>TREASURER R. Michael McClain, Ph.D. Hoffmann-La Roche, Inc.</p> <p>TREASURER-ELECT Judith A. MacGregor, Ph.D. Chevron Research and Technology Company</p> <p>SECRETARY Marion Ehrlich, Ph.D. Virginia Maryland Regional College of Veterinary Medicine</p>	

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The college honors graduate from an HBCU



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My 1st formal encounter with cancer was in graduate school



<https://deptmedicine.arizona.edu/news/2019/transition-leadership-university-arizona-cancer-center-announced>

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The Journey that Shaped this Passion for Science and Cancer Research



- DNIMAS Science Honors Program, B.S. in Biology (4 yrs)



THE UNIVERSITY OF ARIZONA

- Colon Cancer, Ph.D. in Pharmacology and Toxicology (5.5 yrs)



- Pancreatic Cancer, NIH Postdoctoral Fellowship (5 yrs)



- Pancreatic Cancer, Associate Professor (Teaching, Research, and Service) (17 yrs)



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Figure 3. Leading Sites of New Cancer Cases and Deaths – 2022 Estimates

	Male				Female		
Estimated New Cases	Prostate	268,490	27%		Breast	287,850	31%
	Lung & bronchus	117,910	12%		Lung & bronchus	118,830	13%
	Colon & rectum	80,690	8%		Colon & rectum	70,340	8%
	Urinary bladder	61,700	6%		Uterine corpus	65,950	7%
	Melanoma of the skin	57,180	6%		Melanoma of the skin	42,600	5%
	Kidney & renal pelvis	50,290	5%		Non-Hodgkin lymphoma	36,350	4%
	Non-Hodgkin lymphoma	44,120	4%		Thyroid	31,940	3%
	Oral cavity & pharynx	38,700	4%		Pancreas	29,240	3%
	Leukemia	35,810	4%		Kidney & renal pelvis	28,710	3%
	Pancreas	32,970	3%		Leukemia	24,840	3%
All sites	983,160		All sites	934,870			
Estimated Deaths	Lung & bronchus	68,820	21%		Lung & bronchus	61,360	21%
	Prostate	34,500	11%		Breast	43,250	15%
	Colon & rectum	28,400	9%		Colon & rectum	24,180	8%
	Pancreas	25,970	8%		Pancreas	23,860	8%
	Liver & intrahepatic bile duct	20,420	6%		Ovary	12,810	4%
	Leukemia	14,020	4%		Uterine corpus	12,550	4%
	Esophagus	13,250	4%		Liver & intrahepatic bile duct	10,100	4%
	Urinary bladder	12,120	4%		Leukemia	9,980	3%
	Non-Hodgkin lymphoma	11,700	4%		Non-Hodgkin lymphoma	8,550	3%
	Brain & other nervous system	10,710	3%		Brain & other nervous system	7,570	3%
All sites	322,090		All sites	287,270			

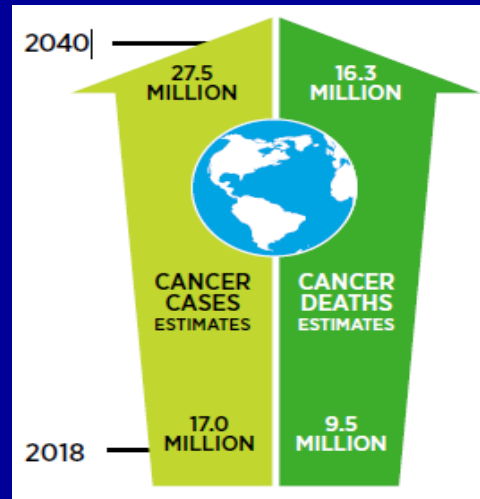
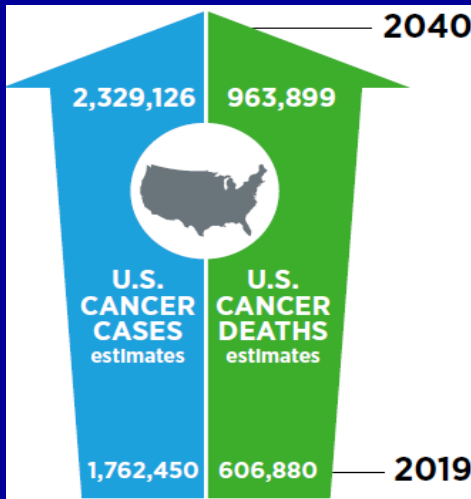
Estimates are rounded to the nearest 10, and cases exclude basal cell and squamous cell skin cancers and in situ carcinoma except urinary bladder. Estimates do not include Puerto Rico or other US territories. Ranking is based on modeled projections and may differ from the most recent observed data.

©2022, American Cancer Society, Inc., Surveillance and Health Equity Science

<https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2022/2022-cancer-facts-and-figures.pdf>

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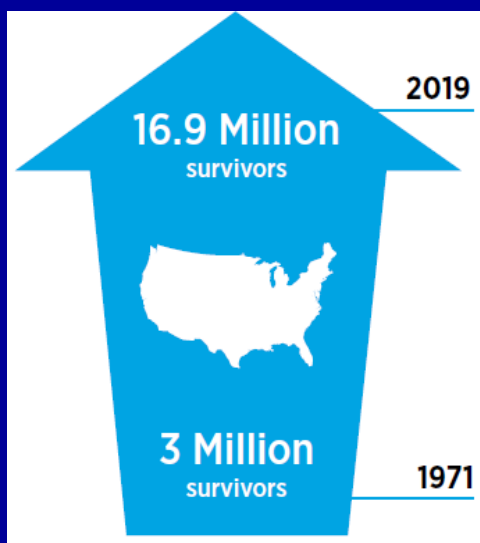
Cancer: A U.S. AND Global Public Health Challenge



cancerprogressreport.org [Internet]. Philadelphia: American Association for Cancer Research; c2019. Available from <http://www.cancerprogressreport.org/>.

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Are We Making Any Progress?



cancerprogressreport.org [Internet]. Philadelphia: American Association for Cancer Research; c2019. Available from <http://www.cancerprogressreport.org/>.

BETWEEN AUGUST 1, 2020 AND JULY 31, 2021, THE FDA APPROVED:

16 new anticancer therapeutics, which are now benefiting patients with various types of cancer

11 previously approved anticancer therapeutics for treating new types of cancer

3 new diagnostic imaging agents

2 new surgery guiding devices

1 new artificial intelligence-driven endoscopy device

2 new multipanel NGS liquid biopsy companion diagnostic tests

https://cancerprogressreport.aacr.org/wp-content/uploads/sites/2/2021/10/AACR_CPR_2021.pdf

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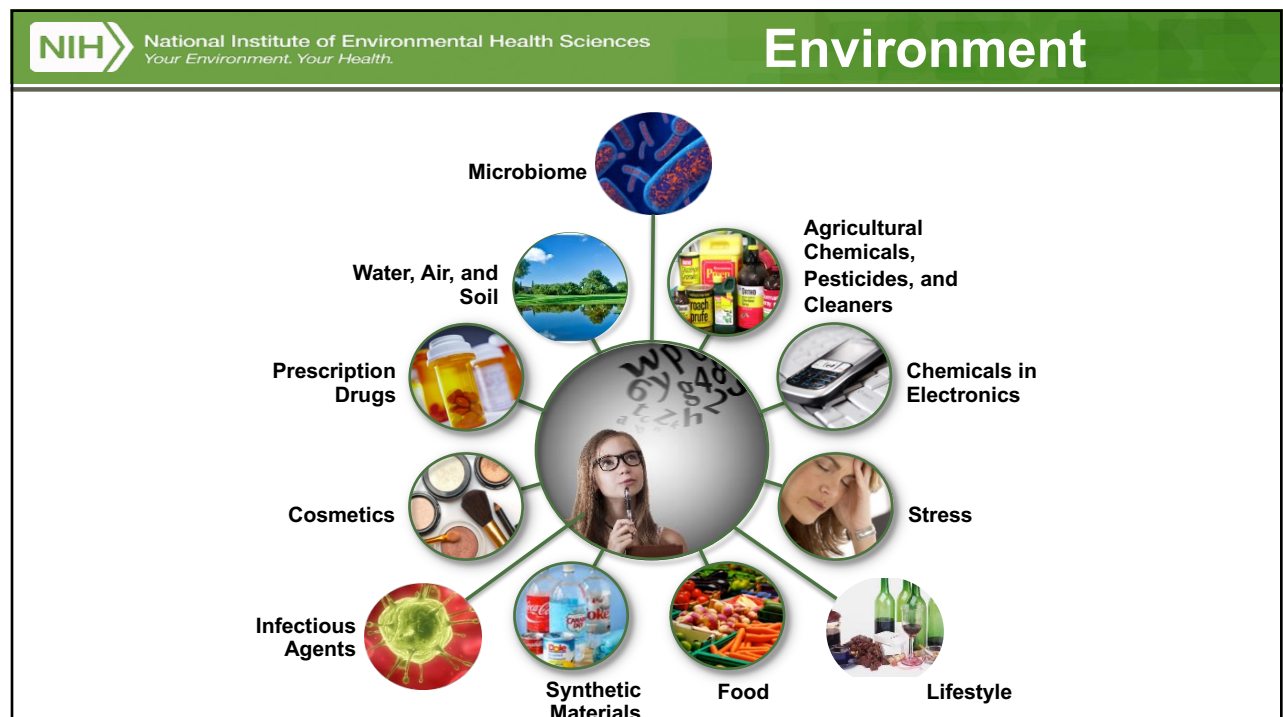
What is Cancer?

Cancer - A collection of diseases that arise when processes that control normal growth control, division, and life span go awry; Happens mainly due to mutations

Mutations – Changes in genetic material of normal cells; Sometimes mutations are inherited (10%) but most mutations are acquired over time due to exposure to carcinogens

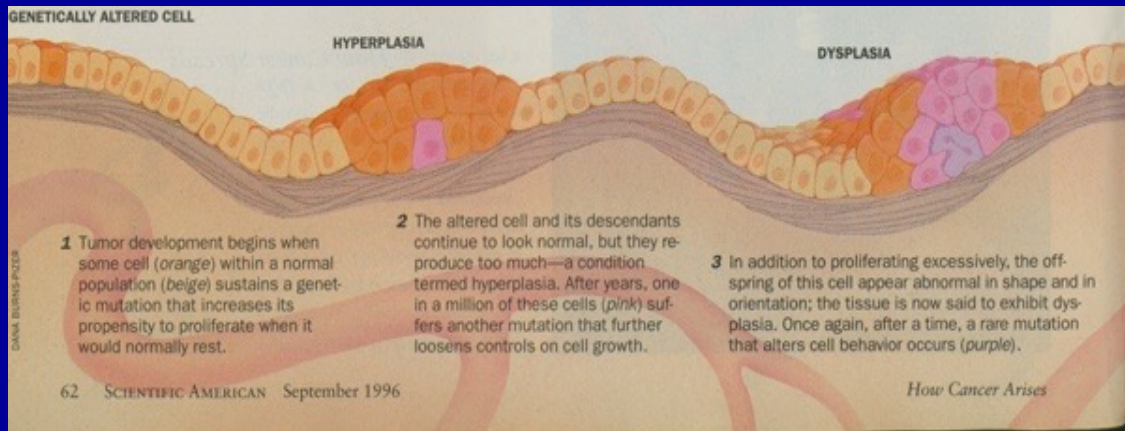
Carcinogens – chemicals or physical substances that can cause cancer (tobacco smoke, UV light)

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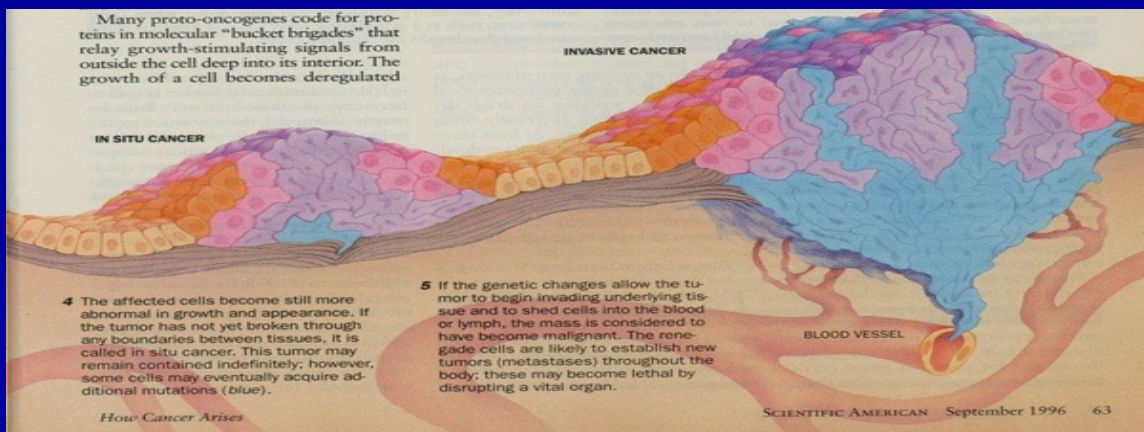
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Cancer Development Occurs in Stages



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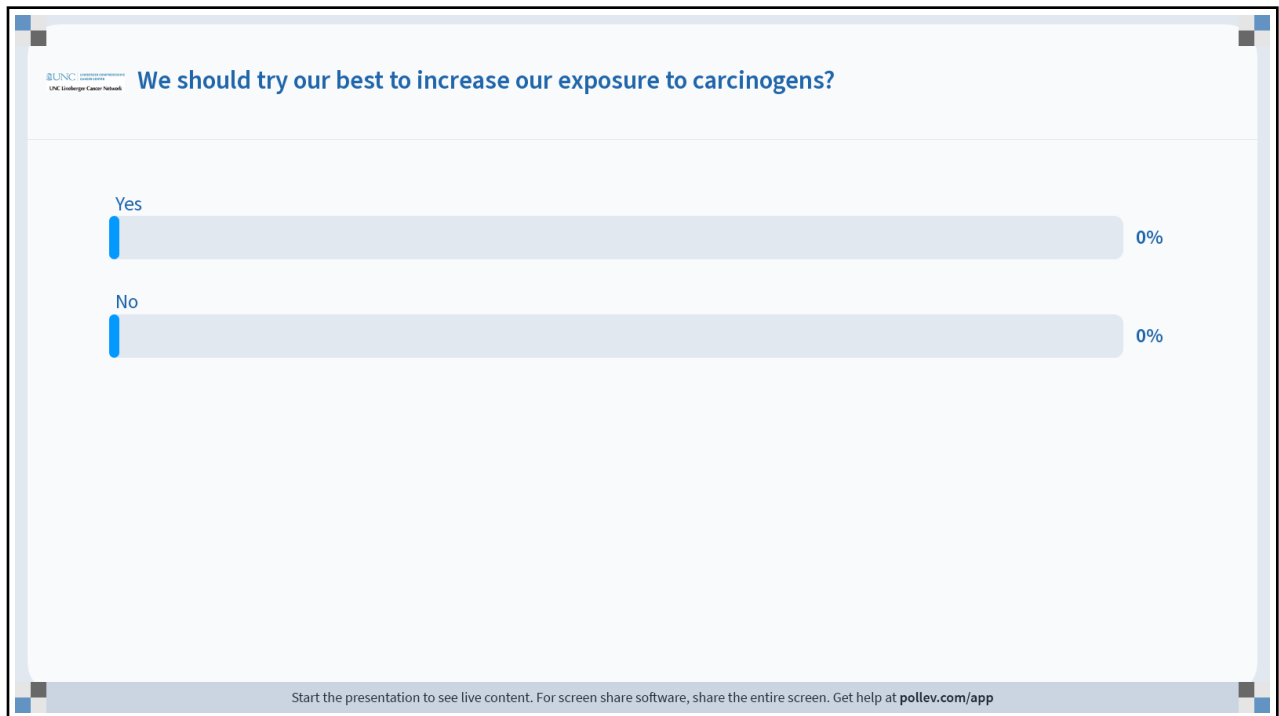
Cancer Development Occurs in Stages



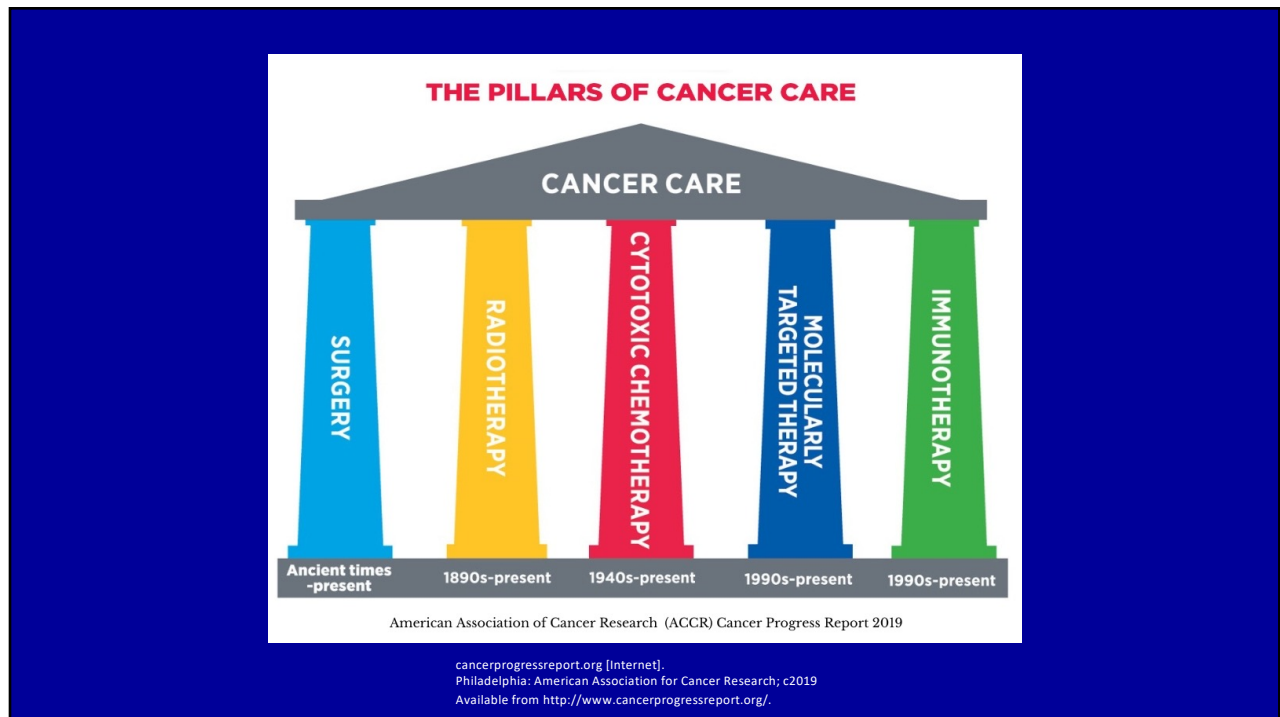
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Video

Please visit the following YouTube video for this portion of the presentation:

<https://www.youtube.com/watch?v=ISJm8Z2nV5Y&t=160s>



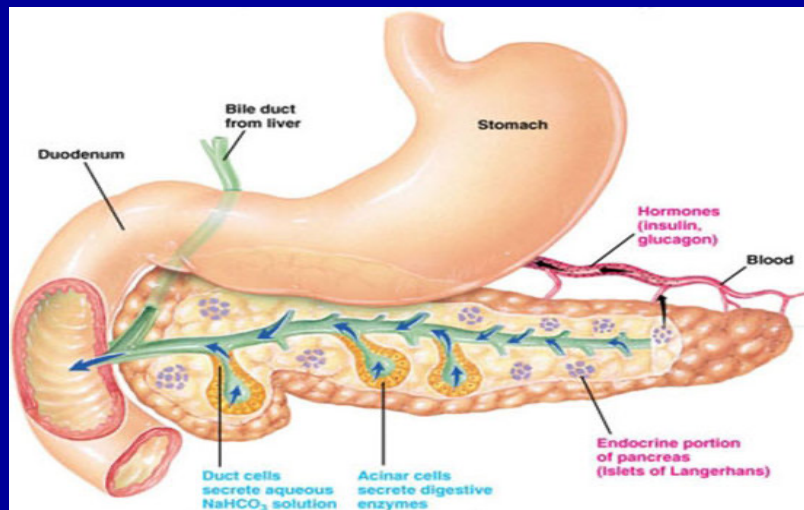
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Outline

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- **My Research Interests in Pancreatic Cancer**
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- What can we do to prevent Cancer?

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What is the function of the Pancreas?

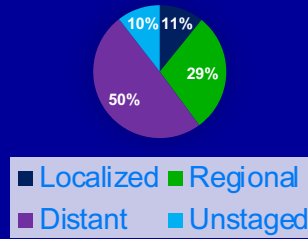


<http://www.olivelab.org/the-pancreas-overview.html>

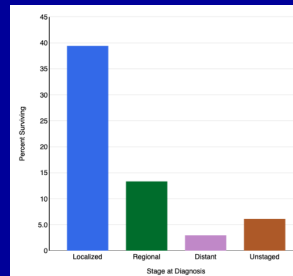
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Pancreatic cancer (PDAC) remains an intractable disease

Stage at Diagnosis



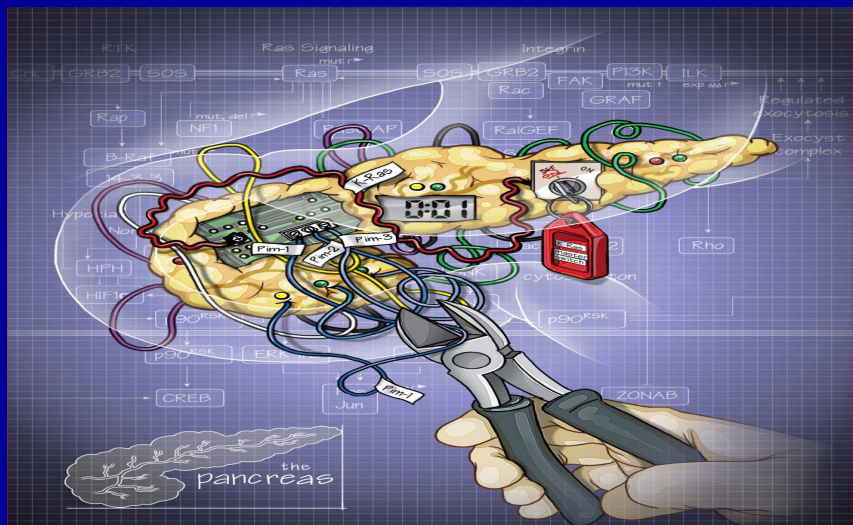
5-year Survival Rate



<http://seer.cancer.gov/statfacts/html/pancreas.html>

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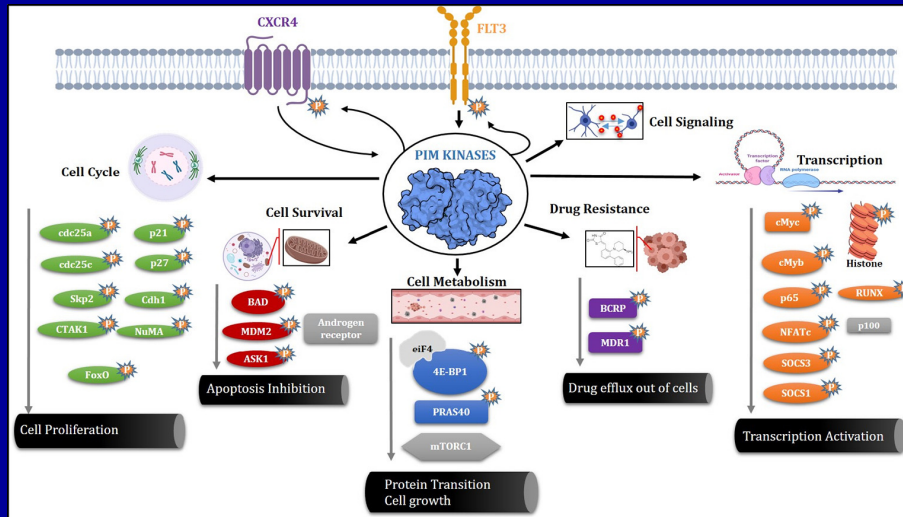
What wires (molecular targets) should we cut?



http://www.nccu.edu/formsdocs/proxy.cfm?file_id=2095

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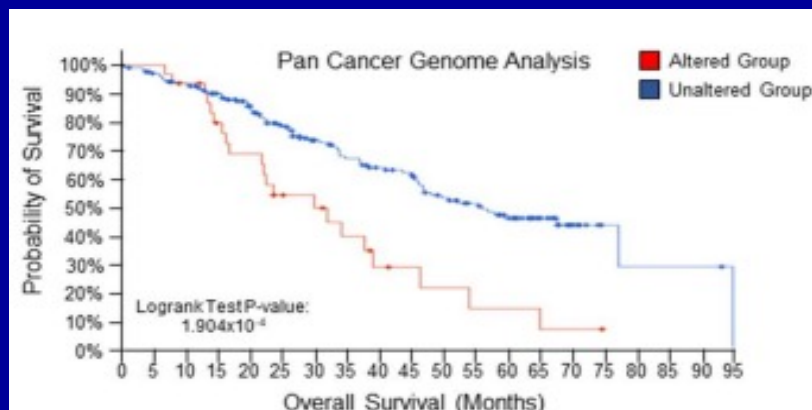
PIM kinases and other potential molecular drug targets



https://ars.els-cdn.com/content/image/1-s2.0-S0024320520306160-ga1_lrg.jpg

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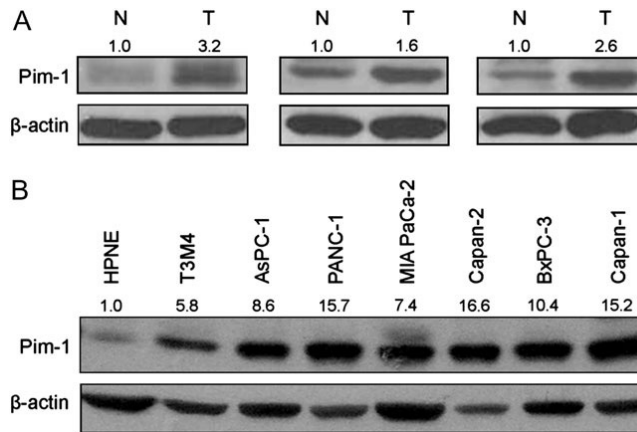
Patient overall survival in individuals harboring PIM genetic alterations



<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9332273/pdf/cancers-14-03565.pdf3>

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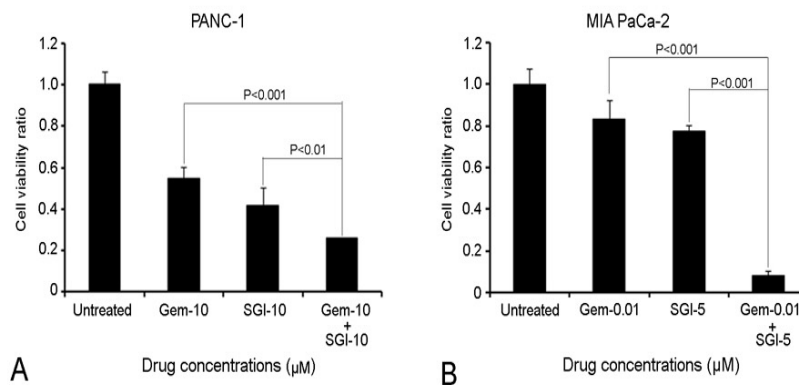
Pim-1 protein is upregulated in human pancreatic cancer tissues and cell lines



Xu, D. et al., *Carcinogenesis* (2011), vol. 32 (4), pp. 488-495.

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The combination of SGI-1776 (PIM inhibitor) and gemcitabine decreases cell viability in PDAC cells



Xu, D., Baines, A.T. et al., *Cancer Biology & Therapy* (2013), vol. 14(6), pp. 492-501.

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Pancreatic cancer is not only lethal, but a health disparity

- The incidence of pancreatic cancer is **50-90%** higher in African-Americans than in any other ethnic group in the U.S.
- African-Americans have the poorest prognosis of any ethnic group in the U.S.
- African-Americans are less likely to receive surgery than any other ethnic group in the U.S.

<http://pathology.jhu.edu/pc/PartAfAm.php?area=pa>

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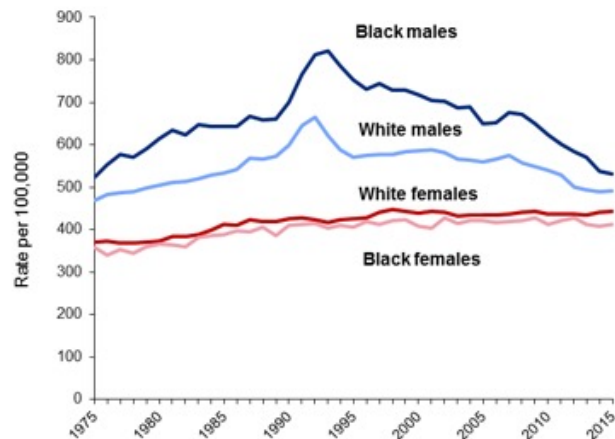
What is the Definition of a Cancer Health Disparity?

The National Cancer Institute (NCI) defines "cancer health disparities" as *adverse differences in cancer incidence (new cases), cancer prevalence (all existing cases), cancer death (mortality), cancer survivorship, and burden of cancer or related health conditions that exist among specific population groups in the United States.*

<https://www.cancer.gov/about-nci/organization/crhd/about-health-disparities/definitions>

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Trends in Cancer Incidence Rates* by Sex and Race, US, 1975-2015



*Age-adjusted to the 2000 US standard population. Incidence rates are adjusted for delays in reporting.
Source: Surveillance, Epidemiology, and End Results (SEER) Program, National Cancer Institute, 2015.

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What is the Definition of Health Equity?












The Human and Health Services Office of Minority Health states that “Health equity is attainment of the highest level of health for all *people*. Achieving health equity *requires valuing everyone equally* with focused and ongoing societal efforts to *address avoidable inequalities, historical and contemporary injustices, and the elimination of health and healthcare disparities*”.

<https://www.cancer.gov/about-nci/organization/crchd/about-health-disparities/definitions>

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WHICH U.S. POPULATION GROUPS EXPERIENCE CANCER HEALTH DISPARITIES?

According to the National Cancer Institute (NCI), cancer health disparities are adverse differences in cancer such as the number of new cases and deaths, cancer-related health complications, quality of life after cancer treatment, financial burden, screening rates, and stage at diagnosis that are shouldered by certain U.S. population groups (90) including:

Racial and ethnic minority groups 	Individuals of different ancestry 	Individuals of low socioeconomic status 	Individuals with disabilities 
Individuals who lack or have limited health insurance coverage 	Residents in certain geographic locations, including rural areas 	Refugees or asylum seekers 	Immigrants 
Members of the lesbian, gay, bisexual, and transgender community 	Adolescents and young adults (AYA) 	Elderly 	

https://cancerprogressreport.aacr.org/wp-content/uploads/sites/2/2021/10/AACR_CPR_2021.pdf

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WHY DO U.S. CANCER HEALTH DISPARITIES EXIST?

Complex and interrelated factors contribute to cancer health disparities in the United States. For racial and ethnic minorities, adverse differences in many, if not all, of these factors are directly influenced by structural and systemic racism. The factors contributing to differences or inequalities include:

<p>Social factors</p> <ul style="list-style-type: none"> • Education • Income • Employment • Health literacy 		<p>Clinical factors</p> <ul style="list-style-type: none"> • Access to health care • Quality of health care 	
<p>Psychological factors</p> <ul style="list-style-type: none"> • Stress • Mental health 		<p>Cultural factors</p> <ul style="list-style-type: none"> • Cultural beliefs • Cultural health beliefs 	
<p>Behavioral factors</p> <ul style="list-style-type: none"> • Tobacco use • Diet • Weight • Physical activity • Adherence to cancer screening and vaccination recommendations 		<p>Environmental factors</p> <ul style="list-style-type: none"> • Air and water quality • Transportation • Housing • Community safety • Access to healthy food sources and spaces for physical activity 	
<p>Genetic and biological factors</p>		<p>General health</p> <ul style="list-style-type: none"> • Infection with certain pathogens, such as human immunodeficiency virus (HIV) • Having other health conditions, e.g., diabetes 	

https://cancerprogressreport.aacr.org/wp-content/uploads/sites/2/2021/10/AACR_CPR_2021.pdf

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UNC, University of North Carolina
UNC Lineberger Cancer Network

Health Disparities only occur with black and brown people.

True 0%

False 0%

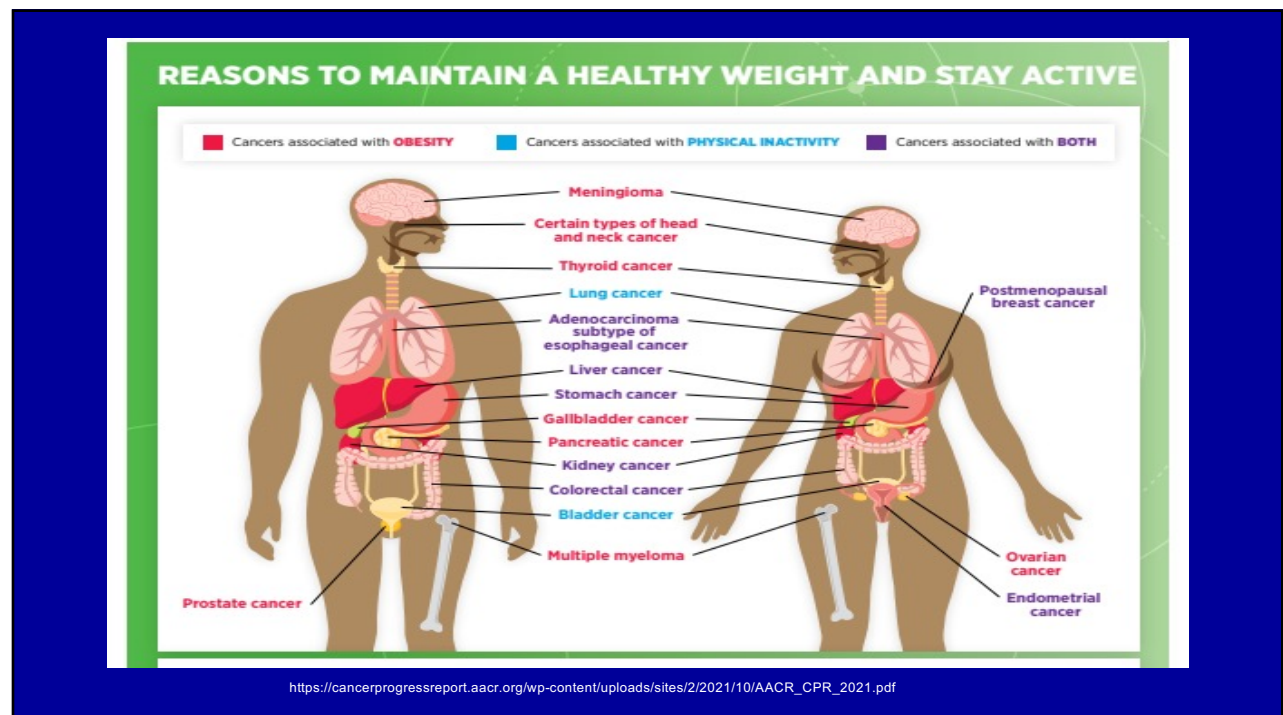
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ALCOHOL AND CANCER RISK

Consumption of alcohol increases an individual's risk of developing six types of cancer—certain types of head and neck cancer, esophageal squamous cell carcinoma, and breast, colorectal, liver, and stomach cancers (97).

https://cancerprogressreport.aacr.org/wp-content/uploads/sites/2/2021/10/AACR_CPR_2021.pdf

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NIH National Institute of Environmental Health Sciences
Your Environment. Your Health.

Prevention is the Key

- Genetic and environmental factors individually contribute and interact with each other to increase risk
- Impacts of exposure vary based on timing of the exposure (windows)

Environmental factors are more readily identified and modified than genetic factors, and therefore, present a tremendous opportunity to prevent non-communicable disease.

**You can't change your genes,
but you can change your environment!**

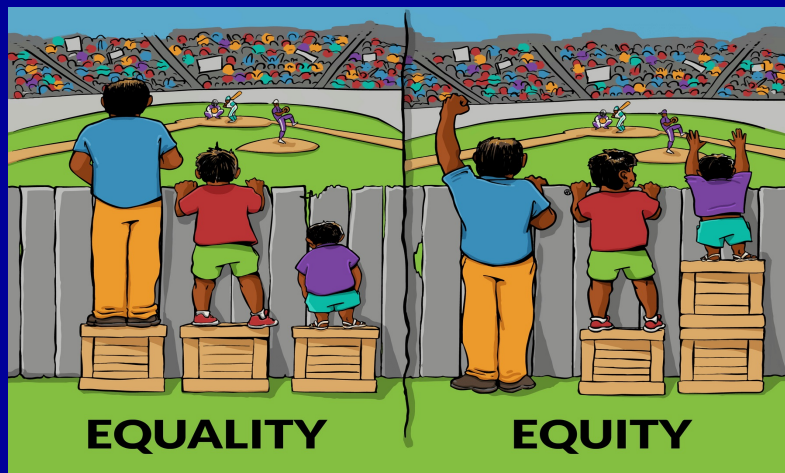
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Cancer Research Needs YOU

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If you want Equity in Healthcare, Please earn your professional or graduate degree!



https://www.google.com/search?q=images+of+health+equity&rlz=1C1GCEB_enUS918US918&og=images+of+health+equity&aqs=chrome..69i57j0l22i30l2.4492j0j7&sourceid=chrome&ie=UTF-8#imgrc=mc78NR2dYfsYnM

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Special Thanks

- The UNC Lineberger Comprehensive Cancer Center (LCCC)
- UNC Cancer Network
- Dr. Bernard (Buddy) Weissmann – UNC LCCC
- **NCCU** and **UNC-CH** and **NC A&T lecture series** planning committee

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UNC Lineberger Cancer Network

Questions/Comments?

Nobody has responded yet.
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Exploring Cancer

Examining the Role of Biology, Race, Class, and Socioeconomics

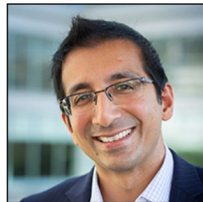
Upcoming Live Webinar



September 1
11:00 AM

Radiation Oncology

What Is It, and What Is It Good For?



Gaorav Gupta, MD, PhD
Assistant Professor, Radiation Oncology
Biochemistry and Biophysics Department
UNC Lineberger Comprehensive Cancer Center
UNC School of Medicine
University of North Carolina at Chapel Hill

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Exploring Cancer is a webinar series taught by cancer biologists, physicians, public health experts, and other cancer specialists from NCCU, UNC-Chapel Hill, and NC A&T.

We hope to see you next time!

UNC Lineberger Cancer Network

