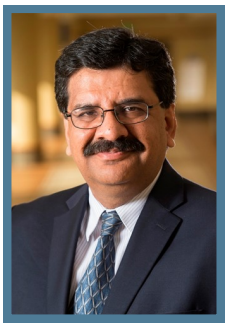
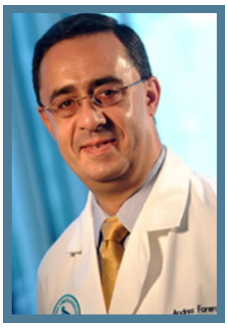
The Hallmarks of
UAB CANCER BIOLOGY
VOLUME 2 - ISSUE 2
DECEMBER 2015

Faculty in Focus: Heme-Onc Clinician Scientists





WELCOME THE CLASS OF 2015!

UAB Cancer Biology

UAB Cancer Biology

UAB GBS CANCER BIOLOGY THEME

From the Directors

As 2015 draws to a close, we look back over a busy year of research and accomplishments from the Cancer Biology students. We were pleased to welcome seven new students into the Cancer Biology Theme this fall. This group brings a diversity of background and experiences into our program – learn a bit more about them on pages 3-4. Other new developments include the appointment of the Dean of the Graduate School; Dr. Lori McMahon will be leading graduate programs on campus (p 7). As we go to press, Dr. David Schneider has just been named as the Associate Dean of Graduate Biomedical Sciences. We look forward to working with the new Dean and Associate Dean to advance the important work of those in the Cancer Biology theme. Our students have been busy in the lab, but have also found time to present their work to the community (p 8) and to volunteer and participate in area fundraising runs for cancer research (p 9-10). This issue's 'faculty in focus' section highlights a few of the outstanding clinician-scientists in the Hematology Oncology division. These scientists are at the forefront of developing innovative diagnostic tools and treatments to advance the care of their patients. We also feature one of the newest tools at the UAB Comprehensive Cancer Center, the cyclotron. The cyclotron allows UAB clinicians and scientists to apply cutting edge imaging techniques to better visualize tumors in real time. We hope you will enjoy this issue of the Hallmark. ●

Theresa Strong Ph.D. & Lalita Shevde-Samant Ph.D.

Visit our website: http://www.uab.edu/gbs/cancerbiology

Get to know 'em

Interview by Joshua Fried







Soniya Bastola	Tesh Lama-Sherpa	Mateus Mota	Shelly Nason	Rachael Orlandella	Alyncia Robinson	Dingguo Zhang
Where are you from?						
Pokhara, Nepal	Solukhumbu, Nepal	Salvador, Brazil	Flint, Michigan	Marietta, Georgia	Albany, Georgia	Xuzhou, China
Where did you receive your undergrad?						
Wesleyan College	Mississippi University for Women	Federal University of Bahia	University of Michigan – Flint	University of Georgia	Mercer University	Xuzhou Medical College
Can you give a short explanation of your research experience?						
Drug discovery, concentrating on anti HER2 therapy for breast cancer.	Chaperone proteins in neurodegenera-tive diseases.	Pathogen Cell interaction, and notch signaling and drug resistance in AML and CML.	Pro protein convertases, MMPs in breast cancer metastasis.	Developed enzyme replacement therapies for rare metabolic diseases.	Thermal ablation for cancer therapy.	Male infertility research concentrating on DNA methylation, and p53 cancer signaling pathways.
What interested you in UAB?						
I saw many faculty members who were doing research I was interested in.	I was familiar with UAB and impressed with the research happening at UAB.	The strong biomedical science program and the close relationship with UAB hospitals.	I was involved in the SPIN Program at UAB which introduced me to UAB.	It is one of the few schools in the southeast with a strong Cancer Biology program. I enjoyed the interview process.	I heard and read good things about UAB. Also I was interested in the translational medicine certificate.	I was impressed with the quality of the research being done at UAB.
What is your favorite part of being a grad student?						
Doing research, spending time in the lab.	Doing research and learning new things every day.	Seeing what you learn in class be applied in the lab.	Learning new things.	More independence in the lab, being exposed to new lab experiences.	I am enjoying the rotations.	Learning so many different things, having new experiences, and using new technology.
Have there been any pleasant surprises about living in Birmingham?						
People are extremely warm and welcoming.	The people are nice.	How hospitable everyone is. Seeing "Southern Hospitality" in person.	It's better than Flint.	I really enjoy where I live.	I am happy with where I live. It is a nice area.	I have found some good Chinese restaruants, namely The Black Pearl.

Soniya Bastola	Tesh Lama-Sherpa	Mateus Mota	Shelly Nason	Rachael Orlandella	Alyncia Robinson	Dingguo Zhang
What are your future plans / goals after earning your PhD?						
Going into industry or a post doc. I don't know yet.	Teaching in academia or going into industry. I'm keeping my mind open.	Start my own lab and teach classes. Basically becoming a professor.	Stay in academia and become a PI and a professor.	Maybe go into industry. I don't really know.	I want to work for the CDC.	Post-Doc or industry. I'm keeping my mind open.
What did you want to be when you grew up when you were a child?						
A doctor.	A medical doctor.	I have always wanted to work in a research lab.	A teacher or a professional soccer player.	A cat. Seriously.	A microbiologist or a virologist.	I never really thought about it. A doctor or scientist I guess.
What would be your ideal vacation?						
Going home to Nepal to see my family.	Tour Europe.	I would like to visit Hawai'i.	Go to Greece.	I would like to go to Italy. I'm Italian and haven't be able to visit there yet.	I would like to visit Japan.	I would like to visit Japan.
What do you like to do in your spare time?						
Read books.	Watch Netflix.	I like to go on walks.	Play soccer, workout, read.	Hangout with friends.	I like to read.	Play basketball, go camping.
What is your favorite book? Movie? Music? Broadway musical? Disney Movie?						
The Harry Potter Series, too many to pick one, Indie Music, too many to pick one.	The Alchemist, too many to choose one, Taylor Swift, Frozen.	The Emperor of all Maladies, City of God, everything but country.	In Cold Blood and Battle Royal, Remember the Titans, John Mayer, Chicago, Finding Nemo.	The Harry Potter Series, can't choose one, Rock music, Wicked, Pocahontas and Mulan.	Gone With the Wind, Grease, Daft Punk, Les Miserables, Aladdin.	The Art of War, Pursuit of Happiness, Eminem.
Would you rather read the book or watch the movie?						
Always the book.	I would read the book first.	I would go for the movie.	Read the book for sure.	Read the book.	I would try to read the book.	Watch the movie.
Would you rather fight 100 duck sized horses or one horse sized duck?						
One horse sized duck.	Just the one sounds good.	What kind of question is this? I would fight 100 duck sized horses.	One horse sized duck.	100 duck sized horses. I will tame them.	100 duck sized horses because that would be amazing.	One horse sized duck. The other option would be too repetitive.
Describe your favorite sandwich.						
Grilled Panini with pesto, sundried tomatoes, mozzarella, and chicken in it!	Wheat bread, tomato, lettuce, gotta have some chicken, olives, no bacon.	A regular ham and cheese.	Avocado definitely, grilled chicken or turkey thick cut, dijon mustard applied lightly, nice whole grain baguette.	Pesto, mozzarella, and tomato sandwich with ciabatta bread from Lucy's.	On wheat, turkey, ham, spinach, pickles, light honey mustard, tomato, and provolone cheese.	Anything with a lot of pepper jack cheese.

APPLY NOW!

"I am glad to be here."
- Mateus Mota -

"I am happy that I came here. "
- Alyncia Robinson -

We encourage you to apply for Fall 2016. December 1 is the deadline for priority consideration (most interviews and offers of admission will occur in January and February). January 15 is the final deadline for all domestic and international applications.

- *January 21-23, first recruiting / reception on January 22*
- *February 18-20, second recruiting / reception on February 19*

The University of Alabama at Birmingham encourages application from and gives full consideration to all candidates for admission and financial aid without respect to age, sex, sexual orientation, race, disability unrelated to program performance, color, religion or national origin. The following is the statistics of the most recent entering class for all GBS themes:

- *1st year PhD students: 46*
- *MD/PhD-GS1 students: 7*
- *Under-represented groups: 20%*
- *International: 14%*
- *Female: 59%*
- *Average GPA: 3.5*
- *Average GRE (V&Q): 310*
- *Prior research experience: 100%*

Visit us at http://www.uab.edu/gbs/cancerbiology/admissions-information for more information. ".

New courses available

Spring GBSC 714 Applications of Microscopy (2 credits) taught by Erik Malarkey Ph.D.

This course will provide an in-depth background in the theoryof modern microscopy analyses for researchersin the biomedical sciences complemented wth hands-on practical exercises. The course will cover a wide range of fundamental and cutty-edge approaches with trainin in experimental design and technical limitations, specimen preparation, diverse uses of bright-field, simple epifluorescence, single and multiphoton confocal, high resolution, live-cell, and intravital microscopy. The course will also provide training in specialized applications such as particle tracking and co-localization, photo-activation, Ca2+ imaging, FRET, FRAP, FLIM, and TIRF, and methods for quantitative data analyses. The course will also cover image preparation for publication and ethical issues related to image manipulation.

Fall 3 credits GBSC703 CB2-101 Intro to Sci Computing Instructor-Malay Basu Ph.D.

Course is CB2-101 Introduction to Scientific Computing. The purpose of this course is to provide an introduction to main computational skills required for scientific computing. The participants will learn advance Linux skills and Python and R programming languages. Course materials of previous courses can be found at http://cmb.path.uab.edu/pages/documents/courses/2014/cb2-101.html. Contact instructors for day/time/location.

GBSC 725 Cancer and Microenvironment Instructor-Yang Yang M.D. Ph.D.

The growth and progression of cancer is closely regulated by the tumor microenvironment. Through this course students will gain a comprehensive understanding of the tumor microenvironment by studying topics that include, for example, the cellular and acellular composition of the microenvironment, mechanisms of communication between tumor and host cells and how the tumor microenvironment promotes tumor growth, metastasis and drug resistance. Students will also learn the in vitro and in vivo models utilized for studying the tumor microenvironment and current approaches for targeting the tumor microenvironment for cancer therapy. Contact instruction for day/time/location.

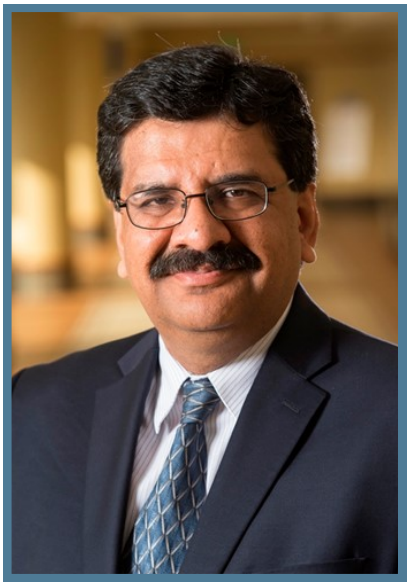
Heme-Onc Clinician Scientists

by Hawley Pruitt

This issue, we are focusing on the clinician scientists leading the way in the Division of Hematology Oncology. **Dr. Ravi Bhatia** is the new Director for the Division of Hematology Oncology coming to UAB from the City of Hope National Medical Center in Duarte, CA. As the Director of the Division of Hematopoietic Stem Cell and Leukemia Research and co-director of the Hematological Malignancies Program at the City of Hope Comprehensive Cancer Center he established his research on leukemia stem cells. His current research interests are to improve the understanding of abnormal regulation of malignant stem and progenitor cells in hematologic malignancies and to develop effective approaches to eliminate these cells to enhance outcomes for these cancers. As a practicing clinical Hematologist-Oncologist and Hematopoietic Cell Transplant physician, his research is highly translational, and is great example of taking scientific knowledge from the bench to bedside.

Dr. Uma Borate is an assistant professor in the Heme-Onc division focusing on acute myeloid leukemia and myelodyplastic syndromes. She did her medical school training at the B.J. Medical College in Pune, India and completed her Internal Medicine Residency at the Albert Einstein Medical Center in Philadelphia. In 2011, Dr. Borate won a prestigious Young Investigator Award to fund her research on Acute Myeloid Leukemia from the Conquer Cancer Foundation of the American Society of Clinical Oncology. Her current research entails measuring telomeres in the blood of leukemia patients before, during, and after treatment with chemotherapy using a novel blood test. Her goal is to develop a prognostic indicator for patients at higher risk of relapse versus those that will achieve long term remission.

Dr. Andres Forero is a professor in the Division of Hematology Oncology, however, he has wide ranging clinical and research interests focusing heavily on translational research. Dr. Forero completed his fellowship at UAB before rising through the ranks at Javeriana University School of Medicine, Bogotá, Colombia to director of the Division of Hematology



Ravi Bhatia M.D.

Uma Borate M.D.

Andres Forero M.D.

Oncology. He returned to UAB in 2000 where he has since held many leading positions in the UAB Comprehensive Cancer Center as well as Department of Medicine. For the past decade has been the Director of the Clinical Protocols and Data Management Shared facility of the UAB CCC, developed the first data safety monitoring plan of the UAB CCC, and has led a large number of clinical trials (Investigator Initiated and Industry trials including studies holding INDs) with emphasis on early pilot, phase I and II studies. He has participated actively in the development and implementation of different projects through the Breast SPORE, and has led the team of investigators that developed the Susan G. Komen for the Cure Promise Grant which has 4 different projects (6.4 million dollars over 5 years). He has been the Principal Investigator of two translational research projects that have the potential to change and/or improve the standard of care management in breast cancer (Dual Pathway Target Inhibition in Breast cancer: ER and VEGF and Targeting Death Receptors for Treatment of Triple Negative Breast Cancer). ●

New Dean of Graduate School: Lori McMahon

by Hawley Pruitt

We are excited that the UAB Graduate School has named Dr. Lori McMahon the new dean of the graduate school, replacing Dr. Bryan D. Noe who retired at the end of 2014. The nationwide search was led by a 13 member selection committee. UAB vice president for research and economic development Richard Marchase Ph.D. has been quoted saying Dr. McMahon's "extensive experience in graduate education, innovative approaches to how graduate education can be improved, and enthusiastic ability to interface with both prospective and current students were distinguishing factors" in her selection.

Dr. McMahon is the Director of the Comprehensive Neuroscience Center and the Jarman F. Lowder Professor of Neuroscience. Her primary appointment is in the Cell, Developmental, and Integrative Biology Department although she has numerous other appointments in a diverse array of departments at UAB. Dr. Lori McMahon received her B.A. from Southern Illinois University at Edwardsville and her Ph.D. from Saint Louis University Health Sciences Center in St. Louis, Missouri. Dr. McMahon obtained postdoctoral training at Duke University Medical Center in the Department of Neurobiology and, in 1998, joined the faculty of UAB as an Assistant Professor in the Department of Physiology and Biophysics. Her first day as the dean of the graduate school was October 1st. Dr. McMahon has said "I am honored and humbled to be the dean of the Graduate School and look forward to working with faculty and students from disciplines across campus to build upon our growing prominence as a world-renowned research university". ●

Komen Research Roundtable

by Abhishek Gangrade

While more than 200,000 new cases of invasive breast cancer are expected to emerge in 2015, research at institutions such as UAB provide hope that there is a cure for the diesease. UAB Cancer Biology students Hawley Pruitt, Ann Hanna, and Monicka Wielgos presented their research at the Komen Research Roundtable on September 22nd. The event is a great opportunity for the research community, breast cancer patients, patient advocates, and survivors to learn about ongoing research. Strengthening the bonds among these groups improves research progress. Hawley presented her work on the effects of N-MYC interactor on breast cancer progression and metastasis. Ann presented her research involving the role of Hedgehog signaling in breast cancer immune modulation of macrophages. Monicka displayed her work on the regulation of PARP-1 on NF-kB-mediated IL-8 expression in HER2 positive breast cancer. . ●

Monicka Weilgos winning second place for presentations at the Susan G Komen North Alabama Affiliate Research Roundtable

Blazer Bolt for Brain Cancer 5K

by Samuel Fehling

Last year the neuro-oncologists at UAB hosted the inaugural Blazer Bolt for Cancer in Birmingham, Alabama with over 500 participants taking part in the 5K and 1 mile events. The Blazer Bolt raised public awareness of brain cancer and helped patients and families battling brain tumors receive the support and services they need. Held this year on October 24th, the first annual Blazer Bolt took place in two Alabama cities simultaneously, Birmingham and Eufaula, starting in Homewood and at the Chamber of Commerce, respectively. Families and loved ones of those battling brain cancer gathered in the early morning to bring attention and raise money for the cause. All proceedings benefit brain tumor research at the University of Alabama Birmingham (UAB) Division of Neuro-Oncology and Children's of Alabama. The Blazer Bolt for Cancer reminds cancer researchers and clinicians of the importance of their roles. With the support the community has given us, we will overcome brain cancer and develop a brighter future for tomorrows care. ●

Photo Courtesy: David Christy Photography

Komen Run 2015

by Kayla Goliwas

The 2015 Komen North Central Alabama Race for the Cure was held on October 17th at Linn Park in downtown Birmingham. Every year graduate students in the Cancer Biology program participate through volunteering on race day, presenting their research to the public, or running the race as part of the UAB Graduate Students for the Cure team. Over $600,000 was raised at this year's race with 75% of the net proceeds staying in the community to fund breast health education programs, breast cancer screening, and treatment. The other 25% raised supports the national Susan G. Komen® Grants Program, which has funded over $15 million in breast cancer research in the state of Alabama since 2003.

The race is much more than a fundraiser; it promotes breast cancer awareness in the community, celebrates breast cancer survivorship, and honors those who have lost their battle with the disease. While the Race for the Cure is the largest fundraiser held by our local affiliate, there are opportunities to volunteer all year. To get involved visit the affiliate website and click "Get Involved". ●

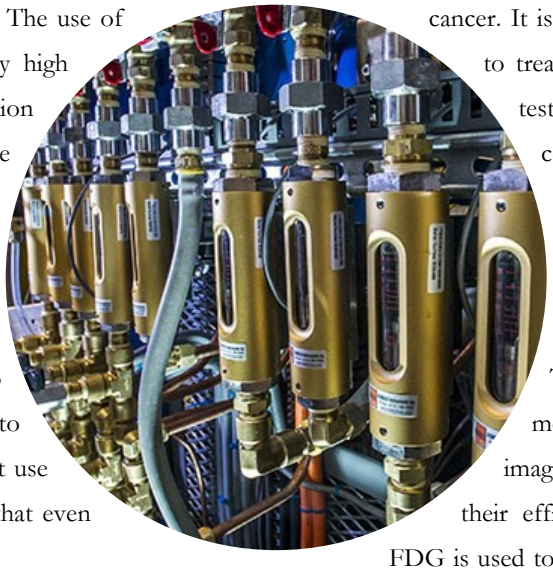
http://www.komenncalabama.org

Monica Lewis at Susan G. Komen Race for the Cure

UAB's Cyclotron

by Joshua Fried

A powerful tool in cancer diagnosis and staging is advanced molecular imaging. UAB proudly houses one of the most powerful tools in cancer imaging, a cyclotron. A cyclotron is a device that creates short lived radioisotopes, by using high powered magnets to accelerate protons to strike special targets. When these protons strike the target material, a nuclear transformation occurs and radioactive atoms are produced. After a radioactive nuclide is made, radiochemists perform chemical reactions to attach the cyclotron made radioisotope to a drug that is specific for the type of imaging application intended. These imaging agents are then injected into a patient or research model animal for imaging with specialized imaging equipment-or PET scanners (positiron - emission tomography). PET imaging agents can be used to quantify tissue metabolism, receptors and track physiologic processes such as tissue oxygen content. The use of PET based imaging agents provides very high resolution quantitative imaging information about a disease or biological process. The UAB cyclotron was installed in November of 2013, and became fully operational in January 2014. The cyclotron resides in the basement of the Wallace Tumor Institute and is adjacent to the PET imaging facility. Its proximity to the imaging facility allows for the efficient use of cyclotron generated radioisotopes, so that even those with short half-lives can be utilized.



Researchers have the freedom to choose many potential materials as targets for the cyclotron. These materials can be in the liquid, gas, or solid phase. Developing a new imaging agent is equal parts chemistry research and drug development. In molecular imaging, the most commonly used radioisotope fluorine 18 (F-18), which has a half life of 110 minutes. In the UAB cyclotron radiopharmacy, after radiosynthesis of a radiolabeled imaging agent, a number of specific procedures take place prior to release of the agent. To make sure that the compounds are safe for human consumption several layers of quality control and quality assurance are integrated in the process. Every batch of a radiolabeled imaging agent that is synthesized is completely evaluated prior to release for use.

The radio-pharmaceuticals (imaging agents) produced by the UAB cyclotron and radiochemistry laboratory are administered to patients and imaged by PET/CT devices. The purpose of molecular imaging is to detect, characterize, and measure diseases' response to therapy, among a host of other applications. Researchers can investigate many potential therapeutic targets with the cyclotron produced radiolabeled imaging agents. Glycolysis, membrane receptors, cell proliferation, hypoxia, and cellular enzymes can all be observed. Currently F-18 fluorodeoxyglucose (FDG) is the only cyclotron based positron labeled agent FDA approved compound that is used in cancer clinical imaging. FDG measures tissue metabolic activity and is primarily used for staging cancer. It is also frequently used to evaluate response to treatment. Other agents are currently being tested in UAB clinical trials. One such compound is F-18 fluoro-labeled thymidine (FLT), an agent that is used to quantify tumor cell proliferation and thymidine kinase activity which is being tested for use in patients with a variety of cancers. The UAB cancer center is incorporating molecular imaging with cyclotron based imaging agents into clinical trials to measure their efficacy. In addition to its uses in cancer, FDG is used to measure heart metabolism for diagnosing cardiac diseases. Radiolabeled ammonia is also used in cardiology imaging to measure cardiac blood flow. Neurological diseases such as Alzheimer's and movement disorders can be investigated as well. Dr. Eary, Director of the Imaging Facility, is developing F-18 fluoromisonidazole for use in cancer imaging.

The cyclotron has already proven to be an invaluable tool not just in oncology, but in a number of other other diseases. As more cyclotron based radioactive imaging agents become approved for use, this technology will help us further our understanding of diseases, treatments, and how they interact. ●

Our New Publications

- **Weaver AN**, Cooper TS, Rodriguez M, Trummell HQ, Bonner JA, Rosenthal EL, Yang ES. DNA double strand break repair defect and sensitivity to poly ADP-ribose polymerase (PARP) inhibition in human papillomavirus 16-positive head and neck squamous cell carcinoma. Oncotarget 2015; 6: 26995-7007.
- Spann AL, Yuan K, **Goliwas KF**, Steg AD, Kaushik DD, Kwon YJ, Frost AR. The presence of primary cilia in cancer cells does not predict responsiveness to modulation of smoothened activity. Int J Oncol 2015; 47: 269-79.
- Feeley KP, **Bray AW**, Westbrook, DG, Johnson LW, Kesterson RA, Ballinger SW, Welch DR. Mitochondrial Genetics Regulate Breast Cancer Tumorigenicity and Metastatic Potential. Cancer Res 2015; 75: 4429-36.
- Rajbhandari R, McFarland BC, Patel A, Greigk M, Gray GK, **Fehling SC**, Bredel M, Berbari NF, Kim H, Marks MP, Meares GP, Sinha T, Chuang J, Benveniste EN, Nozell SE. Loss of tumor suppressive microRNA-31 enhances TRADD/NF-κB signaling in glioblastoma. Oncotarget 2015; 6: 17805-16.

Presentation

- **Tibbs, ZE**. A high frequency SULT1B1 allelic variant (L145V) specific to black African Americans exhibits altered kinetic properties. International Society for the Study of Xenobiotics (ISSX). Orlando, FL. Oct. 21, 2015.

New PhD Candidates

- **Abhishek Gangrade, Aubrey Miller, Kelly Kreitzburg** and **Anh Tran**

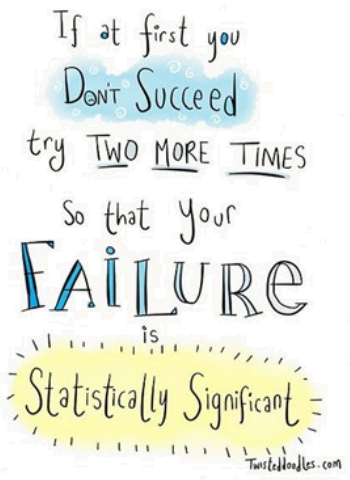
Our Recent Alumni

We caught up with some of our recent theme graduates and found out what they have been doing since graduation.

- **Josh Jackson** is in the process of finishing up his first semester of medical school.
- After defending her dissertation, **Jennifer Stanley** has started her clinical rotations as the final part of her MSTP training.
- **Katie Jo Glowacki** just started a postdoctoral position with Dr. Janet Houghton at Southern Research Institute as a part of the Drug Discovery division in the Oncology Department. ●

#justphdthings

by Ann Hanna



Fun fact :-)

A recent study evaluated the molecular mechanisms responsible for low cancer mortality rates in elephants despite their long life spans and numerous cell divisions. The team of scientists conducting the study found out that elephants have 40 copies of p53 whereas humans only have 2 copies.

You can read the full paper at the following link: http://jama.jamanetwork.com/article.aspx?articleid=2456041 ●