Pharmaceutical Research Institute

ALBANY COLLEGE OF PHARMACY AND HEALTH SCIENCES

GLOBAL THROMBOSIS FORUM

4th Annual **BRIDGE**

BEGINNING RESEARCHERS INVOLVED IN DISCOVERY THROUGH GUIDANCE AND EXPLORATION

QUEST R III PUTTING STUDENTS FIRST

Hosted Virtually by:
Pharmaceutical Research Institute
Albany College of Pharmacy and Health Sciences
1 Discovery Drive
Rensselaer, New York 12144

Brief Biographies

Dr. Shaker A. Mousa

Shaker A. Mousa finished his PhD from Ohio State University, College of Medicine, Columbus, Ohio and Post-doctoral Fellowship, University of Kentucky, Lexington, Kentucky. He also received his MBA from Widener University, Chester, Pennsylvania. He is currently an endowed tenure Professor and Executive Vice President and Chairman of the Pharmaceutical Research Institute and Vice Provost for Research at ACPHS. Prior to his academic career, he was a senior Scientist and fellow at DuPont Pharmaceutical Company for 17 years, where he contributed to the discovery and development of several FDA approved and globally marketed diagnostics and therapeutics.

He holds over 400 US and International Patents discovering novel anti-angiogenesis strategies, antithrombotic, anti-integrin, anti-cancer, and non-invasive diagnostic imaging approaches employing various nanotechnology platforms. He has published move than 1,000 journal articles, book chapters, published patents, and books as editor and author. He is a member of several NIH study sessions, and the Editorial Board Member of several high impact Journals. His research is focused on diagnostics and therapeutics of angiogenesis-related disorders, thrombosis, vascular and cardiovascular diseases.

Dr. Atul Laddu

GTF is privileged to attend the BRIDGE event at ACPHS for the 4th year in a row. It all started with a brief visit to Dr. Shaker Mousa in May 2016 by a few members of the Board of GTF in efforts to efforts to explore a research training facility for its students. The idea of a joint conference for the Questar III Students and GTF students was born during this meeting. Dr. Mousa quickly talked with Dr. Ruth Russell about this concept, and Dr. Russell agreed immediately. This was the birth of the BRIDGE Concept.

Global Thrombosis Forum (GTF, www.gtfonline.net), which is an affiliate of the North American Thrombosis Forum (NATF, www.natfonline.org), was formed in 2012 with a primary purpose to increase the awareness of thrombosis in the community. Later, we expanded to expose the GTF young members to research activities, such as the ones at ACPHS, this has proved to be a significant benefit to the GTF students.

In 2019, 2 of our students, Ms. Anjali Bhave and Mr. Sharan Krishnappan joined the newly initiated internship program for a period of 4 weeks at ACPHS. The outcome of the research was phenomenal, and our students presented their research work at the ASH and the FASEB meetings, a distinguished Honor to any High School student and to GTF.

GTF, a non-profit 501-c-3 organization, runs on a purely voluntary basis, and does not charge the students for the efforts of the GTF staff. GTF has a strong non-discriminatory clause and is open to any student, irrespective of the age, gender, race, and national origin.

COVID-19 epidemic has devastated activities all over the U.S. However, Drs. Mousa, Russell and BOD of GTF were not going to back out of this very significant activity just because of COVID-19 scare. The brains started

turning to find some alternatives to the in-person BRIDGE event, and we continued the BRIDGE event 2021 virtually for the second year.

In 2020, Dr. Atul and Jayashree Laddu, the 2 members of the Board of the GTF announced an award of The Dr. Brij Bihari Lal Mathur Memorial Research Scholarship in the memory of the Late Dr. Brij Bihari Lal Mathur, a teacher, a mentor, a well-wisher, a father, and a guardian to Atul Laddu. Mrs. Usha Mathur, MD, a psychiatrist from Worcester and wife of the late Dr. Brij Bihari Lal Mathur, has kindly agreed to award the scholarship to two GTF students. We are glad to announce the continuation of this scholarship in the year 2021.
A word of thanks to Drs. Fareed, Mousa and Tafur at these institutions for their continued support and encouragement to our young members would be perfectly in order. We could not have done all this without the full unconditional support and cooperation of Ms. Danielle Cowin whom we consider partners in our success.
Let me welcome the GTF young presenters and the members of the Questar III team to this fabulous BRIDGE 2021 event at the ACPHS.

Ruth S. Russell

Ms. Russell obtained her MPhil/ABD Pathobiology and Molecular Medicine, Columbia University and her NYS Teacher Licenses in Chemistry, Biology, and Mathematics. She has more than 20 years' experience teaching in public schools and colleges. She began working for Questar III New Visions Scientific Research and World Health program in 2005. Ms. Russell is an Adjunct Professor of Biology and Public Health at SUNY Albany and an Adjunct Professor of Biotechnology and Literature at Russell Sage College. Ms. Russell's interests include a research based college level program in biological sciences and epidemiology for accelerated high school seniors, located at SUNY Albany's Health Science Campus and involving hands-on experimental projects and rotations in cutting edge technologies, pharmaceutical sciences and toxicology in collaboration with multiple area professionals and entities including the Pharmaceutical Research Institute, the Center for Functional Genomics and the Institute for Health and Environment at University at Albany's School of Public Health.

4th Annual BRIDGE Agenda

Friday-June 25, 2021

8:00AM	Welcome	Dr. Shaker Mousa- VP of Pharmaceutical Research Institute Thrombosis Forum Scholars, Members, Questar Scholars, Guests & Pharmaceutical Research Institute Members
	Introductions	Atul Laddu-President & CEO of Global Thrombosis Forum Ruth Russell-Professor with Questar III New Visions

Power Point Presentations- 10 minutes each +2 Q&A

8:10	**Necroptosis in Alzheimer's Disease: Potential Therapeutic Targets,** Riane Richard, *BRIDGE Mentee	
	Cancer & VTE	Priya Ray, Mentor: Ms. Rachana Kanvinde
	COVID-19 & Anticoagulation	Arya Bhanushali, Rashi Modey, Mentor: Rashmi Kulkarni, MD
	DOAC's	Rohan Pai, Tanisha Singhal, Mentor: Sagar Garud, MD
	COVID-19 and Vaccines	Raina Singhal, Tejas Deodhar, Mentor: Atul Laddu, MD
9:46	***BREAK***- Mute microphones and stop video.	

Poster Presentations 5 minutes each +2 Q&A

9:55	**The Effect of Exercise on Mental Health**	Molly Bisceglia
	COVID-19 and Stroke	Krish Sharma, Mentor: Ms. Jui Bhingarde

Ultra-Fine Particle Air Pollution & Development of Birth Defects Isabella Lucear

Latinos and VTE Soham Satghare, Mentor: Ms. Priya Lokasundaram

Mastectomy Induced Nerve Damage and Phantom Breast Pain Amber Powell

Management of COVID-19 Milind Mukkamala, Mentor: Dr. Aditya Sathe

The Effect of E-Waste Toxin Bioaccumulation in Soil on Human Health Grace Dunham

10:40 *PRI video & judging presentations by the review committee. (PRI staff)*

10:50 **BRIDGE Mentee Presentations 12 minutes +3 Q&A**

Are There Links Between the Surge in DVT Cases and COVID? Sonika Tatipalli

Why would a COVID vaccine cause Rare Blood Clots? Ananya Mahesh

The Role of Intratumor Bacteria in Breast Cancer Treatment Elizabeth Dubois

What are the Differences between Heparin and Direct Oral Anticoagulant in COVID-19? Ankita Mahajan

Importance of Collaborative Care: SSRIs in Glioblastoma Rachel Malek

Is there a benefit in combining anticoagulant and antiplatelet in COVID-19 treatment? Malvika Sawant

Could Heparin benefit patients with COVID-19, beyond the anticoagulant effect? Radhika Kulkarni

Vaccine Induced Thrombotic Thrombocytopenia Mimicking HITT Paige Spiess

Honoring Summer Interns

12:50PM Award Presentations:
The Dr. Brij Bihari Lal Mathur Memorial Research Scholarship in the memory of the Late Dr. Brij Bihari Lal Mathur, sponsored by Dr. Atul and Jayashree Laddu. Award given by Mrs. Usha Mathur, MD
Questar and GTF awards: Shaker Mousa

1:15 Closing Remarks: Shaker Mousa, Atul Laddu, Ruth Russell

Program Information

Questar III New Visions Research and World Health:

Questar III New Visions is a highly selective, college level academic experience offered to accelerate high school seniors living throughout the Capital District. This program involves hands-on laboratory research in the emerging biotechnologies, scientific literacy, and global health. Students interested in future careers in the any of the biological sciences, including medicine, healthcare, biotechnology, pharmacy, biomedical research, genetics, forensics, health fields, biomedical engineering, environmental science, toxicology, biophysics, infectious and chronic disease, Nano biotechnology, etc. Students examine emerging biological research efforts and global health issues. They support their studies by reading some of the literary works that changed the world and by studying current scientific and medical journals. Students work independently and collaboratively to explore solutions to real life issues.

Students learn fundamental research methods in our laboratory. They become skilled at appropriate experimental design and capable of thinking on their own, finding solutions to problems using their intelligence, not just by following established protocols. The technologies learned in the student lab include DNA and protein gel electrophoresis, Western blot, PCR technologies, tissue culture, microbiological techniques, immunology, and plasmid gene mapping. Students master the basic protocols necessary to succeed in today's biotechnology lab. The *Albany College of Pharmacy's Pharmaceutical Research Institute* and the *New York Neuronal Stem Cell Institute* conduct human embryonic stem cell and cancer research studies and are resident at

East Campus, providing students with the opportunity to observe and sometimes even participate in cutting-edge scientific discoveries as they occur!

Many world-renowned researchers and business entities reside at SUNY Albany's Health Sciences Campus, and regularly work with our young scientists. These include Albany School of Public Health, New York State Department of Environmental Conservation, Taconic, Inc., Regeneron, Inc., and Pharmaceutical Research Institute, New York Neural Stem Cell Institute, Institute for Health and the Environment, Cancer Research Institute, Vascular Endothelial Cell Technologies, Inc., SyntheZyme, Inc., Intidyne, Inc., Ultradian, Inc., Albany Molecular Research, Inc., and many others. Additional individuals and entities working with our students include the RNA Institute at SUNY-Albany, Albany Medical Center physicians, RPI scientists, the Albany College of Pharmacy, the Albany County Department of Health, the New York State Cancer Registry, New York State Museum scientists, and many more. ***We are deeply grateful for their continued support of our program and its future scientists.***

Global Thrombosis Forum (GTF)

Dr. Atul Laddu's grandson, the late Rajan Laddu, had back surgery in 2011, after which he was diagnosed with two large blood clots in both his lungs (a condition called Pulmonary Embolism, or PE), which can be a fatal, if not treated immediately. Luckily, Rajan received prompt medical attention and recovered. During this experience, while talking with his many friends at North American Thrombosis Forum (NATF), Dr. Laddu realized how little did the public know about 2 deadly thrombotic conditions called deep vein thrombosis (DVT) and pulmonary embolism (PE). This is when he decided to work with NATF, an organization that conducts research on and spreads awareness about thrombotic conditions nationwide. Unfortunately, Rajan lost his battle to a 5th attack of PE on October 8, 2020, but his legacy continues through the efforts of GTF, NATF, and the BRIDGE Event.

Global Thrombosis Forum (GTF, www.gtfonline.net) is an affiliate of North American Thrombosis Forum (NATF, www.natfonline.org), a community-based organization. GTF had its first meeting held on December 12, 2012. The mission of GTF is to spread awareness about a deadly condition, Thrombosis, in the community. Dr. Atul Laddu, a retired Cardiologist, envisaged the mission, structure and function of GTF with the help and guidance from Dr. Jawed Fareed, Director of the Hemostasis & Thrombosis Research Laboratories at Loyola University Medical Center and Vice-President of NATF and Dr. Samuel Goldhaber, Professor of Medicine at Harvard Medical School and President of NATF.

The primary goal and the mission are to increase the awareness of thrombosis. In addition, GTF works to network with various groups involved in thrombosis, coaches' young volunteers in skills such as communication, presentation, research, and encourages the youth volunteers to organize, plan, and conduct the activities of GTF. Currently, GTF has students from the states of Georgia, Missouri, and North Carolina.

The forum involves middle school and high school young volunteers and are coached by a team of adult volunteers. In 2020, we recruited students in nursing school, and medical students as Mentor to work with our young students. Together, they reach to the masses, and educate them about various aspects of the condition of thrombosis.

GTF has now reached out to several thousands of citizens through its various projects on thrombosis. In 2013, the Governor of Georgia, Nathan Deal, signed a proclamation for GTF and September as Thrombosis Awareness month in the State of Georgia. To date, in just a period of nine years, GTF has received proclamations for thrombosis awareness, including by the Georgia State Senate, several cities and counties, not only in the State of Georgia, but also in the state of Missouri and North Carolina.

There are basically seven different major categories of GTF activities, namely booths, posters, presentations, interviews, research and publications, internships, and Thrombosis Club, all planned, organized, and managed

by the young volunteers with guidance from the members of the GTF Working Group, Board of Directors, and some physicians.

Dr. Jawed Fareed, Director of the Hemostasis & Thrombosis Research Laboratories at Loyola University Medical Center, honored the excellent research work by the GTF interns by proclaiming an annual High School Scholar's Day at Loyola.

Pharmaceutical Research Institute (PRI)

Founded in 2002, the Pharmaceutical Research Institute at ACPHS is a center for drug discovery and development. PRI investigators possess expertise in fields that include nanotechnology, medical chemistry. Molecular biology and cell biology. Areas of focus include hematology/oncology, cardiovascular (dyslipidemia), ophthalmology, vascular diseases, neurology, and inflammation.
As part of its mission, PRI is also engaged in teaching and learning, Pharmacy students, graduate students and visiting scholars from around the world visit the Institute to conduct research and learn the latest advances across a wide range of therapeutic areas. Visit our website at https://pri-albany.org/.

Albany College of Pharmacy and Health Sciences (ACPHS)

Founded in 1881, Albany College of Pharmacy and Health Sciences is a private, independent institution with a long tradition of academic and research excellence. The College is committed to educating the next generation of leaders in the health care professions and advancing innovative research that translates scientific discoveries into therapies that benefit humankind.
ACPHS experience is one that combines quality academics, experiential learning, personalized attention, and a strong emphasis on service – all of which help our students grow personally and develop into talented and trusted professionals. ACPHS has long been regarded for its Doctor of Pharmacy program which remains the school's core program. In recent years, the College has expanded its academic offerings to include five bachelor's programs and five master's programs in the health sciences. Opportunities exist for students within each of these programs to work side-by-side with faculty on groundbreaking research in areas such as cancer, infectious disease, and obesity. These opportunities, along with access to resources such as the cutting-edge Pharmaceutical Research Institute, two student-operated pharmacies and the Collaboratory are part of what distinguishes ACPHS from other colleges and universities. Graduates of the College are prepared for a range of careers such as: biochemist, clinical laboratory scientist, consumer safety officer, drug information specialist, environmental toxicologist, health policy analyst, hospital administrator, pharmacist, physician, physician assistant and research scientist. Graduates are also well positioned to continue their education in graduate or Professional Schools.

Biography & Abstracts for ***PowerPoint*** Presentations

Necroptosis in Alzheimer's Disease: Potential Therapeutic Targets

Riane Richard from New Visions Scientific Research and World Health Attending Shenendehowa High School *Bridge Mentee
My inspirations for my work on Alzheimer's disease were the patients that I worked with at Wesley Healthcare Center in Saratoga. After seeing the toll that the disease took on the patients and their families, both emotionally and physically, I felt that I needed to do something to contribute to our knowledge of the disease and eventually help find a treatment and a cure. I will be attending RPI in the fall for their physician-scientist program with Albany Medical College. In the future, I intend on continuing research on Alzheimer's disease and aim to earn an MD/PhD.
Abstract:
The purpose of this study was to determine the reasoning behind the thrombocytopenia and thrombotic events that occur after the use of the adenovirus based, Covid-19 vaccines. The main question of this study is how these adenovirus vaccines cause thrombocytopenia and thrombotic events after vaccination that mimic

autoimmune heparin-induced thrombocytopenia. The thrombocytopenia occurs through an interaction of the patient's immune system along with the anti-platelet factor 4 or PF4/H. This study was conducted through a literature review using databases such as PubMed and google scholar. Key words such as Covid-19 vaccine, adenovirus, thrombocytopenia, and thrombosis were used to generate these searches. Data was analyzed in a mass review style, where literature was read, analyzed, and synthesized. The mentorship portion of this study was completed with Dr. Mousa from Albany College of Pharmacy and Health Sciences. This study was completed alongside the global thrombosis forum students in a virtual mentorship experience. Dr. Mousa worked with the students to become efficient researchers and bring the projects to the next level. The major results of this study include the connection between the influence of the activation of platelets through the PF4 receptor, due to the production of certain antibodies from the vaccine. The importance of this study is how premature this problem is, and the great need to solve it. If the reasoning behind the antibodies influencing the platelet production is understood, as well as the development of the thrombocytopenia, lives could potentially be saved. Certain groups at greater risk could be encouraged to receive the mRNA vaccine, rather than the adenovirus vaccine. Future research that could develop from this study would include a deeper understanding of what groups are at greater risk of thrombocytopenia and thrombotic events after vaccination. This study concludes the idea that the adenovirus vaccines encourage the production of antibodies, and in some cases interact with the PF4 receptor, and induce thrombocytopenia, as well as venous and arterial thrombosis.

Cancer & VTE

My name is Priya Ray, I am a 10th grader at Lambert High School in Suwanee, GA. I have been with GTF for around one and a half years. My hobbies are dancing and reading. I am extremely interested in the medical field and want to go into it in the future. Today, I will be presenting my research on Cancer and VTE.

Abstract:

Cancer and VTE have impacted the medical community greatly.

We researched cancer and VTE to determine the causes, effects, and impacts of cancer and VTE in a patient. Our research found that cancer and VTE are related.

Cancer-related VTE can be treated with anticoagulants (Heparin, DOACs).

Cancer and VTE is a two-way street and with proper medical care, treatment regimens and prevention guidelines, VTE can be managed to reduce VTE recurrences in cancer patients.

COVID-19 & Anticoagulation:

My name is Arya Bhanushali, I am a sophomore at Johns Creek High School, Johns Creek, GA. I have been a member of GTF for the past 3 years. I am interested in pursuing biomedical engineering as I am passionate about how patients are influenced by technological advances. This interest allows me to apply engineering and technical skills to aid patients and give them a more efficient treatment, recovery, or even hospital experience. At today's event, my colleagues and I will be presenting a project on COVID-19 and Anticoagulation.

My name is Rashi Modey, I am a rising 10th grader in South Forsyth High School, Cumming, GA. I have been a member of GTF for the past 3 years. My passion is Hospitality and Tourism Industry. At today's event, my colleagues and I will be presenting a project on COVID-19 and Anticoagulation.

Abstract:

The COVID-19 pandemic has affected millions of people worldwide. Besides COVID-19 affecting several organs in the body, it has increased the incidence of thrombotic conditions, especially hospitalized patients who are at high risk for developing thrombotic conditions. Thrombosis continues to remain an important concern in these patients. The authors have researched the possible relationship

of COVID-19 and risk of thrombosis, its management and prevention in their presentation on COVID-19 and Anticoagulation.

DOAC's: (Direct Oral Anti Coagulants)

My name is Rohan Pai. I am in 10th grade at Paul Duke STEM High School in Norcross, GA. I have been a member and active participant in GTF for 5 years. My passion is 3D modeling using AutoCAD. I enjoy working with it and love when everything comes together in a model. When I grow up, I want to work in the IT field. The project I will be presenting is my research on Direct Oral Anticoagulants, also known as DOAC's.

My name is Tanisha Singhal. I am a junior at Alpharetta High School, Alpharetta, GA. I have been in GTF for a little over a year now and love working on our different thrombosis projects! My passion is to attend a BS/MD program and become a General Surgeon. The project I will be presenting is my research on Direct Oral Anticoagulants, also known as DOAC's.

Abstract:

Over the past many years, we have seen a steady increase in the options for anticoagulants. Direct Oral Anti Coagulants (DOACs), introduced in 2010, are the latest addition to the list of anticoagulant agents: They are direct thrombin inhibitors (DTIs) and direct factor Xa inhibitors. The DOACs possess several advantages over the traditional agents such as warfarin and heparin. The DOACs have one disadvantage: the high cost.

Bleeding following the use of DOACs can be managed using reversal agents. Despite the cost and safety issues, DOACs have carved a role in medicine.

Covid-19 and Vaccines

My name is Raina Singhal, I am currently in 10th grade at Alpharetta High School, Alpharetta, GA. I have been part of the GTF Organization for almost two years. Currently, I am focused on completing the healthcare pathway at my school and medical research. In the future I have a great passion to become a general surgeon as I am extremely interested in the medical field. The subject of my presentation today is my research on COVID-19 and Vaccines.

I am Tejas Deodhar. I am a rising junior at South Forsyth High School in Cumming, Georgia. I have been with GTF since 2016 and have participated in various projects. I enjoy playing the clarinet and exercising in my free time. I aspire to have a career in medicine or research in the future. Today, I will be presenting my research on COVID-19 and Vaccines.

Abstract:

Since the inception of the pandemic, there have been 25 million cases of COVID-19 and over 555,000 deaths. Throughout the pandemic, there have been many myths and speculations of different drugs and practices that can help cure the virus, but it was only in late 2020 that the first confirmed vaccine was developed.

Currently, the Pfizer, the Moderna, and the Johnson and Johnson vaccines are being distributed across the country. We researched the information about the 3 COVID-19 vaccines that have been approved by the FDA.

Biography & Abstracts for ***Poster*** Presentations

How exercise can treat the symptoms of depression and anxiety.

Molly Bisceglia from New Visions: Scientific Research and World Health, Troy High School.My mom and other strong women in my life have inspired me to be who I am today. I plan to become a doctor. Observing how exercise can be beneficial for mental health.

Abstract:

What effect does exercise have on the symptoms of anxiety and depression? **Hypothesis:** Exercise decreases the symptoms of depression and anxiety. **Introduction:** Physical and mental health often complement each other. According to research, health-related aspects of physical health are related to mental health outcomes. "Mental health is defined as a state of happiness, in which everyone can realize their potential, can cope with normal life stress, can work productively, and can contribute to the community." Anxiety disorder is the most common mental illness in the United States, affecting 40 million American adults 18 years and older each year, accounting for 18.1% of the total population. "Anxiety disorders are highly treatable, but only 36.9% receive treatment with them." Suicide is the 10th leading cause of death in the United States, causing more than 47,500 deaths each year. Suicide is the second leading cause of death among people ages 10 to 34. **Method:** First, understanding the impact of exercise on a person's mental health through a personal discussion with mentor Lori McAllister. Understanding the difference between exercising to stay healthy and exercising to obtain a social standard is the starting point for this research. Once the research focus was obtained, analyzing general depression statistics, and verifying anxiety data turned out to be an important step in the research process. Followed by analyzing other related studies. **Conclusion:** It was found was that exercising is an effective way to reduce the intensity of depression and anxiety symptoms. Aerobic exercise is an effective treatment for various anxiety disorders and may be as successful as cognitive behavioral therapy in reducing generalized anxiety. “Exercising for 20 minutes at 70% -90% of the maximum heart rate three times a week has been shown to significantly reduce anxiety”.

COVID-19 and Stroke

My name is Krish Sharma. I am a 9th grader at Alpharetta High School, Alpharetta, GA. I have been in GTF for over 2 years and enjoyed the experience. I have had first-hand experience with allergies, and I understand how hard it can, so I would like to help people who have to deal with the same hardships that come with allergies. When I grow up, I would like to be an allergist. Today I will be presenting my research on Covid-19 and Stroke.

Abstract:

Since the inception of Covid-19 on March 11, 2020, Covid-19 has affected several organs in the body including the lungs, heart, and the brain. Covid-19 produces multiple symptoms ranging from cough, fever and chills, pain, or pressure on the chest, to stroke. There is a 7·6-fold increase in the odds of stroke with COVID-19 compared with influenza. In-hospital mortality is higher in patients with stroke and COVID-19 compared to historical non-COVID-19 patients. The management of stroke following Covid-19 is very similar to that of stroke patients without Covid-19. Use of Recombinant Tissue Plasminogen Activator (rtPA) and Thrombectomy are some of the common therapies used to manage COVID-19 induced stroke.

The Role of Ultra Fine Particle Air Pollution on the Developing Fetus

Isabella Lucear, New Visions Scientific Research and World Health. Attending The University of Rhode Island Majoring in Nursing and Health Studies

Greta Thunberg inspires me because of her hard work and determination to solve the environmental crisis.

Abstract: The purpose of this study is to define the birth defects that can result from being exposed to Ultra-Fine Particle Air pollution while the fetus is in utero. While defining the birth defects, this study is also looking into the factors that play the biggest role in contributing to the specific found birth defects. (Girguis, M.) The question driving this study is How can Ultrafine Particles affect the development of a fetus in utero combined with living in or near a low socioeconomic area with limited access to healthcare? I was able to hypothesize that the exposure to ultrafine particles air pollution during a child's time in utero can lead to the development of birth defects when UFPs cross the placenta and interfere with neuronal migration can lead to tube defects and brain development disorders when left untreated without the proper prenatal care. This study was driven by the methods of a meta-analysis of compiled peer-reviewed research articles. This meta-analysis was driven by finding a correlation between Ultra Fine Particle exposure during a child's time in utero can lead to the development of birth defects such as Spina Bifida, neural tube development, Brain growth, and other organs or limb development. When Ultrafine Particles cross the placenta and interfere with neuronal migration can lead to the previously stated birth defects. By communicating with both my mentors Dr. Brian Frank and Marilyn Wurth through email and virtual meet they both provided helpful information that was imperative to understanding this study. I was able to discuss and expand my knowledge of Ultra fine Particles with both Dr. Brian Frank and Marilyn Wurth. The exposure to ultrafine particles air pollution during a child's time in utero can lead to "the development of birth defects such as neural tube development, brain growth, and other organs or limb" (van Gelder, M) development. When Ultra Fine Particles cross the placenta and interfere with neuronal migration can lead to tube defects and brain development disorders when left untreated without the proper prenatal care.

Latinos and VTE

My name is Soham Satghare, I am in 11th grade at Chattahoochee High School, Johns Creek, GA. I have been in GTF for the past 2 years. I am passionate to learn about blood clots, its effects on different ethnicities, and to educate and inform the public about blood clots. Today, I will be presenting my research on Latinos & VTE.

Abstract:
Latin Americans or Latinos make up about 18% (60 million) of the 328 million population of the US. Most of the Latino population is concentrated in the South, Southwest, and Western parts of the U.S. Latinos have a significantly lower prevalence of VTE compared to Caucasians, but higher than Asians/Pacific Islanders. The reasons for the high occurrence of thrombosis in this population is a complex interplay between genetic and environmental risk factors. Obesity and diabetes cause a higher risk of VTE to the Latino race. We conclude that there is a strong correlation between genetic factors and the incidence of thrombosis in Latin Americans, although they still have one of the lowest VTE rates throughout all the races.

Mastectomy Induced Nerve Damage and Phantom Breast Pain

Amber Powell from Leeds NY, participating in New Visions Scientific Research and World Health and attending Cairo-Durham High School. My family motivates me because they encourage me to always be curious and to do what I love. I am attending WPI as a biology and biotechnology major and hope to eventually obtain my PhD in cellular and molecular biology.

Abstract:
Phantom limb pain is an essentially unknown process that causes patients to feel pain in parts of the body that are no longer there. Phantom limb pain (PLP) is most often studied in veterans and people with diabetes that have amputated limbs. However, the effect that phantom limb pain can have on cancer survivors, specifically breast cancer survivors, is gravely understudied. In this paper, multiple types of mastectomies, a common surgical procedure that amputates the breast, were studied to find out if nerve damage can cause an increased rate of PLP. This study also did a systematic review of current theories

on the neurophysiological origins of phantom pain and phantom limb syndrome to see if nerve damage could affect PLP according to known theories. The goal of this study is to have a greater understanding of what can cause PLP to appear in certain mastectomy patients and appear as phantom limb syndrome or not appear at all in other patients. After analyzing nerve damage and current PLP theories, it could be concluded that nerve damage does affect the presence of phantom limb pain over phantom limb syndrome. The inflammation post-mastectomy as well as larger nerves damaged during surgery was shown to increase rates of phantom pain. This study also discusses the emotional role phantom limb syndrome can have on breast cancer survivors, especially women, who have lost one or both breasts. This knowledge should be used in the treatment of PLP, especially in patients with PLP in places where typical treatment options will not work.

Management of COVID-19

My name is Milind Mukkamala, I am a sophomore at Johns Creek High School from Atlanta, Georgia. I would like to become a businessman and my hobbies include playing tennis and reading.

Abstract:

COVID-19 is a pandemic that has killed millions of lives across the globe and has also changed people's daily lives. This virus caught the world by surprise since the world was not prepared for such a pandemic and there were no existing vaccines and treatment modalities. Diagnostic COVID tests have been developed to detect the virus in the body. Three vaccines have been approved by the FDA (J&J, Moderna and Pfizer), which produce antibodies in the blood. A few therapies have been developed to manage COVID-19. Despite a small progress has been made, COVID-19 continues to be an overwhelming challenge to the world.

The Effect of E-Waste Toxin Bioaccumulation in Soil on Human Health

My name is Grace Dunham from New Visions World Health and Scientific Research Cobleskill-Richmondville HS. My Nana inspires me because of her selfless, loving, and creative personality. I will be attending Cornell University with a major in Global and Public Health and possible minors in Food Science and Ag Business.

Abstract:

E-waste is made up of electronics no longer in use, including technology like cell phones and appliances. Over half of the e-waste produced globally is shipped to developing nations, where informal, harmful recycling takes place. The purpose of this study is to examine how the presence of heavy metals and organic compounds in soil from e-waste impacts human health. The hypothesis was that the toxins harm human health and deplete agricultural potential of land. A literature review within the PubMed database was done on articles that addressed the impact of e-waste recycling upon the soil, or the community living near the soil, or workers firsthand. A mentorship was also done with a few professionals in environmental science, such as Dr. David Carpenter. This was supplemented with webinars, and data was also compiled into tables from the articles found.

It was found that the presence of toxins from e-waste in the soil impacts human health by leading to the bioaccumulation of chemicals in food sources, by depleting agricultural potential, and by direct inhalation as the soil turns to dust. A few examples include, respectively, the buildup of cadmium in fish, the ability of lead to inhibit rhizosphere function and the heightened ability of heavy metal ions to move through sandier soils. There is a serious need for new policies to tighten regulations on e-waste, while bearing in mind that the practice is the livelihood of thousands of people. Also, further investigation is needed on how the organic compounds and heavy metals interact with one another once released and combined with the catalysts of sunlight, air, and water.

Biography and Abstracts for ***BRIDGE Mentee*** *Presentations*

Are There Links Between the Surge in DVT Cases and COVID?

Sonika Tatipalli is a Sophomore at South Forsyth High School, GA, and has been a member of GTF for the past 3 years. Sonika won a second place in the GTF Essay Competition, the HOSA: Barbara James Service Award - Bronze Level, a Spelling Bee Class Winner, and several competitions. She has made several presentations (An Overview of GI Endoscopic Procedures at the GI Symposium, at the High School Scholars Day at Loyola University on the Global Heparin Shortage, and on myocardial infarction at the GTF sponsored CV Symposium. Sonika has been a very active writer and publisher and has published on Role of Research in your Life, How Did the High School Students of GTF Face the COVID-19 Pandemic? and on a breakthrough in colon polyps' treatment. Sonika is a multilingual student. Sonika wants to pursue a career in the medical field.

Abstract:
In this past year, there has been a large increase in the number of deep vein thrombosis cases. A significant potential cause of this could be the COVID-19 pandemic. In fact, several in-depth studies prove how the incidence rates of DVT in the general population are remarkably lower than the incidence rate in COVID-19 patients. Additionally, COVID-19 induces a hypercoagulable state, triggering thrombotic episodes. Analyzing the overlaps of the risk factors of both these conditions and the specific anticoagulant thromboprophylaxis prevention of thrombosis in COVID-19 patients once again highlights how there seems to be a strong link between COVID-19 and the recent surge of DVT cases.

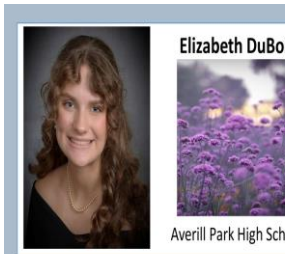
Why would a COVID vaccine cause Rare Blood Clots?

Ananya Mahesh is a Senior at Johns Creek High School, GA. She has been in GTF for the past 3 years and has given presentations about thrombosis in several places. She has been a props director in her school's theater production of Big Fish the Musical. She presented in the BRIDGE event 2020 and won the first prize and at the GI Symposium sponsored by GTF. She loves to conduct research and has been selected for an internship at Loyola University. Received a proclamation for thrombosis awareness month in the city of Lawrenceville, GA. She is multilingual, a certified technology mentor. Ananya plans to be a surgeon or a researcher in medical field.

Abstract:
Vaccine Induced Thrombotic Thrombocytopenia (VITT) is a medical condition caused by the adenovirus-based COVID-19 vaccine that leads to blood clots in unusual areas and lowered platelet count in blood. The condition, which resembles Heparin Induced Thrombotic Thrombocytopenia, is caused by the formation of anti-Platelet Factor 4 antibodies. The current incidence of VITT is very rare. Since there are not very many cases that have been released, it is difficult to determine any particular risk factors that make one more susceptible to VITT. As of right now, treatment methods include anticoagulants (including heparin), antibodies, and cortisone.

The Role of Intratumor Bacteria in Breast Cancer Treatment

Elizabeth DuBois, New Visions Scientific Research and World Health, Averill Park High School. My father, Daniel DuBois, inspires me because he works very hard and still finds time to prioritize his family and things he enjoys. He is very smart and honest, so I admire him very much. In the fall I will be attending SUNY Cortland to study biomedical sciences. I hope to eventually get a PhD and become a research scientist.



Abstract:
Question/Purpose: What role does intratumor bacteria play in breast cancer treatment?
Hypothesis: Since bacteria have different properties and functions, the presence of different bacterial species within tumors have varying effects on treatment efficacy.
Methods: Mentorship & analysis of research papers.

Conclusion: The presence of different intratumor bacteria causes different interactions between the bacteria and cancer therapies.

What are the Differences between Heparin and Direct Oral Anticoagulants in COVID-19?

Ankita Mahajan is a Sophomore at Johns Creek High School, GA. She has been in GTF for the past 3 years. Ankita loves to be part of several projects in GTF and has been a leader of a few. She won the first prizes at the BRIDGE Poster competition in 2019, and the GTF Essay competition, and has given a presentation on thrombosis in Melbourne, Australia. She won Second-Degree Blackbelt for Tae Kwon Do. Ankita plans to be an expert in the Field of Biology, or Neuropsychology.

Abstract:

Thromboembolic developments and excessive blood clotting are prominent afflictions associated with severe cases of COVID-19. Hence, the administration of anticoagulants such as heparin and Direct Oral Anticoagulants (DOACs) aids in the recovery process of patients with COVID-19. The difference between these two agents is that heparin is given by injection and has a rapid onset of action, whereas a DOAC is given orally and has a slow onset of action.

Using SSRIs to Treat Glioblastoma: The Importance of Collaborative Care

Rachel Malek participating in the New Visions Scientific Research and World Health program and attends Troy High School. I am expected to graduate this month 2021. I plan to attend New York University in the Fall to study Public Health. My inspiration and motivation come from my older brother and sister because of their curiosity and perseverance.

Abstract:

Glioblastoma Multiforme (GBM), a Grade IV astrocytoma, is the most malignant type of brain tumor. It presents much difficulty when it comes to treatment due to its complexity and intricate location. This results in a median survival time of around 12 to 15 months in adults. Due to the corresponding relationship between cancer patients taking antidepressant medications, previous studies have highlighted the potential to utilize Selective Serotonin Reuptake Inhibitors (SSRIs) as both a mechanism for psychological, as well as clinical use. The purpose of this study was to examine the importance of collaborative care in GBM patients taking SSRIs to understand the relationship in which SSRIs decrease progression. After questioning what role SSRIs play in decreasing GBM progression and how that would give insight to other drug-drug interactions, a literature review was conducted, followed by mentorship experience with Dr. Shaker Mousa who specializes in GBM work. Main conclusions that were found included specific interactions of SSRIs with the tumor microenvironment, induction of apoptosis through Ca2+ influx, and interference with glutamate production all contribute to tumor inhibition and greater chance of survival rate (Caragher, 2018; Hayashi, 2016; Pei, 2020). Future studies should focus on the role of SSRIs in other cancer types to amplify understanding of the effect of SSRIs in a multitude of systems.

Is there a benefit in Combining Anticoagulant and Antiplatelet in COVID-19 Treatment?

Malvika Sawant, is a Sophomore at Johns Creek High School, GA. She has been in GTF for the past 3 years. Malvika won first prize at the GTF Sponsored Redwood Wealth Management Essay Competition Senior Category. She interviewed Stephan Moll, MD, a hematologist at the University of North Carolina Medical Center, made a presentation on Falls in the Elderly at Loyola University at the High School Scholars Day, presented information on blood clots to the audience in Suwanee Library, talked on General Gastrointestinal Endoscopic Procedures at the Gastrointestinal Symposium sponsored by North American Thrombosis Forum and Loyola University. She enjoys Indian Classical

dancing and has written a few publications in the media. Her career goal is **in** Medical Profession with expertise in Science and Technology, or a Career in MSF.

Abstract:
The COVID-19 pandemic has spread rapidly across the globe causing immense amounts of people to be hospitalized, furthermore, even causing deaths. Many clinicians are observing pathophysiological principles to diagnose patients and give them specific treatments that have been outlined. A therapeutic approach that has been observed to be quite beneficial is the antithrombotic treatment labelled by the combination of antiplatelets and anticoagulants. There have been multiple studies covering the increasing rates of the association between thrombosis and COVID-19. The mechanisms of the treatment cover the operations behind this specific therapeutic treatment and its positive results. However, there are risk factors that must be addressed, which are overcome through the proposed algorithm.

Heparin: Beyond Anticoagulation

Radhika Kulkarni is a Sophomore at North Gwinnett High School, GA. She has been in GTF for the past 3 years. She is a co-founder/president of the North Georgia Habitat for Humanity, the President-elect of the Science National Honor Society. Radhika has written and published a few articles, and presented on various topics such as Warfarin-is it going to survive battle? Rehab labs, and atrial fibrillation. She was the winner of a GTF sponsored essay competition. She is a classical guitarist and a certified lifeguard. She would like to pursue a career in Medicine.

Abstract:
COVID-19 is associated with a hypercoagulable and inflammatory state predisposing patients to thrombosis. Reports suggest that heparin, a common anticoagulant, has effects beyond anticoagulation that will benefit the patient. This article will summarize non-anticoagulant effects of heparin including neutralization of chemokines and cytokines, reducing viral cellular entry, as well as neutralization of extracellular cytotoxic histones which in effect reduces the risk of a cytokine storm. Considering the pro-inflammatory nature of COVID-19, these anti-inflammatory effects targeted by heparin should be further studied.

Vaccine Induced Thrombotic Thrombocytopenia

Paige Spiess from Schaghticoke NY attending Hoosic Valley.
Most inspired by my parents. They work hard, despite challenges and disparities, and are incredibly successful in their professional lives.
I plan on attending Albany College of Pharmacy and Health Sciences for Pharmaceutical Sciences, as well as the Pre-PA program alongside Albany Medical College

Abstract: The purpose of this study was to determine the reasoning behind the thrombocytopenia and thrombotic events that occur after the use of the adenovirus based, Covid-19 vaccines. The main question of this study is how these adenovirus vaccines cause thrombocytopenia and thrombotic events after vaccination that mimic autoimmune heparin-induced thrombocytopenia. The thrombocytopenia occurs through an interaction of the patient ' immune system along with the anti-platelet factor 4 or PF4/H. This study was conducted through a literature review using databases such as PubMed and google scholar. Key words such as Covid-19 vaccine, adenovirus, thrombocytopenia, and thrombosis were used to generate these searches. Data was analyzed in a mass review style, where literature was read, analyzed, and synthesized. The mentorship portion of this study was completed with Dr. Mousa from Albany College of Pharmacy and Health Sciences. This study was completed alongside the global thrombosis forum students in a virtual mentorship experience. Dr. Mousa worked with the students to become efficient researchers and bring the projects to the next level. The major results of this study include the connection between the influence of the

activation of platelets through the PF4 receptor, due to the production of certain antibodies from the vaccine. The importance of this study is how premature this problem is, and the great need to solve it. If the reasoning behind the antibodies influencing the platelet production is understood, as well as the development of the thrombocytopenia, lives could potentially be saved. Certain groups at greater risk could be encouraged to receive the mRNA vaccine, rather than the adenovirus vaccine. Future research that could develop from this study would include a deeper understanding of what groups are at greater risk of thrombocytopenia and thrombotic events after vaccination. This study concludes the idea that the adenovirus vaccines encourage the production of antibodies, and in some cases interact with the PF4 receptor, and induce thrombocytopenia, as well as venous and arterial thrombosis.

Freshmen

Krish Sharma, Alpharetta High School, Alpharetta, GA

Sophomores

Arya Bhanushali, Johns Creek High School, Johns Creek, GA
Milind Mukkamala, Johns Creek High School, GA
Priya Ray, Lambert High School, Suwanee, GA
Raina Singhal, Alpharetta High School, Alpharetta, GA
Rashi Modey, South Forsyth High School, Cumming, GA
Rohan Pai, Paul Duke STEM High School, Norcross, GA

Juniors

Soham Satghare Chattahoochee High School, Johns Creek, GA
Tejas Deodhar. South Forsyth High School, Cumming, GA
Tanisha Singhal Alpharetta High School, Alpharetta, GA

Seniors

Amber Powell, Questar III/Cairo-Durham High School, Leeds NY
Grace Dunham, Questar III/Cobleskill- Richmondville High School, Summit NY
Isabella Lucear, Questar III/Cobleskill-Richmondville High School, Cobleskill NY
Molly Bisceglia, Questar III/Troy High School, Troy NY

BRIDGE Mentees with Dr. Shaker Mousa -2021

Ananya Mahesh, Global Thrombosis Forum, Johns Creek High School Junior, GA
Ankita Mahajan, Global Thrombosis Forum, Johns Creek High School Sophomore, GA
Elizabeth DuBois, Questar III/Averill Park High School Senior, Wynantskill, NY

Malvika Sawant, Global Thrombosis Forum, Johns Creek High School Sophomore, GA
Paige Spiess, Questar III, Hoosic Valley High School Senior, Schaghticoke, NY
Rachel Malek, QuestarIII/Troy High School Senior, Troy, NY
Radhika Kulkarni, Global Thrombosis Forum, North Gwinnett High School Sophomore, GA
Riane Richard, Questar III, Shenendehowa High School Senior, Clifton Park, NY
Sonika Tatipalli, Global Thrombosis Forum, South Forsyth High School Sophomore, GA

Thank you for your attention!

Planning Committee:

Danielle Cowin, Sr. Administrative Assistant, PRI

Dr. Shaker Mousa, Chairman & Executive Vice President, PRI

Mrs. Archana Athalye, Vice President, Member of the Board of GTF, Alpharetta, GA

Atul Laddu, President and CEO, Member of the Board of GTF, Suwanee, GA

Mrs. Jayashree Laddu, Member of the Board of GTF, Suwanee, GA

Mrs. Supriya Sawant, Member of the Board of GTF, Johns Creek, GA

Professor Ruth S. Russell, Questar III New Visions Scientific Research & World Health