

INAUGURAL ISSUE

THE JOHNS HOPKINS KIMMEL CANCER CENTER

ESOPHAGEAL CANCER MATTERS

A Team Approach

2023/2024

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ESOPHAGEAL CANCER MATTERS

THE SIDNEY KIMMEL
COMPREHENSIVE
CANCER CENTER AT
JOHNS HOPKINS

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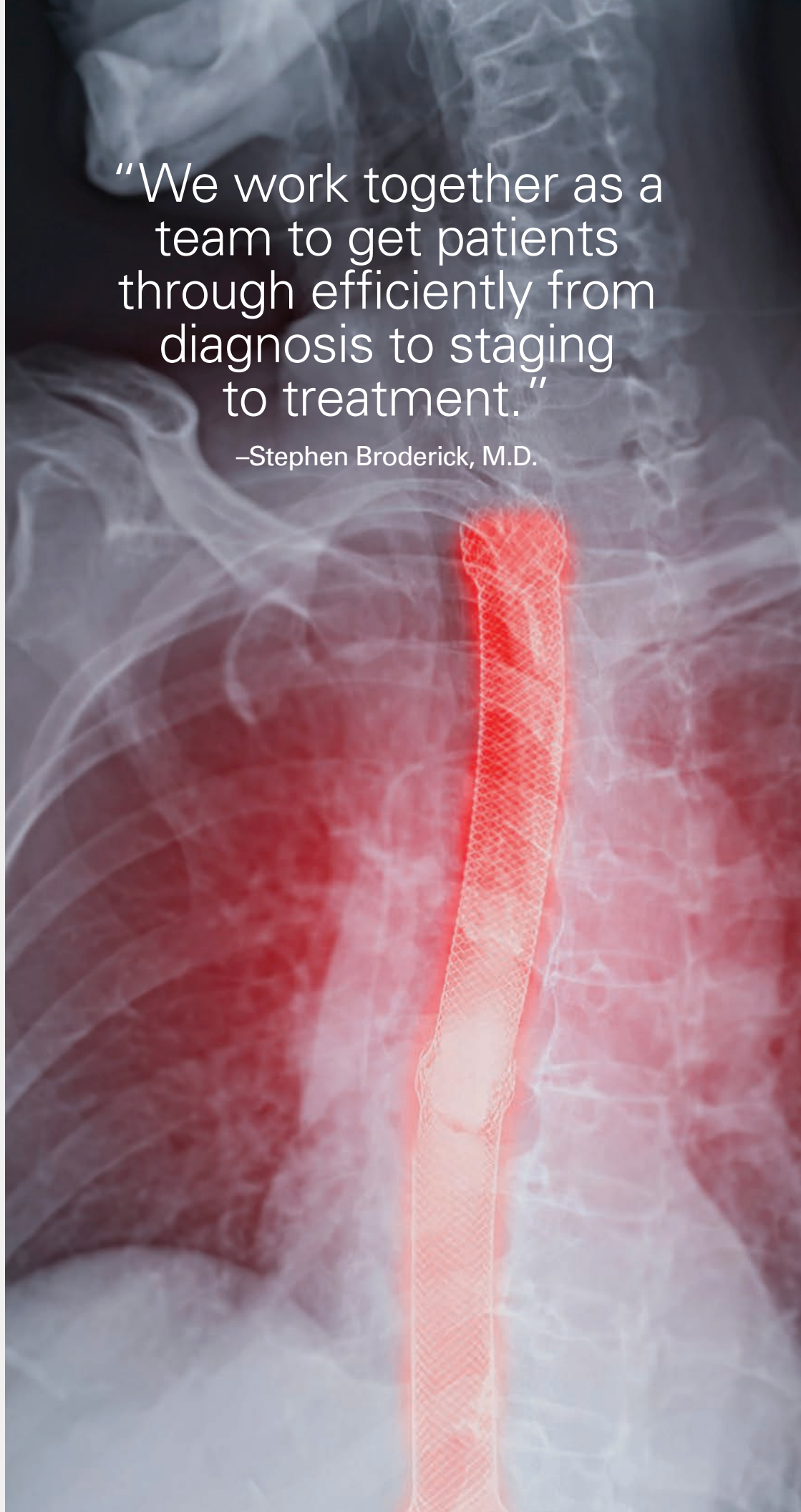
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TURNING
RESEARCH
INTO
RESULTS

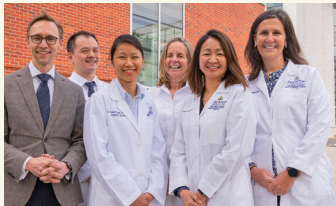
“We work together as a
team to get patients
through efficiently from
diagnosis to staging
to treatment.”

–Stephen Broderick, M.D.



ESOPHAGEAL CANCER MATTERS

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A Team Approach

Bringing together experts from different specialties to combat esophageal cancer



Toni's Story

A patient on the road to recovery and getting back in the groove



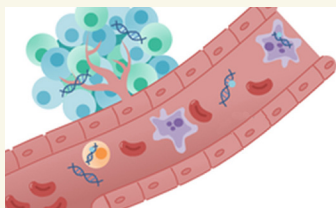
You're Bugging Me

The role of the microbiome in fighting esophageal cancer



Esophageal Cancer Screening

DNA Biomarker panel may become screening test for esophageal cancer



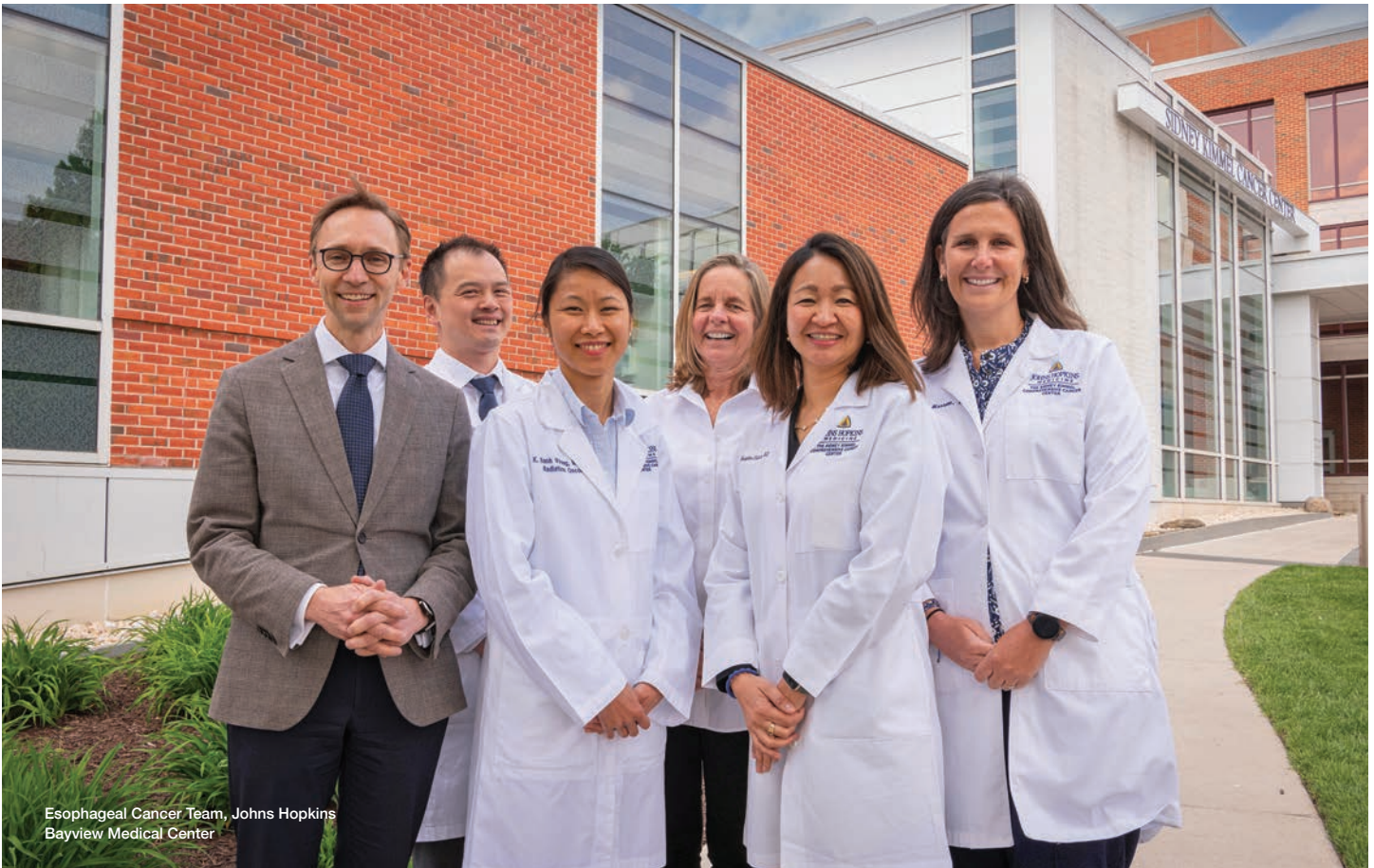
Tumor Clues

Tracking molecular cancer footprints in blood



It's in the Data

Data may hold the answers to many unsolved mysteries about esophageal cancer



Esophageal Cancer Team, Johns Hopkins
Bayview Medical Center

A Team Approach Combating Esophageal Cancer

LIKE MOST PATIENTS with esophageal cancer, by the time Christopher began experiencing symptoms, his cancer had already progressed to an advanced stage.

The most common symptoms, difficulty swallowing or food getting stuck when eating, ultimately lead people to see their doctor.

Christopher had trouble swallowing from time to time. Starchy foods like rice were the worst and felt like they were expanding in his throat, he describes. His wife, Jill, encouraged him to talk to his doctor.

“I was not worried,” he says. “I had a lot of heartburn, but there was nothing in my mind that led me to believe something was seriously wrong.” The busy architect did not feel ill. He was

keeping a full schedule. Nonetheless, at his wife’s encouragement, he contacted his doctor, and an endoscopy was scheduled.

An endoscopy is a procedure in which a small flexible tube with a tiny camera is inserted through the mouth, down the throat and into the esophagus.

A few weeks after the procedure, Christopher was at work when he got a call from his wife. “We got the report,” Jill said. “You have cancer.” Christopher thought she must be kidding. “Cancer was the furthest thing from my mind,” he remembers. He realized it wasn’t a joke when Jill began to cry. “It’s bad,” she said through tears. “We have to call the Kimmel Cancer Center at Johns Hopkins.”

Jill’s best friend was a cancer survivor and recommended the center to her.

The Multi-D

Most patients with esophageal cancer, upward of 80%, are treated with a combination of chemotherapy, radiation



therapy and surgery, says thoracic surgeon **Stephen Broderick, M.D.** Immunotherapies — newly developed drugs that unleash the power of immune cells against the cancer — are also being studied in clinical trials.

The Kimmel Cancer Center’s Multi-disciplinary Esophageal Cancer Clinic, nicknamed the Multi-D, brings together experts in medical oncology, radiation



oncology, surgery, nursing, social work and all other patient care specialties for a one-day appointment for a patient with esophageal cancer. Each specialist meets with the patient, and the experts review imaging and pathology. At the end of the appointment, the patient receives a treatment plan.



As one of the first people who new patients with esophageal cancer meet, **Jean Butler**, the multidisciplinary clinic coordinator, is a source of comfort and direction

“Newly diagnosed patients are scared,” Ms. Butler says. “We get them in right away to give them support and help relieve some of the anxiety.” Butler gives patients her phone number and invites them to call any time throughout their treatment with questions or concerns.



Rarely, more than a week passes before she hears from them. As part of their first appointment, patients attend a teaching session with Butler on the basics of their cancer and the treatments they may hear about when they meet with doctors. That way, she says, they are prepared and able to focus on questions about the treatment plan.

“We provide as much support upfront as possible so patients know they are surrounded by a care team concerned about their physical and emotional care,” says Ms.



Butler, who consults with **Russell Hales, M.D.**, the multidisciplinary clinic’s co-director, on every patient. Having that extra support makes

a big difference. By the end of the day, patients say they feel well educated about their cancer. They understand

their diagnosis, their individualized treatment plan and any anticipated side effects, she says, adding that about four new patients are seen in the clinic each week.

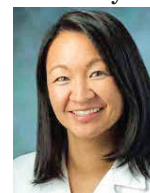
A nutrition evaluation is also performed, since swallowing issues and weight loss are common among patients with esophageal cancer. They may have trouble eating, and some have feeding tubes. Patients who need nutritional support are identified and issues are addressed right away.

Before a patient’s first visit, Ms. Butler works with referral coordinator **Margaret Clark** to make sure the experts have the imaging and pathology needed to evaluate the cancer.

Treatment Plans

Christopher and Jill traveled from their home in Virginia to the Kimmel Cancer Center’s multidisciplinary esophageal cancer clinic.

His diagnosis was stage 3 esophageal cancer. This means the cancer had begun to spread outside of the esophagus. “The experts did all of the tests and X-rays and came up with a plan,”



says Christopher. He says that after listening to recommendations from each one, including Dr. Hales, who is a radiation oncologist, and **Joy Feliciano, M.D.**, a medical oncologist, he felt comfortable and was ready to start treatment.

“I trusted them and was ready to do whatever they suggested,” he says.

“We work together as a team to get patients through efficiently from diagnosis to staging to treatment,” says Dr. Broderick. Treatment is challenging, he adds, but continued research and refinements to the surgery to remove the cancer are improving outcomes.

Christopher’s treatment began in spring 2019 with chemotherapy and radiation therapy, followed by surgery.

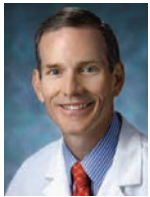
Complex Surgery

“For surgery, we have two primary goals,” Dr. Broderick says. “We want

the most effective operation, one that provides the best chance of cure and one that allows the patient to return, as much as possible, to a normal quality of life.” Key to this goal, he points out, is a surgery that allows patients to resume a normal diet.

“Culturally, eating is an important part of who we are,” Dr. Broderick says. “We gather for family meals, go out to dinner, so this is essential to quality of life.”

The surgery to remove the cancer is called an esophagectomy. Surgeons take out the diseased part of the esophagus, pulling the stomach up and connecting it to the remaining esophagus.



Kimmel Cancer Center experts, led by **Richard Battafarano, M.D., Ph.D.**, regional director of general thoracic

surgery, worked to reduce the most serious complication of esophageal cancer surgery—leaks where esophageal and stomach fluids escape through the incision where the esophagus and stomach are joined together during surgery—and for good reason. Leaks, he says, increase the risk of death and long-term complications. They also impact the immune system, making it more likely that the cancer will come back, Dr. Battafarano explains.

There are other complications. Pneumonia and pleural effusions—a dangerous buildup of fluid—are among the common ones, and they are more manageable than leaks, he says.

Nationally, leak rates range from 10% to 21%. Dr. Battafarano and his team reduced that rate to an incredibly low 2% at Johns Hopkins.

Combination Therapy

For most patients whose cancers, like Christopher’s, are diagnosed after the cancer has begun to spread, the first course of treatment is chemotherapy and radiation to knock the cancer back and stop the spread.

“It’s tough,” Christopher recalls. He turned to his love of music and art, and

played his guitars and created artwork to help cope with the intensive, life-saving therapy.

Dr. Feliciano, his medical oncologist, understands. She wears gold, glittery shoes on clinic days to lift her patients’ spirits of. This small gesture caught on, and now much of the clinical team and many patients and family members don sparkly shoes. During Christopher’s infusions, friends and family members provided encouragement, texting him photos of themselves wearing their own shiny footwear.

Christopher drew on this support in the months ahead, as he prepared for major surgery amid the global COVID-19 pandemic.

In August 2019, after completing chemotherapy and radiation therapy, he underwent an extensive, 11-hour surgery to remove any remaining cancer in his esophagus and lymph nodes, which the spreading cancer had begun to invade. Christopher remained in the surgical intensive care unit for eight weeks, having four more surgeries to address complications.

With the support of his wife and five children, he recovered and was discharged in November 2019. The long stay in the hospital took its toll, but Christopher was determined to regain his strength. After about a month of recovery, he returned to work and began exercising.

He and Jill were very careful during the pandemic. They went to the small rural town of Deep Creek Lake in Garrett County, Maryland, during his recovery and remained there through June 2020, returning to the Kimmel Cancer Center for quarterly appointments, imaging and bloodwork. He met with his doctors via telemedicine.

Immunotherapy

Christopher was also part of a clinical study of immunotherapy, a new type of cancer treatment that uses drugs that prompt the immune system to attack the cancer and reduce the risk of cancer recurrence. He received immunotherapy before surgery,

chemotherapy and radiation therapy.

Studying the benefit of immunotherapy before surgery also gives researchers the opportunity to study all of the molecular inner workings of tumor samples and immune cells to pinpoint what drives response and resistance.

“We think this will provide unique insights about why immunotherapy works in some esophageal cancer patients and not in others,” says **Valsamo Anagnostou, M.D., Ph.D.** (see story on page 11), who is leading the study in collaboration with Drs. Feliciano and Lam.



The results of this study are not yet available, says Dr. Feliciano, so she doesn’t know if immunotherapy helped Christopher, but data from ongoing studies is being evaluated, and overall appears promising.

“All I know is I have a clean bill of health,” says Christopher, who returns to the Kimmel Cancer Center every six months to see Dr. Feliciano and to make sure his cancer remains in check.

A similar clinical trial for patients with esophageal cancer explored the benefit of immunotherapy with the drug nivolumab, after chemotherapy, radiation therapy and surgery, to prevent the cancer from coming back. Cancer cells block the natural immune response to cancer, and this drug re-ignites the immune response. Results of this study were published last year in *The New England Journal of Medicine*, and the treatment was found to reduce recurrence of esophageal cancer by 31% and nearly double disease-free survival. In May 2021, the findings led to the first approval by the Food and Drug Administration of the immunotherapy drug for esophageal cancer.

Immunotherapy is showing promise as a new way to combat this cancer by stimulating the immune system to monitor for and eliminate any returning cancer cells, says Dr. Feliciano. This type of advance in treatment, she adds, offers hope to patients battling esophageal cancer.



Toni's Story

Back in the Groove

TONI CALLED IT her kickback. It was a nagging symptom she never before experienced. When she ate, some of the food regurgitated into her mouth.

“No matter what I ate or drank — food, water, it didn’t matter — it came back up,” says 68-year-old Toni, a retired information technology specialist for the Social Security Administration.

Eating was difficult, causing Toni to lose weight — 40 pounds in all. Her doctor tried acid reflux medications and antacids, but they didn’t help, so an endoscopy was ordered. During an endoscopy, a flexible tube with a tiny camera attached is passed, under anesthesia, through the mouth and throat so a doctor can examine the esophagus and stomach.

When the results of the endoscopy were in, Toni was told the cause of her “kickback” was esophageal cancer.

Toni didn’t hesitate. She made an appointment at the Kimmel Cancer Center and met with a multispecialty team of experts, including a surgeon, medical oncologist and radiation oncologist. The tumor was located where the esophagus joins the stomach. Her treatment plan began with six weeks of chemotherapy and radiation to kill as much of the cancer as possible.

The active mother of four, grandmother of 15 and great-grandmother of two, with another great-grandchild on the way, had focused much of her time on helping others. She frequently hosted family dinners for 40 people to recognize birthdays and honor accomplishments. Also, the self-identified DIY girl was busy redecorating and remodeling her home.

Toni is also a seamstress. She learned the skill from her godmother when she was 12.

“I’ve been sewing ever since,” says Toni, who can look at an outfit and recreate it. “I can make anything I see,” she says. When her grandsons needed pants altered for their high school graduation, they turned to Toni.

“It’s hard for me to slow down,” she says. Still, she knew she would have to shift her focus to treatment and recovery.

Toni jokes with her radiation oncologist **Russell Hales, M.D.**, about her alter ego — the Energizer Bunny.

Even as she contemplated her treatment options, she was thinking about how she could help other people. Her medical oncologist, **Joy Feliciano, M.D.**, discussed a clinical trial of immunotherapy, a type of cancer treatment that activates the body’s natural defenses — the immune system — to seek and destroy stealth cancer cells that may remain after surgery, radiation and chemotherapy. The hope was that it would keep her cancer from coming back. The treatment involves a monthly infusion for a year. Toni opted to participate, but she did not think about how it might keep her cancer at bay. Instead, she was excited about how it could help future patients with esophageal cancer.

“It felt like something I could do to help others,” she says. She thought about her mother, who died of ovarian cancer, and her father, who died of lung cancer.

Toni did do one thing to help herself. Before treatment began, she quit smoking and she committed to sticking to her exercise routine of walking five

miles three or more times per week, to prepare for her cancer battle.

Just before Thanksgiving 2021, Toni began a five-week regimen of chemotherapy and radiation therapy. When it was completed, two spots of cancer remained in her esophagus, which her surgeon removed in a six-hour operation.

The surgery was successful — Toni’s surgeons believed they got all of the remaining cancer before it began to spread to other parts of her body. Still, there were some complications. To reach her tumor, the surgeon had to collapse her lung. She also had pain related to nerves that needed to be cut through to reach the cancer.

“I am very pleased with the entire team who cared for me,” says Toni. “I love the set up at Kimmel. I can do everything in the same place. I don’t have to go to other parts of the hospital.”

Toni was so appreciative that, when her treatment was finished, she brought fruit arrangements to her care team.

“Every person seemed to care about me,” she says. “They were all so dedicated. I could tell that every person I encountered cared about their jobs, and this was reflected in how they treated me. The care I was shown made this journey very comfortable.”

Toni continues monthly visits to receive immunotherapy, and she is working to regain some weight and some of the muscle tone she lost. She says she is getting back to where she was before the cancer diagnosis.

“I am still recovering, but my energy is slowly coming back,” she says. “I’m getting back in the groove.”

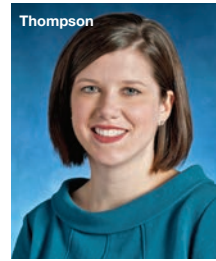
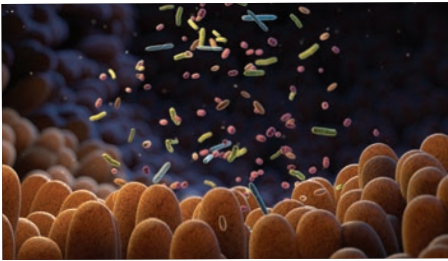
RESEARCH

You're "Bugging" Me

The Role of the Microbiome in Fighting Esophageal Cancer



Cynthia Sears



WHAT ROLE DO the germs in our gut play in esophageal cancer? Under the mentorship of leading microbiome expert, **Cynthia Sears, M.D.**, and in collaboration with **Valsamo “Elsa” Anagnostou, M.D., Ph.D.**, **Kellie Smith, Ph.D.**, and **Liz Thompson, M.D., Ph.D.**, of the Bloomberg-Kimmel Institute for Cancer Immunotherapy, **Fyza Shaikh M.D., Ph.D.**, is working to figure it out.

The microbiome—the microscopic society of organisms in our gut, including hundreds of species of bacteria—aid in digestion, metabolism, and immunity. Dr. Shaikh and collaborators want to learn how these bugs might create environments conducive to the development of cancer and also how they may modify treatments that fight cancer, particularly immunotherapy with a class of drugs called checkpoint inhibitors. Cancer cells exploit immune checkpoints to shut down the immune response to cancer, and checkpoint inhibitors reactivate the immune response.

Piggybacking on a clinical trial of immunotherapy before chemotherapy, radiation therapy and surgery for esophageal cancer, Dr. Shaikh worked with study leader **Vincent Lam, M.D.**, to collect samples from patients, including stool, tumor DNA, and normal DNA, to get a picture of the microbiome.

Dr. Shaikh is not interested in the DNA of the cancer cells and immune cells as much cancer research is focused on but rather the DNA of bacteria. Using a special technology, she is able to selectively extract and study the DNA of bacteria she finds. She is particularly interested in the microbiome of patients who obtain what is known as a complete pathologic response from immunotherapy, meaning at the time of surgery, there was no

tumor remaining. The immunotherapy essentially cured the cancer.

“Looking at the microbiome, we found that those who had a complete pathologic response had a different profile than people with residual tumors,” says Dr. Shaikh. There was something different in the microbiome of those who responded well to the immunotherapy. “It was surprising to us. This was a small study with 18 samples from 18 people, so we really didn’t expect to see anything going into it. This strong signal was exciting.”

She cautions, however, that the work is early. Researchers will need to differentiate the species of bacteria found in samples from patients and confirm what they found was not by chance.

“We are going back to the laboratory and looking at data analysis models to confirm what we found in the small study,” says Dr. Shaikh. There is limited information on what bacteria are in esophageal tumors and what the esophageal microbiome looks like with cancer treatment. We are among the first to study the gut and esophageal microbiome in patients receiving immunotherapy.

The microbiome and its impact on the immune response is a new field of study in cancer with the first basic research studies published in 2015 followed by human studies in 2017 and 2018, she says.

“An incredible amount of work has been done, but we really are just getting started on this important story,” says Dr. Shaikh.

A biorepository of patient samples established at the Bloomberg-Kimmel Institute for Cancer Immunotherapy is key to her ongoing research. Drs. Sears, Shaikh and colleagues are using these samples to study the bacteria and develop the methodology and

computational methods needed to distinguish good bacteria from harmful, cancer-promoting bacteria.

The biorepository, she says, is essential to pushing this fledgling field forward. Funding is another critical factor. She leveraged this research to earn a prestigious grant to look for biomarkers that will predict response to treatment. Looking at the metabolites—the microscopic products of bacterial activity—found in the microbiome of cancer patients, she can begin to classify bugs that support treatment and those that work against its success.

The range of bacteria is vast, and there is a lot of redundancy, but perhaps similarity in metabolites of different bacteria could be a predictor of response to immunotherapy, she says.

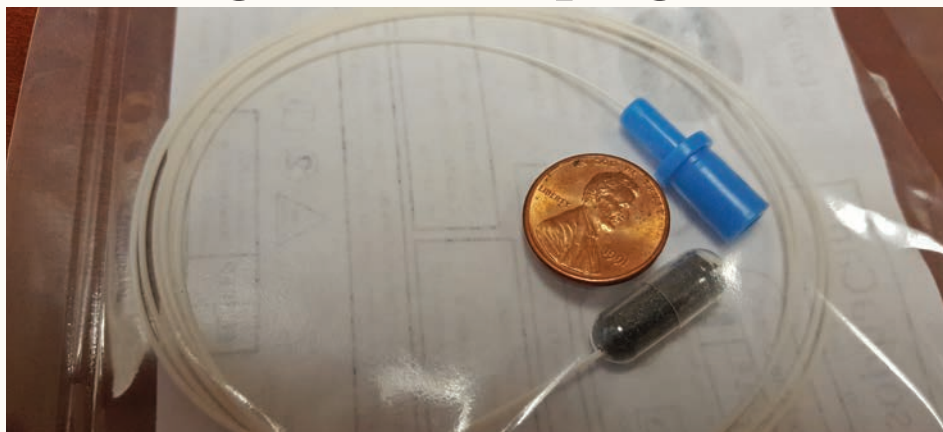
Interventional studies are another goal but finding funding for them has been a challenge. She’d like to study the effect of things like fiber supplements, yogurt, and probiotics in cancer patients to determine if their impact on patients’ microbiome is helpful or detrimental to response to cancer therapies.

There are many ways to modify the microbiome, including new biotherapeutic drugs—oral medications containing small groups of bugs—dietary modifications and more, Dr. Shaikh explains. The question is can we use them, and also develop new ways, to enhance the microbiome and create an environment that supports response to immunotherapy with checkpoint inhibitors.

“If we can get more patients to that complete pathologic response, how amazing would that be?” says Dr. Shaikh. “I think the microbiome is an incredible tool we are just beginning to understand. There is so much opportunity.”

Esophageal Cancer Screening

DNA Biomarker Panel May Become Screening Test for Esophageal Cancer



AS DIRECTOR of the Gastrointestinal Early Detection Biomarkers Laboratory, **Stephen Meltzer, M.D.**, is collecting clues that already exist in the esophagus to detect esophageal cancer.



“With esophageal cancer, diagnosis is a matter of life and death,” says Dr. Meltzer, who has dedicated decades of his career to the detection and prevention of this

disease. “Currently, there is no inexpensive, minimally invasive screening tool that can be used regularly to diagnose those at risk for esophageal squamous cell cancer.” This includes people with exposure to tobacco, wood smoke, (common in some low-income countries), alcohol, environmental carcinogens, or other esophageal squamous cell cancer risk factors, he says.

Worldwide, 604,000 people are predicted to develop esophageal cancer this year. Esophageal squamous cell cancer occurs in the cells that line the esophagus and is by far the most common type of esophageal cancer.

The challenge, Dr. Meltzer says, is that there are currently no screening tests to find this common type of esophageal cancer in people without symptoms, in contrast to other cancer

types. For example, we have screening mammography for breast cancer screening, colonoscopy for colorectal cancer screening, serum PSA for prostate cancer screening, and Pap smears for cervical cancer screening. Moreover, if someone has symptoms suggesting esophageal squamous cell cancer, they must undergo endoscopy and biopsy, which are expensive, risky, and often unavailable in developing countries, where the risk for the disease is highest, he explains.

Most importantly, this lack of screening means that most esophageal squamous cell cancers are detected at very late stages, with the resulting five-year survival rate less than 20%. Since esophageal cancer incidence is now rapidly rising, Dr. Meltzer is responding to an urgent worldwide need with a safe, inexpensive, easy-to-administer screening test.

Building on a nearly 30-year-old discovery by Kimmel Cancer Center epigenetics experts, Dr. Meltzer developed a noninvasive DNA-based test that detects cancer in the lining of the esophagus. “Epigenetics” refers to chemical changes in DNA that can serve as telltale clues, or biomarkers, that occur in cells lining the surface of the esophagus and signaling the presence of cancer.

To capture esophageal cells, Dr. Meltzer uses a device consisting of a small gelatin capsule containing a soft sponge, about as long as the diameter of a dime, attached to a flexible string. The end of the string remains outside the mouth. A few minutes after being swallowed, it dissolves in the stomach; It is then pulled out via the string, collecting esophageal lining cells as it moves upward and out of the mouth.

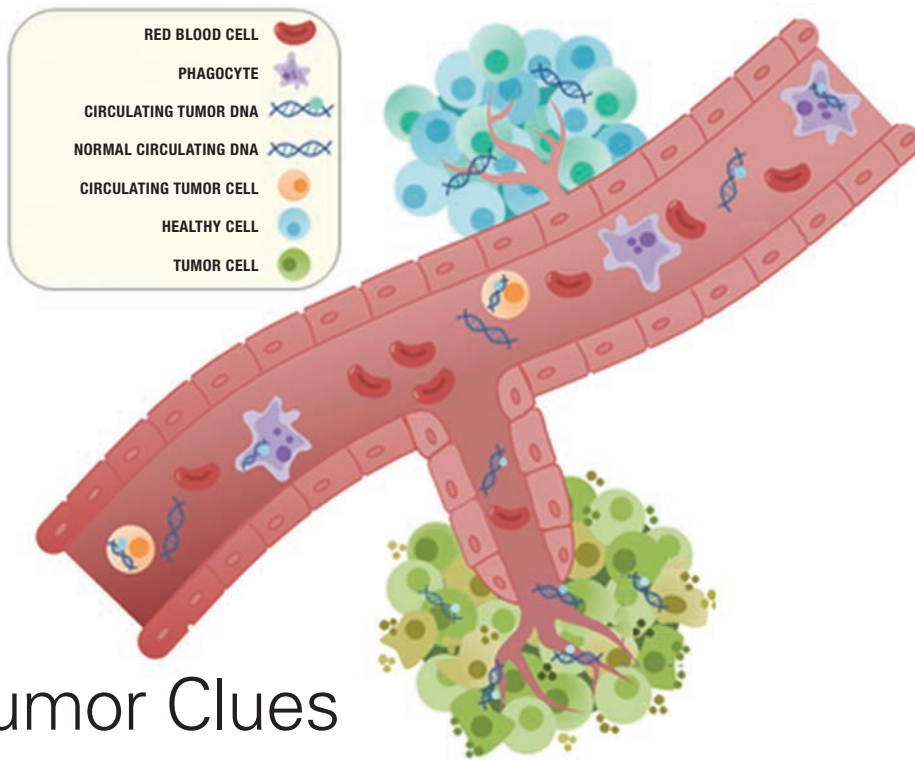
A statistical algorithm specific to esophageal squamous cell cancer is then applied to measure and analyze the collected cells for levels of DNA methylation of specific genes, which occur predominantly in cancer cells.

In a recent study, Dr. Meltzer’s research team, which included **Drs. Joy Feliciano, Vincent Lam, Richard Battafarano, Kristen Marrone**, several Johns Hopkins University gastroenterologists, JHU engineers, epidemiologists, statisticians, and other key national and international collaborators, administered the test to 94 people. Participants included patients at Johns Hopkins Hospital, but prominently featured many patients in Uganda, which has high rates of esophageal squamous cell cancer. In this study, the test successfully classified about 90% of patients as having esophageal squamous cell cancer or not.

“These findings have global implications, with a large impact on patients in lower-income countries who have limited access to health care resources,” says Dr. Meltzer. “We may be able to save thousands of lives if we can detect this disease early enough to intervene therapeutically.”

Dr. Meltzer hopes to soon bring tests to market for detecting all types of esophageal cancer and their precancerous precursor conditions, through a company he co-founded called Capsulomics, Inc.

Dr. Meltzer says these preliminary results suggest that larger screening trials should be conducted in high-risk populations around the world. He is hopeful the test may also help guide surveillance for recurrence after primary cancer treatment.



Tumor Clues

Tracking Molecular Cancer Footprints in Blood

AS TUMOR CELLS die, they leave fragments of their genetic material (also known as DNA) circulating in the bloodstream. This molecular footprint, known as circulating tumor DNA, can be detected in a simple blood test by ultra-sensitive technologies such as next-generation sequencing, known as liquid biopsies. Johns Hopkins Kimmel Cancer Center researchers were among the first to point this out and to study how it could be used to detect cancer earlier and to guide cancer treatment.

Valsamo Anagnostou, M.D., Ph.D., director of the thoracic oncology biorepository at Johns Hopkins, believes this technology could help patients with esophageal cancer and is collaborating with oncology experts **Joy Feliciano, M.D.**, medical director of the thoracic oncology program at Johns Hopkins Bayview Medical Center, and **Vincent Lam, M.D.**, director of the esophageal cancer research program.

Looking for circulating tumor DNA in the bloodstream after surgery with the liquid biopsy blood test can help inform doctors if microscopic cancer cells invisible to the surgeon's eye remain. These cells (micrometastases) are critical because they can cause the

cancer to come back and spread to other parts of the body.

"It is a way of tracking in real-time the status and extent of the cancer," Dr. Anagnostou explains.

If the doctors find this molecular footprint — tumor DNA circulating in the bloodstream — or what Dr. Anagnostou calls molecular persistence, they know cancer remains. They may opt for more aggressive therapies or different drugs to kill lingering cancer cells. Patients who do not have any circulating tumor DNA in the blood after surgery — Dr. Anagnostou calls this molecular clearance — are at low risk for cancer recurrence and could be spared additional therapies and the side effects that frequently accompany them.

"Maybe patients who show sustained circulating tumor DNA clearance are less likely to require chemotherapy, radiation therapy or immunotherapy," says Dr. Anagnostou. Another approach, she says, is to use circulating tumor DNA to help determine if patients have received enough treatment, reserving more aggressive treatments for patients with detectable circulating tumor DNA and adjusting courses and types of ther-

apy until tumor DNA in the blood is no longer detectable.

Anagnostou hopes that monitoring circulating tumor DNA can help guide how to best alternate and sequence therapies to improve clinical outcomes.

Her research is providing new clinical evidence. In early findings from 16 of 32 patients with esophageal cancer who are participating in a clinical trial in which many blood samples were collected over time, Dr. Anagnostou says they were able to demonstrate that patients who had a molecular response (no circulating tumor DNA after immunotherapy, chemoradiation and surgery) had better clinical outcomes. On the other hand, patients who had molecular persistence (circulating tumor DNA after immunotherapy, chemoradiation and surgery) were more likely to have a cancer recurrence. These findings were discussed at the American Association for Cancer Research annual meeting in 2021 and reported in the *Journal of Clinical Oncology* on Feb. 1, 2022.

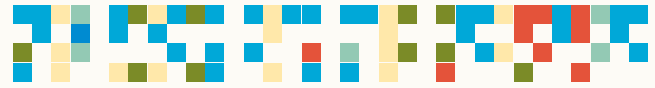
"These findings are very relevant for esophageal cancer because these approaches provide a noninvasive way to detect cancer recurrence and monitor therapeutic response," says Dr. Anagnostou.

Several challenges remain, she says, before this approach can become a standard practice in cancer care. Next-generation sequencing assays may be limited in detecting very low levels of circulating tumor DNA in patients with early stage esophageal cancer. Furthermore, not all DNA, and changes in its sequence (mutations), in the bloodstream comes from the tumor, she says. Emerging technologies are helping to sort out these challenges.

Since circulating tumor DNA is tracked through a simple blood draw, use of liquid biopsies may expand eligibility and participation in clinical trials for patients.

"Most clinical trials are conducted at academic centers like ours, but blood samples can be easily and safely collected locally and shipped to us, making clinical trials and cancer care more inclusive," she says. "This is the future."

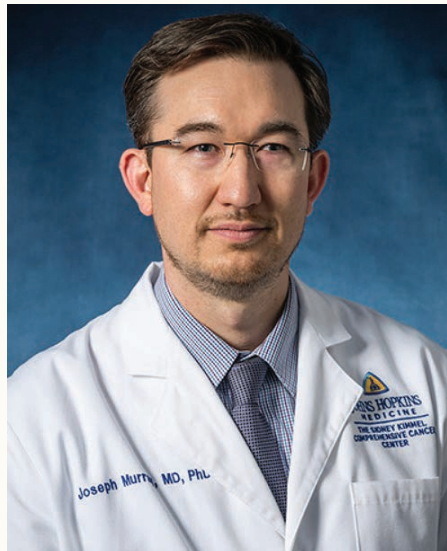
It's in the Data



NEW FACULTY MEMBER Joseph Murray, M.D., Ph.D., believes data holds the answers to many unsolved mysteries about esophageal cancer. Symptoms, imaging, outcomes, treatments received, and tests administered are among the information he would like to assemble to create a large matrix of data on each patient to better understand how patients get cancer, their responses to treatments, and the complications they suffer.

He's dubbed the repository the Thoracic Cancer Data Commons. It includes data provided by more than 21,000 patients with lung cancer, esophageal cancer, mesothelioma, and other thoracic cancer diagnoses.

"I want to delve into and find out what features and characteristics of a patient's clinical course can lead us to better outcomes," says Dr. Murray. "I envision a learning health system where data is its own laboratory, expanding our knowledge of these



cancers and helping us characterize and treat patients more precisely."

In collaboration with Dr. Vincent Lam, Dr. Murray is using tools, such as liquid biopsy, to gather detailed data on genetic alterations in esophageal cancer

and evaluating how the genetic variations drive disease changes over time. These studies may, for example, make it possible to observe cancer-driving changes that can be targeted with a drug therapy or identify a cancer that is transforming into one that is resistant to a particular treatment.

"Learning from our patients is the most important thing, and I want to look at every avenue for opportunities to improve outcomes."

"Learning from our patients is the most important thing, and I want to look at every avenue for opportunities to improve outcomes," says Dr. Murray. If the answers are in the data, then it follows, he says, that more data we gathered and analyzed, the more rapid discovery of better roadmaps for care.

Read the full story here: bit.ly/3oZCdp7

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