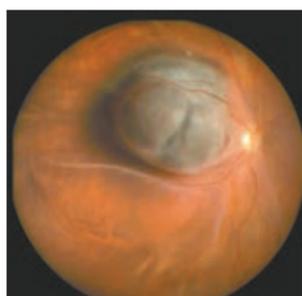


HEALTH



The first patient, Ed Tuggle of Hazleton, Pa., gets a final eye check before a laser activates the drug. ROGER BARONE / Wills Eye Hospital

OCULAR MELANOMA



In the top image, the dark spot in the eye is a harmless freckle, or nevus, formed by pigment-carrying melanocytes. In the lower image, the nevus has grown into a malignant melanoma.

TARGETING EYE CANCER

Wills Eye Hospital is testing a drug it hopes kills the melanoma but saves sight. It is an approach that could hold promise for other cancers as well.

By Marie McCullough
STAFF WRITER

Eradicating cancer without damaging healthy tissue is the Holy Grail of cancer researchers. Wills Eye Hospital in Philadelphia is testing a novel, light-activated drug designed to do just that in the eye, raising hopes for the first ocular melanoma treatment that would preserve patients' vision. Sparing eyesight could encourage earlier detection and treatment, thus reducing the chance of metastases — the deadly spread that killed acclaimed author and neurologist Oliver Sacks in 2015.

"This could be a game-changer if it works," said Carol Shields, an ocular oncologist at Wills Eye and Thomas Jefferson University.

That's still a big if. Shields treated the first patient, a 46-year-old man from Hazleton, Pa., in March. A dozen patients in all will be treated at Wills and five other centers over the next two years — and that's just the first of three clinical trials needed to win approval from the U.S. Food and Drug Administration.

But if Aura Biosciences' experimental therapy vanquishes the rare eye malignancy, it could pave the way for a new class of exquis-

See **EYE CANCER** on G3

BLUE CROSS BROAD STREET RUN

Three stretches to help keep your hips loose

By Ashley B. Greenblatt
FOR THE INQUIRER

Are tight hips keeping you from hitting your stride? With the 38th annual Blue Cross Broad Street Run next Sunday, now is the perfect time to loosen up those stiff hip flexors.

Tend to taut muscles with the following restorative stretches. (You will need a yoga mat or carpeted floor for this circuit.)

High lunge. When there are kinks in the body's kinetic chain, joints fail to operate at full function. This is seen when tight hip flexors contribute to underactive glutes and, as a result, potential lower-back or knee problems.

- ▶ Step back with the right foot, and lower the body into a lunge.

- ▶ Fold forward and place the hands on either side of the left foot, making sure the right leg forms a straight line from the hip to the foot.

- ▶ Lift your chest up and stand tall, bringing the arms into an extended overhead position. Hold for 20 to 30 seconds, then repeat on the opposite side.

Extended side angle. This total body stretch opens the hips, lengthens the hamstrings, and strengthens the core and leg muscles.

- ▶ Stand with the feet shoulder-width apart.

- ▶ Elevate both arms until they are positioned parallel to the floor.

- ▶ Step the right leg out and turn the right foot and thigh out to the side. The foot and shin should form a 90-degree angle.

- ▶ Bend at the right knee and torso until the fingertips of your right hand graze the ground. Hold for 20 to 30 seconds, then repeat this stretch on the opposite side.

Wide-legged child's pose. This gentle stretch opens the legs into a deeper position, which helps improve your overall hip health.

- ▶ Begin on the hands and knees, positioning the knees wider than shoulder width apart. The feet are in plantar flexion, with the top of the foot touching the mat.

- ▶ Take a deep breath, straighten the spine and slowly lower the body so that your torso falls between your knees and your forehead is resting against the mat.

- ▶ Extend your arms and hold for 20 to 30 seconds.

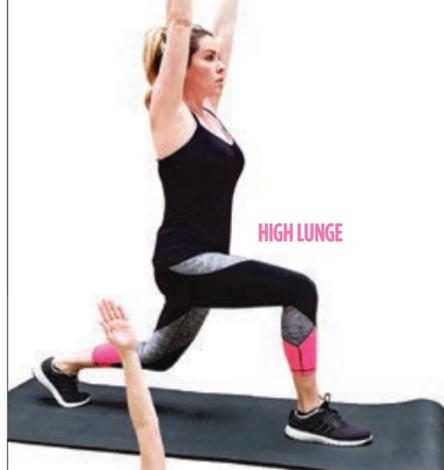
Help your hips now so you can make it through the home stretch later.

Earn it.

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📧 @AshleyBlakeG18

Ashley Greenblatt is a certified personal trainer at the Sporting Club at the Bellevue.



HIGH LUNGE



EXTENDED SIDE ANGLE



WIDE-LEGGED CHILD'S POSE

IF YOU GO The Blue Cross Broad Street Run begins next Sunday at 8 a.m. at North Broad Street and Somerville Avenue. It ends 10 miles south (and all downhill) a quarter-mile inside the Philadelphia Navy Yard. Registration is now closed. www.broadstreetrun.com or 215-683-3594.

Getting a jump on teen substance abuse



Putting a stop to it before it starts is a goal. One method that works is building relationships with students. The DARE program, for instance, has students engaged at William Cramp Elementary in Philadelphia. BRIANNA SPAUSE / Staff Photographer

By Courtenay Harris Bond
FOR THE INQUIRER

Philadelphia Police Officer Wendy McGrody began a recent fifth-grade DARE lesson at Cramp Elementary in the Kensington/Fairhill neighborhood by navigating some tough questions. "If someone has an overdose, can they come back?" one student asked.

"When you overdose, your body technically shuts down, and you can die from it," McGrody answered. "Unfortunately, as you've been noticing in the news, there are a lot of people losing their lives because of heroin."

Javier Rodriguez, 11, said later that this knowledge made him "nervous." Daniel Cruz, 11, said he appreciated the fact that the police officer was "truthful." Emmorie Frazier, also 11, said that McGrody "likes kids. I can tell she likes her job."

See **PREVENTION** on G4

DEMENTIA | G2

Caregivers need to do the adapting.

FIVE QUESTIONS | G7

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Eye cancer

Continued from G1

itely precise cancer therapies. In lab experiments, the drug's artificial viral nanoparticles — derived from groundbreaking technology pioneered at the National Cancer Institute — have been shown to zero in on and bind to many types of malignant cells without harming normal cells.

“We decided to first focus on a cancer with medical need and no other drug option,” Aura's founding CEO, Elisabet de los Pinos, said of ocular melanoma. “But we think that our technology can be applied to other cancers,” including bladder and head and neck.

A freckle in the eye

Many people have a harmless freckle, or nevus, in their eyes, formed by the same pigment-carrying melanocytes that produce freckles in the skin.

Just as in the skin, the eye spots can turn malignant. Sun exposure is not clearly linked to ocular melanoma, but fair skin and light eye color are risk factors.

While the disease is rare, with about 3,100 new diagnoses and 330 deaths in the United States each year, it often goes undiagnosed until it affects vision. Sacks — known for books including *Awakenings* and *The Mind's Eye*, in which he tells the story of his own cancer — said his symptoms hit suddenly, wiping out a triangular chunk of the vision in his right eye.

Sacks decided to have a chip of radioactive iodine embedded in his eye to treat the tumor. It caused severe pain, hallucinations, and vision loss in the center of that eye. The radiation and, later, laser-irradiation, ultimately left that eye blind.

Other ocular melanoma treatments, including proton beams, gamma knife, and surgery to cut out the tumor, also have damaging side effects. If these fail to control the cancer, the eye must be removed.

The first patient, Ed Tuggle, a maintenance supervisor for a food company, never had symptoms. In 2010, his ophthalmologist spotted a tiny freckle during a routine eye exam. Last year, the same doctor saw that the lesion had grown. Although it was still small — about one-tenth of an inch — he sent Tuggle to Wills, where



At Wills Eye Hospital, Drs. Sara Lally (left) and Carol Shields discuss the eye treatment with Ed Tuggle and his wife, Daneen. In all, a dozen patients will be treated at Wills and five other centers over the next two years — the first of three trials needed to win FDA approval. DAVID MAIALETTI / Staff Photographer



A protective lens is put on Tuggle's eye before the light-activated drug treatment. Early signs were positive.

Shields did a battery of tests and concluded that it was malignant.

Patients with small tumors such as Tuggle's often choose monitoring rather than immediate vision-damaging treatment. But holding off can be anxiety-provoking, given that studies indicate up to 40 percent of ocular melanomas metastasize.

When Shields proposed another option — Aura's clinical trial — Tuggle and his wife, Daneen, a nurse, were eager.

The actual procedure in early March was a breeze, Tuggle recalled. Shields numbed his eye, injected the drug, and six hours later, used a laser to activate the light-sensitive dye that is part of the therapy.

His dose was purposely low, intended more to test safety than effectiveness. Patients in the next trial will get multiple, higher doses. Still, a month after Tuggle's injection, Shields

was pleased to find that the tumor had begun to atrophy. Based on animal studies, it takes three or four months to gauge the response.

“I've got a lot of faith,” said Tuggle, who said he has had no side effects. “In my mind, it's already worked.”

Targeting tumors

De los Pinos, a molecular biologist who previously worked in Eli Lilly & Co.'s oncology division, founded Cambridge, Mass.-based Aura in 2009 with the goal of developing a highly targeted approach to cancer treatment.

The first product candidate is built on decades of advances involving, of all things, the human wart virus — human papillomavirus, or HPV.

In the 1980s, certain virulent strains of HPV were shown to cause cervical cancer. In the 1990s, scien-

tists figured out how to make harmless, empty HPV shells — called virus-like particles — to prime the immune system to ward off the real germ. Virus-like particles became the basis of Merck's groundbreaking cervical cancer prevention vaccine, Gardasil, approved in 2006.

More recently, a team at the National Cancer Institute led by John T. Schiller and Douglas R. Lowy deciphered how HPV infects certain cervical cells in the first place. Physically “disrupted” cells overproduce a carbohydrate molecule that normally helps with wound healing. The virus binds to that mole-

cule, called heparan sulfate proteoglycans. Healthy intact cells, meanwhile, resist being bound.

Using animal models, the NCI researchers showed that virus-like particles behaved like the actual virus, using the carbohydrate to attach to tumors. And not just in the cervix. In 2015, Schiller, Lowy, Aura's de los Pinos, and others published a study that showed virus-like particles “can infect a broad range of cancer cell types,” including ovarian and lung, by binding to the carbohydrate.

Since virus-like particles are harmless on their own, Aura's are coupled with a light-sensitive dye. When

activated by laser light, the dye becomes toxic to the tumor cells' membranes and — if all goes as expected — selectively kills the cancer.

Although ocular melanoma is rare, Shields has long urged people to get annual eye checks because finding it early is critical.

Now, she foresees a way to make early detection less dreadful.

“We're hoping this becomes a new alternative in the management of melanoma of the eye,” she said.

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SOLUTION TO THE MEDICAL MYSTERY ON G2

An issue that was worsened by the patient's other medical problems

Her blood and stool cultures were growing salmonella typhimurium, a food-borne bacterium commonly known as salmonella. It typically leads to symptoms such as abdominal pain, diarrhea, fevers, nausea and vomiting.

The patient told us she lived alone, did not have any pets, never ate out, and always prepared her own food. The day before she felt ill, she had eaten baked chicken with a salad.

Upon further questioning, she remarked that the chicken may not have been fully cooked.

In healthy patients, this infection resolves itself without medical intervention. However, in patients with a compromised immune system, salmonella can cause complications, such as an infection in the bloodstream and heart. Our patient's older age, underlying diabetes, and use of steroids made her immune system vulnerable. Her severe fatigue and rapid heart rate were

most likely complications of the salmonella infection.

Our patient cleared the infection quickly with antibiotics. Her echocardiogram did not show any evidence of heart infection, and her diarrhea resolved within a few days.

There are many ways to avoid contracting salmonella. To protect yourself, be sure to:

Cook meat and eggs well.
Wash fruits and vegetables thoroughly.

Wash hands before and after cooking, after using the bathroom and changing diapers or taking out the trash.

Make sure to keep your refrigerator temperature below 40 degrees Fahrenheit.

Avoid drinking unpasteurized milk or dairy products.

In addition, reptiles and amphibians such as turtles, lizards and frogs carry salmonella. It is highly recommended that you wash your hands after handling these animals.

— Gul Madison

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