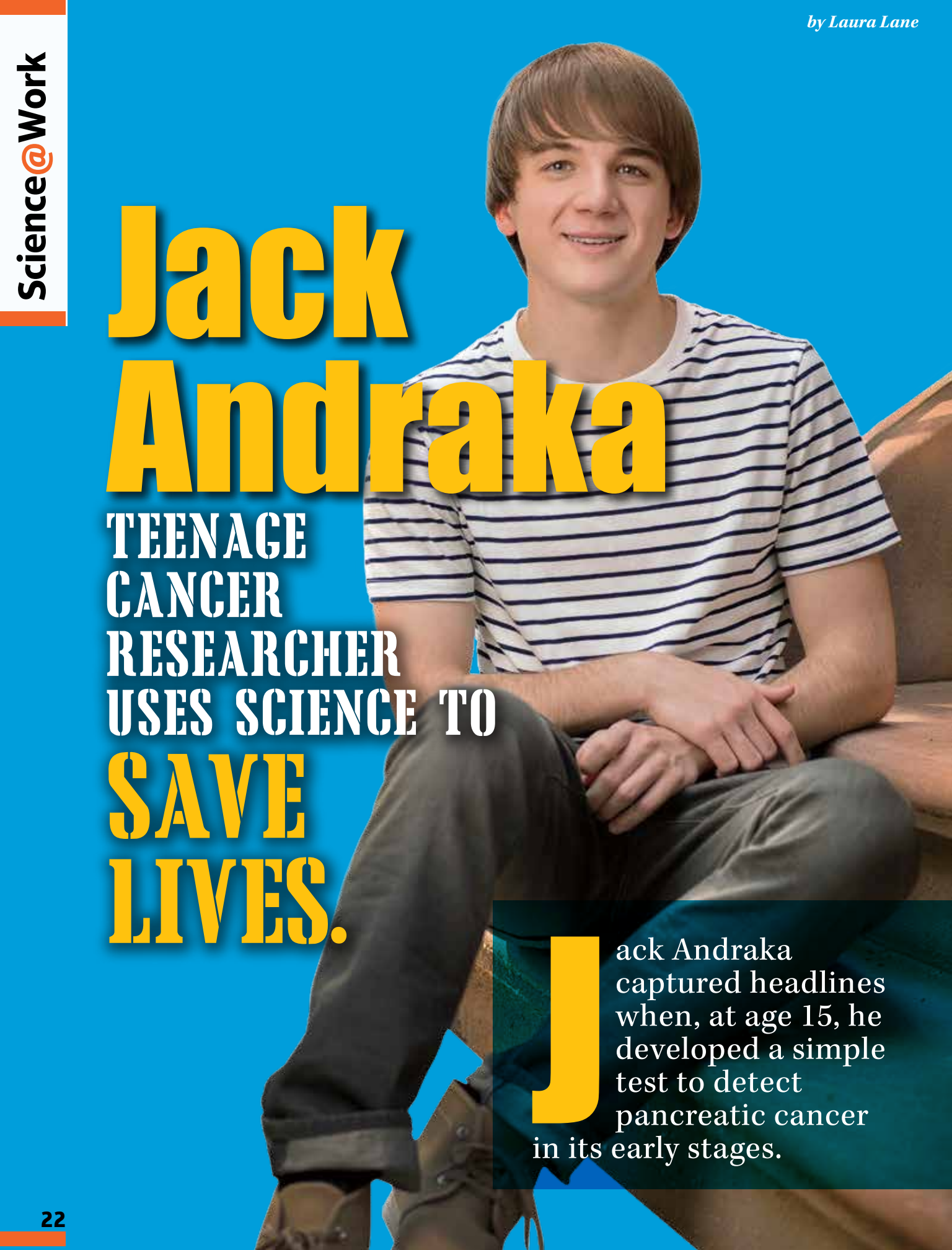
by Laura Lane

Jack Andraka

TEENAGE CANCER RESEARCHER USES SCIENCE TO SAVE LIVES.



Jack Andraka captured headlines when, at age 15, he developed a simple test to detect pancreatic cancer in its early stages.

A cluster of pancreatic cancer cells, magnified

His breakthrough came to him while he was half-listening to his freshman biology teacher's lecture on antibodies that bind to proteins in the blood. At the same time, he was secretly reading an article on carbon nanotubes in *Science* magazine. Jack wondered if he could line a network of carbon nanotubes with specific antibodies and introduce a drop of the patient's blood into the tubal network to detect the presence of pancreatic cancer. His idea focused on mesothelin-specific antibodies, because mesothelin is a protein that the body overproduces when pancreatic cancer attacks.

Jack emailed his idea to 200 leading cancer researchers. He received 199 rejections, but Dr. Anirban Maitra, professor of pathology and oncology at Johns Hopkins School of Medicine, gave Jack a green light.

Seven months later, Jack's test detected mesothelin in the blood of mice bearing pancreatic tumors. He won numerous awards for his groundbreaking work and was First Lady Michelle Obama's personal guest at the 2013 State of the Union address.

Despite his overwhelming success, Jack Andraka's road has not always been easy. In his new memoir, *Breakthrough: How One Teen Innovator Is Changing the World,* Jack shares his experiences of being bullied in school, and he encourages kids to vigorously pursue their dreams. *Muse* recently spoke with him.

Q You went from freshman biology in high school to working in a lab at Johns Hopkins. Did it take you a while to learn the ropes?

A I had never been in a lab before, and I was just like, "Oh my gosh! What am I doing here?" I screwed up so many procedures. Like on the very first day I accidentally sneezed in my culture flask . . . it was awful. Finally, after I screwed up every scientific procedure, I got it right.

Q What do you say to kids who have great ideas but aren't sure where to begin?

A All you have to do is just email a lot of professors. It only takes one yes for it to become a breakthrough. That's actually the subject of my new book. It's all about saying how it only takes one yes or one correct protein in order to have a breakthrough and change the world, so why not let it be you?

Q In *Breakthrough*, you write that middle school was a difficult time for you. You were bullied and felt ostracized. How did you cope with it?

A Actually how I coped through it was just throwing myself into science. I mean I was just bullied terribly for my sexuality as well as being the "math-and-science" kid, so science and math was kind of my safe haven where I could just bury myself in scientific equations and textbooks and be able to just kind of get through it.

Q What do you say to younger kids who are experiencing difficult times too?

A I always tell them it definitely does get better. While it sounds like a cliché, it's totally true. My life now [at age 18] is completely different from what it was back in middle school. I mean you never know what possibilities are ahead of you, so look forward to the future rather than dwelling on the past about mean bullies who are trying to pull you down.

Q What else have you learned along the way?

A One thing I've learned is never give up, because you're always going to be the greatest advocate for your research and ideas, so if you don't believe in it, then who will?

Laura Lane is a freelance writer in Madison, Wisconsin. Her science-loving children think Jack Andraka is the coolest person she has ever interviewed.