

At more colleges, classes on genetics get personal

Ryan J. Foley, Associated Press



IOWA CITY, Iowa (AP)—Bakir Hajdarevic didn't have to study for the most important test in a class last fall. He just had to spit—a lot.

The 19-year-old freshman at the University of Iowa took an honors seminar on personal genetics in which students had the option of sending saliva samples so a testing company could use DNA to unlock some of their most personal health and family secrets. The results would tell them how likely they were to get some forms of cancer, whether they were carriers for genetic diseases, where their ancestors came from, and a trove of other information.

The class, taught at Iowa for the first time, is part of a growing movement in higher education to tackle the rapidly advancing field of personal genetics, which is revolutionizing medicine and raising difficult ethical and privacy questions. The classes are forcing students to decide whether it is better to be ignorant or informed about possible health problems—a decision more Americans will confront as the price of genetic testing plummets and it becomes more popular.

Hajdarevic said he was eager to "find out about all the little mysteries" lurking in his DNA. Sure he was nervous that he might get bad news about cancer risks. But he said the curiosity to learn about himself—and whether he needed to take steps to improve his health—outweighed those concerns.

And so, one day last fall, he found himself in his dorm room struggling to spit into a test tube that he would mail to 23andMe, the Mountain View, Calif., testing company.

"It was like 10 minutes of spitting, literally," he recalled, laughing. "I ran out of spit really quickly. I was spitting for like 15 seconds and then I'd run out of juice."

Such episodes have become more common as similar classes have popped up on college campuses over the past three years with backing from 23andMe, which

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tests for about one million genetic variants possibly linked to tens of thousands of conditions and traits. The company announced in December it had raised \$50 million from investors, and was cutting its price for its personal genotype testing from \$299 to \$99.

23andMe has offered universities discounts on the testing for the classes, along with course materials, and has partnered with dozens of universities and high schools. Stanford University, University of Illinois, the University of Texas and Duke University are some of the schools featuring courses on personal genetics this year, according to its website.

Some of the classes are geared toward medical, nursing and pharmacy students whose careers could be shaped by genetics, while others are for undergraduates hoping to learn more about a field often noted in popular culture. Most of the courses are electives, and students can opt out of the testing if they're uncomfortable. For students whose DNA is tested, the knowledge they glean is intensely personal and wide-ranging, from whether they are a carrier for cystic fibrosis to whether they are likely to be good sprinters.

This is a generation that grew up sharing details of their lives on Facebook, and these students said they were eager to know more about themselves.

"I thought the coolest thing about the whole class was that you would be able to test your own genetics to find out things about yourself. That's what drew me in," said University of Iowa freshman Morgan Weis, who plans a career in nursing. When her results came back, "I told my friends, 'Come look at this, it's so cool'. I was pretty excited about it."

This semester, Stanford professor Stuart Kim is teaching a class for medical students and graduate students in genetics and computer science for a fourth time. He says his students will never forget the class when they learn whether they are sensitive to the blood-thinner Warfarin; that knowledge could be critical if they ever suffer a stroke, because too large or small a dose could kill them. But he dreads the day when testing informs a student: That man who raised you? He's not your biological father.

"That will happen one of these days," he said.

He said 90% of the students have opted to test their own DNA rather than a random person's, and a class survey found that students who did so retained more information.

University of Iowa professor Jeff Murray has been teaching human genetics for 25 years, and developed last fall's class after reading about similar ones elsewhere. He talked through the pros and cons of testing with students, and spent two class periods examining 23andMe's consent form. Murray encouraged students to consult with their parents, through their consent was not required—students were all 18 or older. Only a few opted out of the testing after they or their parents raised concerns.

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"Some people just didn't want to know if they are going to get breast cancer or Alzheimer's," said one of Murray's students, Alexis Boothe, 18. "Personally, I wanted to know."

She said she was not surprised when she learned she's seven times more likely than the average person to develop Crohn's disease, a bowel disorder, since it runs in her family. But now she said she can make sure not to smoke and watch her stress, two triggers. Boothe said she was amused when she learned that she shares northern European ancestors with the singer Jimmy Buffett, and when a third cousin she doesn't know sent her a message through the company.

For Hajdarevic, one surprising result was that he may be lactose intolerant. Although he's eaten dairy without issue his whole life, he can now monitor for symptoms that could develop later. He also learned he's a carrier for the mild form of a rare genetic disease, Alpha 1-antitrypsin deficiency.

But overall, he says, he was relieved.

"I was kind of scared going in, like, 'Oh my God, I might have a high risk factor for some kind of cancer'," he said. "But knock on wood, according to the test, I don't really have much to worry about."

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