This is FRESH AIR. I'm Terry Gross...Our guest David Epstein says scientists are learning a lot more about the role of genetics in athletic performance, and in his new book he explores the subject in a number of ways, like whether big-league hitters have naturally faster reflexes, or whether some people are born with speed... He finds that science now has answers, or at least insights, into all those questions. David Epstein is a senior writer for Sports Illustrated, where he covers sports science, medicine and Olympic sports.

DAVE DAVIES, HOST: David Epstein, welcome to FRESH AIR. Your first chapter is called "Beat by an Underhand Girl."...Tell us what happened here.

DAVID EPSTEIN: Well...that first chapter is about Major League Baseball players who are in an exhibition facing Jennie Finch, who at the time was one of the world's greatest softball pitchers. And frankly, they sort of giggled their way up to bat against her because they figured, well, here comes this ball that's bigger than the one we're used to, here's this woman who's throwing it underhand, tosses, and it takes about the same time to get to them as a major league pitch does.

DAVIES: And they are hitting softballs, not hard balls, right?

EPSTEIN: Indeed, indeed. She was pitching them softballs, exactly. And so they all felt like that would basically tee off on her and take batting practice, hit a couple balls out of the park, and it turned out that they couldn't even hit foul balls off of her, much less get any actual hits. And so it turned into actually a television show where this pitcher Jennie Finch would go around to major league camps and just whiff the best hitters in the world.

DAVIES: Right, and when you say the best hitters in the world - give us some names.

EPSTEIN: Well Albert Pujols, who was the best hitter of a generation, is one of the first people that Jennie faced, and when I talked to Jennie Finch, she actually said that she was afraid that he would hit the ball right back at her. So they thought about putting a net in front of her before she did this. And then within about two pitches, she realized that he would never even get close to the ball. I mean, he was missing by a half a foot sometimes. Some of the major leaguers she was facing, Barry Bonds, they would swing and miss so hard they would spin around.

DAVIES: Right, so the best of the best, and they can't even make contact with her pitches. Now there's a fascinating point that arises from this, and one of them kind of dispels the notion that these big-league hitters are blessed with amazing reflexes. It turns out they aren't, right?

EPSTEIN: That's correct. So going into it, I figured that they would have these sort of super-human reaction speeds because they face 100-mile-per-hour pitches every day. And Jennie Finch's fastballs take exactly the same amount of time as a baseball does. The baseball comes from 60 feet and six inches at 95 miles an hour. Jennie Finch throws from 43 feet at about 65 miles an hour, same exact time, and the ball is bigger, and yet they couldn't hit it at all. It turns out that even the best hitters in the world have perfectly pedestrian reaction times. I actually scored better on a visual reaction time test than Albert Pujols did.

DAVIES: OK, so it's not their reflexes, but there is an explanation, and what is it?

EPSTEIN: They pick up on cues from the player's body before their pitch. The hitters are actually focusing in on the motion of the pitcher's shoulder and the pitcher's torso and hand, and then as soon as the ball's released their eyes are only picking up those anticipatory cues that allow a hitter to hit the ball...basically the reaction time of major league hitters to a visual stimulus is about 200 milliseconds, that's one-fifth of a second - half the total transit time of a fastball. But, it's the same reaction time for teachers, lawyers, and doctors as well. We simply do not have a biological system that is capable of tracking objects moving at that speed. So once the ball is halfway to the hitter, he might as well close his eyes. He's already swinging wherever he's
swinging. So in that first half of the pitch, right when the ball's out of the hand, the hitter has to have picked up cues from the pitcher's body and the movement of the ball to know where it's going ahead of time.

DAVIES: All right, so it's not that they're reacting more quickly, it's that they're reading the picture they're seeing and anticipating where the ball is going to be. It's like it's the software, not the hardware, right?

EPSTEIN: Exactly, exactly. It's - this is a learned perceptual skill, and in fact if you do a digital simulation, which some scientists have done, where you delete the pitcher's shoulder, Albert Pujols becomes me, basically. You have to delete a little more than the shoulder to get to that novice level, but he basically becomes a novice if you do that, and you can do the same thing with tennis players. The problem, when he was facing Jennie Finch, was that he didn't know this. He didn't know how he is able to hit a baseball. And Jennie Finch, her shoulder motion is completely different from a Major League Baseball player. The seams of the ball are completely different. The rotation of the ball is different. And so he was completely stripped of the anticipatory cues that would allow him to seem like he has super-human reflexes.

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