

Jockeying for genetic advantage

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When you buy a racehorse, you pay your money and you take your chances. Top yearlings at Keeneland's 2011 Thoroughbred auction, for instance, averaged nearly \$350,000 and hadn't yet raced a step. Odds are that some of them never will. Now, thanks to a Binghamton University biologist, it's possible to boost the odds of getting a winner with a simple genetic test.

ThoroughGen, founded by Steven Tammariello, associate professor of biological sciences, performs genetic testing on horses. The company offers a basic three-gene test for Thoroughbreds at a cost of \$175. It screens for one gene that is vital to energy production and two tied to muscle function. Energy production is linked to stamina, muscle twitch to speed. But according to Tammariello, this is just the tip of the iceberg, adding that the horse has some 27,000 genes.

Tammariello carts a portable testing device to sales. All he needs is one strand of hair from the horse's mane and if he receives a sample by 4 p.m., he can give clients results the next morning. But the field is so new that it's still fighting pockets of resistance. Still, for many breeders in the Thoroughbred industry, genetic testing is the future. And it's the future for other breeds of horses as well, not just the racers.

"If buyers want to find out what genotype represents the best show jumpers, we can do that," Tammariello says. "I've been contacted by a group that wants to figure out which gene variants are found in top polo ponies. We can look at any variation that anybody wants to examine, in any breed of horse."

Of course, the tests aren't foolproof. The right genes don't guarantee a winner; the wrong genes don't guarantee a loser. But the tests do boost the odds of picking fast horses and avoiding slow ones. Only a small percentage of horses overcome genetic flaws.

Tammariello's research stems from being a lifelong fan of horse racing and it all started when he began to look at a horse genetically in order to get a predictor of its racing potential.

"I assumed that someone would have already done genetic testing on Thoroughbreds," he says. Yet when he did a thorough Internet search to find [genetic-testing](#) services, he came up with none.

"We then began to examine genes that were important to muscle twitch and energy production in multiple breeds – everything from Shires to Thoroughbreds," Tammariello says. "We found a [gene variant](#) that is in high frequency in draft horses that was also found in slow Thoroughbreds. Many of our clients have brood mares and they want to know whether they carry the variant for slower muscle twitch. Slower twitch is useful for muscular power, but not for speed. We can test a group of Thoroughbreds and predict which ones have the worst chance to make it to the track."

This gives breeders a new option. They can continue to breed top horses to top horses, or they can use the tests to figure out which horses might make the best breeding match. That should produce more good horses, though not necessarily faster times.

"Honestly, I don't think speeds will get faster," Tammariello says. "I tell my clients that this is not a way to breed superhorses. What we are trying to do is decrease the number of substandard horses that are produced, and increase the chances of producing sound horses."

According to Tammariello, at this point, there are more Thoroughbreds produced than ever make it to the track. In fact, about one-third of the Thoroughbreds born each year will never race. Some are not sound enough. Some are not fast enough. So there's a whole population of horses that no one knows what to do with. But by genetically testing stallions and mares, breeders may get a better idea which matches are likely to pay off.

"We wanted to improve the chance of horses running well," Tammariello says. "At the same time, we wanted to decrease this surplus of horses. If you have a good idea of what you will get, you may forgo breeding [horses](#) that have a high probability of producing foals that may fail as racehorses."

Provided by Binghamton University

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