

Transcript

Testing Creosote Genetics (no kit)

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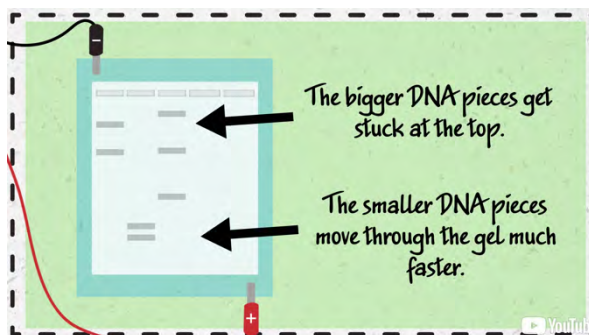
[Kelly] We're going to test the hypothesis that differences in a plant's DNA causes differences in the size of creosote bushes across the southwest. There are several ways that scientists analyze the genetic makeup of plants. One method is called gel electrophoresis, and it's used to compare the DNA of individuals. This is Dr. Michele Nishiguchi. Dr. Nish is a molecular ecologist at the University of California Merced.



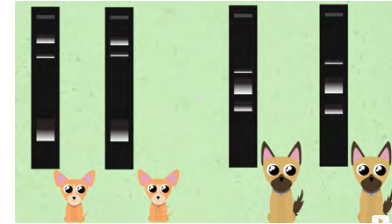
[Dr. Nish] When we want to look at differences between people's DNA, what you have to do is an easy way to do it is you collect that DNA from different individuals and a lot of times people do cheek swabs, and they get the cells in your cheek and they break open those cells. And every one of your cells in your body has your signature DNA. And then what you do is you have to chop it up in little pieces, and oftentimes we use enzymes that actually can do that job. They're called restriction enzymes and they recognize certain DNA sequences and they'll cut up your total long stringy pieces of DNA.

Because DNA is all hooked together, they'll chop it up into little pieces, and then you can run that on a gel, okay. And the way a gel works, it's like a sieve. You got your DNA that you've chopped up in little pieces, okay. Let's say I load my DNA and your DNA and your buddy's DNA next to us, but they're all different, remember? We've used the same enzyme but the genetic signatures are different. And we put them in the gel and we run a current through that because DNA has a negative electric charge. When you run an electrical current through the gel, the negatively charged pieces of DNA are going to be attracted towards the positive electrode at the other end of the gel.

These pieces are all different sizes, okay, and they're going to go through the sieve of the gel and the smaller ones, because they're tiny, they're going to be able to slink through the gel much faster than the larger pieces. So the little pieces are going to go to the bottom of the gel much faster than the bigger pieces, and they're going to be stuck up more close, more close to the top of where you loaded the gel. But remember that my DNA, and your DNA, and your buddy's DNA are all different. So the pieces that were cut might be different sizes. So I'll have a profile, say, you know a couple big pieces and a couple small ones. You might have three or four more bigger pieces, but you know less smaller ones. And your buddy you might have a mixture of all those and so you can say aha look at this is Dr. Nish's, her bands, and this is my bands, and my buddy's bands, and they're all different.



[Kelly] Remember the example with the Chihuahua and German Shepherd puppies? We would expect our gel electrophoresis results for these four dogs to look something like this. Two similar DNA samples from the German Shepherds, and two similar DNA samples from the Chihuahuas.

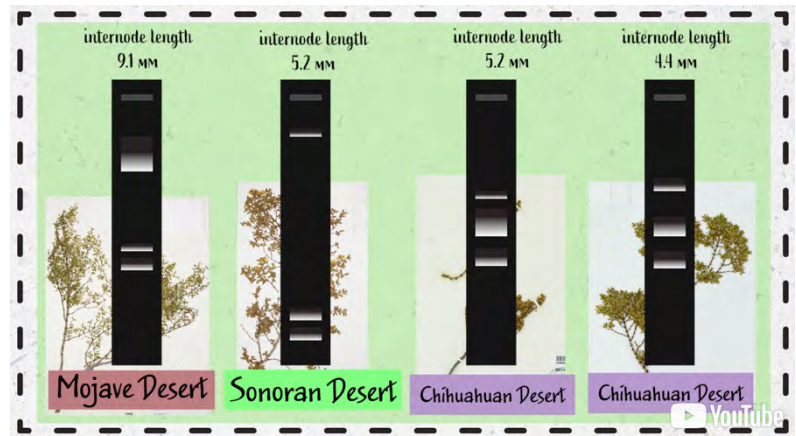


Here's the results of four DNA samples from creosote bushes. Some have similar DNA, and some look very different. Do shrubs that are a similar size also have similar DNA?
Edpuzzle question: Do the shrubs that are the same size also have similar DNA?



We see that these two creosote bushes which have a similar internode length have different DNA. We also know that there's a trend across the deserts. Creosote bushes here in the Chihuahuan desert tend to be smaller. Is there also a difference in the DNA of shrubs from different deserts?

Edpuzzle question: Is there a difference in the DNA of shrubs from different deserts?



Think about what you've just observed and go back to Canvas to answer the questions. Do you think that the differences in the plants can be explained by the differences in their DNA?