

VIDEO TRANSCRIPT

A Look inside the Lab: PCR Machine – Video transcript

A PCR machine, it's called polymerase chain reaction, so it uses a DNA polymerase to amplify a target subsection of DNA into multiple copies.

One of the main advantages, and the reason that we use PCR to begin with, is because typically, when we have a sample of interest that has DNA we want to investigate, normally the amount of DNA present is too small to reliably do tests on. So, it's required that we amplify that DNA before we can really investigate what's going on.

The most basic function of a PCR machine, or thermocycler, is to rapidly raise and lower the temperatures of your sample tubes to allow the polymerase chain reaction to take place.

I'm a microbial biochemist, so I study metabolic pathways in bacteria and the small chemicals that they make in the hosts, in our case humans—in a human host— how they affect us whether for good or bad. And to do that, of course bacteria are very small, so they have very little amounts of DNA associated with each cell. So, when I want to investigate a particular enzyme and how it functions, I need PCR so I can amplify the gene that makes that enzyme. I can then clone it and make as much of that protein as I want.

I use PCR as well to tell different bacteria apart. Primers are used to bind to specific portions of DNA. You can also design a primer that will enable you to tell different bacterial species apart because different bacteria have different DNA, so you can target sites that you know will be different between the different species, so you can tell which is which by which one amplifies.

And I do that a lot, the term for that would be called genotyping. And a lot, like, genotyping PCR is involved with AncestryDNA®; if you want to know what your genome is and who you're related to that requires PCR. Forensics—DNA forensics in police work— didn't exist, really, before PCR, as being able to get minute traces of DNA and amplify enough of it that you're able to distinguish between one person and another that can't happen without PCR. And you can even sequence mammoth DNA that have been dead for thousands of years because we can use PCR, and without that, that would be impossible.