
New Tool for Better Molecular Diagnostics



Rice University scientist David Zhang has developed a tool that can speed up the design of molecular diagnostics based on the specific recognition of DNA and RNA. The method is described in *Nature Communications*.

The new method cuts down the time that is typically required to analyse the thermal behaviours of DNA and RNA strands from months to only a few hours. This tool could enable scientists to build a database of biophysical properties of genetic molecules.

Under the traditional method known as the melting curve analysis, the behaviour of a DNA sequence is studied by first heating and cooling down the molecules at different temperatures to observe their fluorescence. Based on this, the researchers guess the DNA properties at temperatures other than the one measured. These approaches can be inaccurate, as explained by Zhang, because the way a DNA molecule behaves at 75 degrees Celsius may not be the same as it behaves at 37C.

"Our goal is to build a database of good DNA and RNA thermodynamic parameters. Melt curves done in the '80s and '90s are too crude," he said. "Unfortunately, that's what people in diagnostic and life-sciences research use today because there's been no better method." Zhang says that they have developed a tool that can measure exact thermodynamics and that they are studying DNA in the wild rather than observing them in an overheated cage.

Since the current methods take months to find the true state of the DNA, this new system is much quicker because the researchers are able to speed up the reaction up 10,000 or even 100,000-fold. This technique may be more labour-intensive but it is definitely more accurate. Compared to the previous methods, this new method has tenfold lower errors and is able to provide a more accurate rational design of DNA diagnostic reagent. To top it, there is no need for a patient for this to work.

Zhang feels this method holds great promise and could be beneficial to the entire world.

Source: [Rice University](#)

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