Methods for Enriching Microbial Cell-Free DNA in Plasma

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The Invention

UW-Madison researchers have developed a method of enriching microbial DNA in a plasma DNA sample for early detection of microbial infection. Previously, this group found that microbial DNA fragments are shorter in plasma compared to human cell-free DNA, due to high levels of degradation of microbial DNA in plasma. Other researchers have shown that single stranded DNA library preparation can also enrich for microbial DNA fragments in samples because ssDNA preparations are more effective at incorporating the shorter microbial fragments into a sequencing library. The UW-Madison researchers combined these two steps, removing long strands of DNA followed by creating a ssDNA library from the resulting shorter strands of DNA, to develop an enrichment approach. They demonstrated that this method enriches microbial DNA by a mean of 202-fold across 46 patient plasma samples making it much more feasible to use whole genome sequencing for microbial DNA detection.

To provide context, for an average sample analyzed using 10 million sequencing reads, this enrichment approach increases the total microbial DNA reads from 65 reads to 11,000 reads. This improved sensitivity makes this method feasible for clinical use. Being able to do whole genome sequencing on the DNA should allow the researchers to determine the source of the microbial DNA, as well. They are currently working on that last step.

Tech Fields

- Diagnostics & Biomarkers : General diagnostics & biomarkers
- Research Tools : Microbial technologies

For current licensing status, please contact Rafael Diaz at rdiaz@warf.org or 608-960-9847