Abstract

Applications of 3rd generation sequencing in dairy research

The future of studies on complex microbial communities belongs to the 3rd generation sequencing platforms that offer ultra-long reads and direct RNA sequencing.

Today’s absolute leaders in generation of ultra-long reads is Oxford Nanopore Technologies (ONT). ONT has developed the world’s first and only nanopore DNA and RNA sequencer called the MinION. The MinION first released in 2014 is a handheld sequencer in which DNA and RNA single strands are guided through protein-based nanopores across a membrane. Although this technology is still in its rapid development stage, in the last two years a massive progress has been made regarding error rate and throughput stability. It turned out that today Nanopore sequencing is the most optimal choice in terms of price ($1000 for MinION platform and <$100/Gb) computing requirements, relatively low wet-lab work load, time of data generation and broad spectrum of applications (DNA and RNA sequencing, methylations analysis). Since 2015, I have been a fervent users of early-access ONT platforms. We have recently developed a method for bulk, rapid and highly cost-effective way to type bacteria down to species and strain level. Join my stop to see how to sequence bacteria in real-time using Oxford Nanopore Technologies.