

## Enhancing Clinical Microbial Diagnostics with *MagPurix*<sup>®</sup> technology

### Reliable DNA extraction for Nanopore 16S Sequencing

#### Executive Summary

Standardizing 16S rRNA long-read sequencing for clinical diagnostics requires a DNA extraction method that delivers high yield, purity, and consistency across diverse bacterial species. The **MagPurix**<sup>®</sup> technology demonstrated excellent extraction efficiency, unbiased microbial recovery, and compatibility with Oxford Nanopore workflows in a recent *Frontiers in Cellular and Infection Microbiology* publication (Butler et al., 2025). The study confirmed that MagPurix<sup>®</sup> technology provided reproducible and balanced microbial DNA suitable for nanopore sequencing—without inhibitory artifacts seen in other extraction methods.

#### Key Findings

##### 1. Reliable Extraction Across Diverse Microbes

Using the WHO Whole-Cell Gut Reference Reagent (20 species in equal abundance), MagPurix<sup>®</sup> technology achieved 81% sensitivity (vs. 75% for Qiagen EZ2 kits), no false positives, and superior detection of *Parabacteroides distasonis* — missed by all other extraction kits.

##### 2. Consistent Yield and Sequencing Compatibility

MagPurix<sup>®</sup> technology and the Viral/Pathogen kit B, produced high-quality DNA yields (mean 361 ng per extract) with optimal purity ( $A_{260}/A_{280} \geq 1.7$ ). Unlike some extraction systems containing sodium azide, MagPurix<sup>®</sup> extracts were fully compatible with Oxford Nanopore sequencing without the need for additional purification.

##### 3. Improved Diagnostic Performance

The optimized ONT workflow (using DNA from MagPurix<sup>®</sup> technology) detected bacterial DNA in all previously 16S-PCR-negative clinical samples, including pus, joint fluid, and heart valve specimens that had failed conventional culture or Sanger sequencing.

##### 4. Workflow Advantages

- Automated up-to 24-sample throughput
- Hands-off magnetic bead purification minimizes variability
- Extraction-to-sequencing within the same day
- Extraction performance Balanced yield across Gram+ / Gram– species
- Sequencing compatibility No inhibitory buffers; ready for ONT workflows

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- Clinical relevance Proven detection in culture-negative samples
  - Workflow efficiency Automated magnetic bead extraction, 50 µL elution
  - Quality & accreditation Used in UK NHS ISO 15189 validation framework

## Conclusion

The study by Butler et al. validates MagPurix® technology as a robust and reliable extraction system for nanopore-based 16S sequencing in clinical diagnostics. By ensuring unbiased DNA recovery and sequencing compatibility, *MagPurix® technology* empowers laboratories to confidently adopt long-read sequencing for culture-negative infection diagnosis—improving accuracy, reducing turnaround time, and supporting better patient outcomes.

## Reference

Butler, I., et al. (2025). Standardization of 16S rRNA gene sequencing using nanopore long-read sequencing technology for clinical diagnosis of culture-negative infections. *Frontiers in Cellular and Infection Microbiology*, 15, 1517208. <https://doi.org/10.3389/fcimb.2025.1517208>