TECHNOLOGY SUMMARY

A novel repair method for FFPE-induced bacterial DNA damage

VALUE PROPOSITION

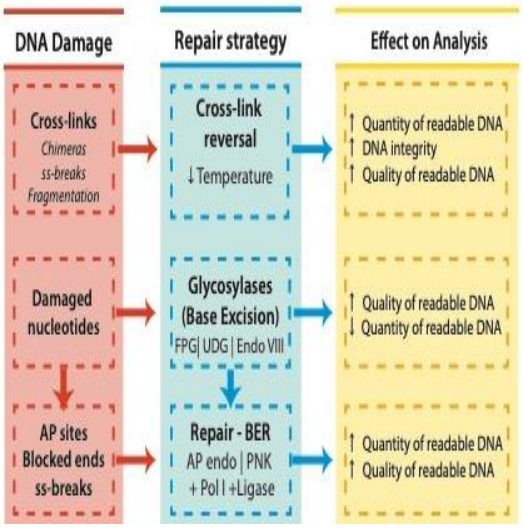
Formalin-fixed, paraffin-embedded (FFPE) specimens have huge potential as source material in the field of human microbiome research. However, FFPE processing induces DNA damage which negatively affects DNA sequencing outputs which is a significant hurdle for microbiome studies. This technology is a validated method for repair of FFPE-damaged DNA to increase the fidelity of DNA studies (including microbiome analyses).

THE TECHNOLOGY

FFPE samples are being recognised as viable source material for microbiome analyses. The quantity and quality of DNA obtained from an FFPE block is highly influenced by the fixation and embedding process of the FFPE material and the method for DNA purification and downstream analysis. This represents a serious problem for microbiome studies, where DNA template is often minimal and sequences studied are not limited to one genome.

Our technology is a validated strategy that improves the sequencing quality of bacterial and mammalian FFPE DNA. The steps can be incorporated into existing DNA extraction procedures/kits. Two strategies to reduce FFPE DNA damage were devised - an optimised de-crosslinking procedure reducing sequence artefacts generated by high-temperature incubation, and secondly, an *in vitro* reconstitution of the base excision repair pathway. As evidenced by whole genome sequencing, quantitative PCR, high resolution melt analysis, and Sanger sequencing, treatment with these strategies significantly increases fragment length, reduces the appearance of sequence artefacts, and improves the sequencing readability of bacterial & mammalian FFPE DNA.

GRAPHIC



FIELDS OF APPLICATION

FFPE clinical sample analysis.

PATENT STATUS

Provisional patent filed GB2010373.5

STATUS/ DEVELOPMENT OBJECTIVES

The method for repair of FFPE-damaged DNA to increase the fidelity of DNA studies has been validated and published https://doi.org/10.1093/biomethods/bpaa015

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