Problock: A biological standard for formalin-fixed samples

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Abstract

Formalin-fixed, paraffin-embedded (FFPE) tissue is the gold standard for pathology tissue storage, making FFPE tissue libraries rich repositories for identifying and analyzing the bacterial microbiomes that stretch across the human body. Unfortunately, various facets of the FFPE process can compromise the integrity of tissue for this type of analysis, including DNA damage, susceptibility to contamination, and the lack of suitable DNA extraction methods. A new study proposes a system called Protoblock for standardizing and optimizing FFPE tissue-based research. A Protoblock is generated by embedding a known number of fixed cells in a molded agar matrix. After the agar solidifies, the block is processed following routine FFPE protocols and verified by microscopy. Experiments confirmed the quality and condition of DNA purified from Protoblocks, revealing important calibration information, such as how DNA damage evolves over fixation time, and how host DNA and sample prep method might bias bacterial analysis. While processing of FFPE tissue for microbiome research requires several more improvements, the Protoblock system represents an important step in the right direction.