MicroRNA Profiling of FFPE Sample Types

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Archiving histological tissue samples by formalin-fixing and embedding in paraffin blocks has been a routine practice for medical and research institutions for many years and large collections of these samples now exist throughout the world. Estimates of sample numbers range from 300-400 million in the US alone covering virtually all known diseases. This number may be growing by tens of millions of samples per year.¹

What makes these samples of particular interest is the rich patient data and medical history associated with each sample. Because the samples are so well annotated, they are proving to be a valuable source of information for retrospective clinical studies of human diseases.

Initially, it was unclear if the nucleic acids would remain in sufficient condition to provide robust analytical results due to the adverse effects of formalin fixation. But studies have shown that although degradation to large RNA can occur, in general, small RNAs are unaffected by the fixation process². Indeed there are now a multitude of commercially available kits and methods for extracting microRNA from FFPE prepared tissue samples.³

Furthermore, it has been demonstrated in multiple studies that miRNA is minimally affected by FFPE treatment and microRNA extracted from FFPE samples provides reliable expression levels by direct comparison with frozen tissue samples.⁴⁵⁶⁷⁸ MicroRNA expression data was found to be reliable for FFPE samples stored for up to 30 years.⁹

Kits for extraction of microRNA from FFPE prepared tissue samples:

1. RecoverAll Total Nucleic Acid Isolation Kit for FFPE – Ambion
2. miRNeasy FFPE Kit (50) – Qiagen
3. FFPE RNA Purification Kit – Norgen

4. LC Sciences internal research.