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Early cancer detection by XNA technology

Michael J Powell
PhD.C.Chem, MRSC, DiaCarta Inc., USA

Scientists at DiaCarta have developed an innovative xenonucleic acid molecular clamp technology or XNA technology to address the sensitivity needs for tumor gene mutation and other important gene mutations in liquid biopsy and FFPE samples. XNA technology uses proprietary designed XNA oligomers with modified backbones that hybridize target DNA sequences of interest by Watson-Crick base pairing. When the sequence is a complete match, XNAs hybridize tightly to the DNA target sequences, blocking strand elongation by DNA polymerase in the PCR reaction. However, when a mutation is present in the target sequence, the mismatch leads to instability of the XNA oligomer: DNA duplex, allowing strand elongation by DNA polymerase. As a result, an only target sequence containing mutations is selected for amplification and wild-type sequence, despite being present in much larger DNA amounts/ copies, will not be amplified. Since XNA oligomers are not recognized by DNA polymerases, they cannot serve as primers in the subsequent real-time PCR reactions.XNA molecular clamps assays are highly sensitive using nucleic acids obtained from liquid biopsy or tumor tissue biopsy (FFPE) samples. The limit of detection (LOD) can reach as low as 0.1% (7 or 8 copies of mutant DNA) in 5 ng of ctDNA, roughly equivalent to 2 mL of blood from a patient. Since the presence of high levels of circulating cell-free mutant tumor DNA (ctDNA) and exosome derived nucleic acids have been found to be associated with poor survival in multiple cancers and dynamic monitoring of the level can be used as a predictive factor for cancer treatment.

Biography

Michael J Powell is a highly recognized scientific and business leader with more than 25 year's experience in R&D, technology, and business and corporate development. He has extensive knowledge and experience in the fields of molecular diagnostic assay research and development, qPCR and other nucleic acid amplification technologies, and automated instrumentation platforms. He has published many research papers in leading scientific journals and holds more than 40 patents and patent-pending applications. He received his PhD in medicinal organic chemistry from Loughborough University, Loughborough, UK and also pursued postdoctoral research and a teaching fellowship from the University of Nottingham, Nottingham, UK. Mike was also a postdoctoral industrial research fellow at the University of Oxford, UK and was instrumental in developing the amperometric glucose sensing technology that was the basis of Medisense, Inc. which was acquired by Abbott Labs for $950M.

mpowell@diacarta.com

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