Intellectual Property
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City of Hope
NATIONAL MEDICAL CENTER AND
BECKMAN RESEARCH INSTITUTE

Alternative to PCR

DESCRIPTION

Pyrophosphorolysis Activated Polymerization (PAP-A) is a powerful technology that may be the foundation for the next generation of tools to study DNA. In PAP-A, two distinct steps (pyrophosphorolysis and polymerization) are serially coupled by the DNA polymerase enzyme using an activating oligonucleotide. PAP-A can be applied to exponential amplification or linear amplification. Unlike traditional PCR, PAP-A produces an exceptionally high level of selectivity and specificity. In PAP-A, nonspecific amplification requires two extremely rare events to occur (mismatch pyrophosphorolysis and nucleotide misincorporation); thus, PAP-A is nearly never incorrect. The extraordinary fidelity (~10^{-9}) of PAP-A translates to increased accuracy and reliability for detecting extremely rare signals (even a single copy) amidst a high degree of noise.

KEY ASPECTS

- Novel and sensitive enzymatic approach to detect genetic mutations
- Orders of magnitude more specific and selective than PCR; and resistant to false-priming
- Ideally suited to detecting rare (low abundance) signals
- Potentially useful for early detection or new cancers or relapse, high fidelity genome sequencing, monitoring transplant engraftment/rejection and forensic applications, among many other fields.

INTELLECTUAL PROPERTY

Title	Patent Number	Origin	Issued
Pyrophosphorolysis activated polymerization (PAP)	7033763 7238480 2003/241401 7504221 4500673	US US AU US JP	4/25/2006 7/3/2007 11/8/2007 3/17/2009 4/23/2010
Pyrophosphorolysis activated polymerization (PAP): application to allele-specific amplification and nucleic acid sequence determination	6534269 1259646 B1 2001/241621 B2	US EU AU	3/18/2003 9/2/2009
Serial coupling of restriction cleavage and extension for nucleic acid amplification	7105298	US	9/12/2006

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