

## Sequence Enabled Enzyme Reassembly (SEER) System

**Background:** Zinc finger proteins, the most abundant and diverse binding motifs, recognize a wide range of nucleic acid targets. Each zinc finger domain can recognize a 3-base tract, thus a 3-finger protein can recognize a tract of 9 base pairs with high affinity. With this technology, University of Arizona researchers have generated novel constructs of zinc finger binding protein modules with reporters such as protein complementation assays (PCA) to detect specific nucleic acid sites of interest.

### Applications:

- *Recognition of specific nucleic acid sequences unique to pathogens*
- *Detection of DNA accessibility and the presence of unusual DNA structures such as G-quadruplex and DNA modifications such as methylation*
- *Identification of such sequences can be a marker for cancer, age-related and genetic diseases*

### Advantages:

- *SEER can be applied to the detection of any DNA sequence of interest ranging in use from identification of pathogens such as anthrax to the presence of HIV within a living cell*
- *Precise recognition of a 9-base pair tract enabling DNA sequence recognition with high affinity and specificity*
- *Does not require bulky equipment or sensitive instrumentation enabling presentation in a kit for quick genotype detection in the field where other systems are impractical*

**The Technology:** The Sequence Enabled Enzyme Reassembly (SEER) system utilizes a pair of specific hybrid proteins containing zinc finger binding domains or modules that bind the nucleic acid. These hybrid proteins include a PCA system fragment, that when proximally located by zinc finger modules binding to the nucleic acid generates the functional PCA reporter.

Detection of the signal from reconstituted reporter gene can be detected by fluorescence or color metric detection systems. This technology is the first example of nucleic acid dependent reassembly of protein fragments that can be applied to detection systems.

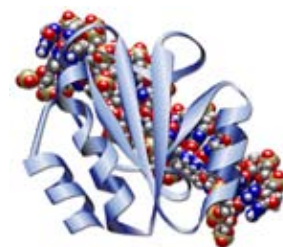
**Lead Investigator:** David J. Segal Ph.D., Indraneel Ghosh Ph.D., et al., University of Arizona

**Recent Publication:** Ooi, A.T., et al, "Sequence-Enabled Reassembly of b-Lactamase (SEER-LAC): A Sensitive Method for the Detection of Double-Stranded DNA". *Biochemistry* (in press)

**Status:** PPA filed; Ready for Licensing

**Refer to Case # UA05-076**

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