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Nanoscale Process to Generate Reagents Selective for Individual Protein Variants

Protein variants have been associated with many different and devastating human diseases including Alzheimer's and Parkinson's diseases, diabetes and cancer. Unfortunately, assessment of these protein variants is technologically difficult, primarily owing to two factors: a lack of binding partners that can distinguish between protein isoforms (which may only differ slightly from the parent form) and the difficulty in separating and purifying the variants (which typically occur only at trace levels in vivo). Novel separation techniques coupled with novel molecular recognition protocols are needed to sufficiently separate and distinguish these protein variants.

Researchers at Arizona State University have developed a novel device and method to separate and concentrate protein variants at a microliter scale and to create novel binding partners with exquisite selectivity for the individual protein isoforms using only picograms of target material. Moreover, the entire process, from protein isolation to generating antibody based binding partners, utilizes minimal amounts of material.

This technology enables the generation of highly selective binding partners against various different protein variants. It allows for detection of different states including healthy vs diseased, aggressive vs. non-aggressive disease, infectious vs. non-infectious virus or bacteria, weaponized vs. non-weaponized viruses or bacteria and so on.

Potential Applications

- Studying the molecular basis of disease progression
- Developing highly selective binding reagents to protein isoforms
 - Binding reagents to distinguish between weaponized and non-weaponized viruses or bacteria
 - Binding reagents to distinguish between infectious and non-infectious viruses or bacteria
 - Binding reagents to distinguish between aggressive and non-aggressive disease states

Benefits and Advantages

- Utilizes only trace amounts of target material
- Can separate different protein variants from a complex source on a nanoscale
- Can generate binding partners with high specificity for the protein variants on a nanoscale
- Binding partners are generated without the use of animals

For more information about the inventor(s) and their research, please see [Dr. Sierks' directory webpage](#)[Dr. Sierks' laboratory webpage](#) [Dr. Hayes' departmental webpage](#)[Dr. Hayes' research webpage](#)