NORTHERN ARIZONA UNIVERSITY

Center for Health Equity Research

Southwest Health Equity Research Collaborative
PILOT PROJECT PROGRAM

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Project Title: "Multivalent Display of HPV Antigens using Self-Assembling Peptides"

Proposal Abstract:

Since the introduction of the first HPV vaccine in 2006, the prevalence of certain HPV types declined among women from the general population aged 14-24 years. The currently available HPV vaccine (Gardasil® 9) was developed using virus-like particles (VLPs). It prevents against nine of the over 150 HPV types; two that cause warts (types 6, 11) and seven that can cause cancer (types 16, 18, 31, 33, 45, 52, and 58). While effective, the HPV vaccine have certain limitations. For example, they require extensive purification protocols, two doses, and refrigeration. Therefore, research efforts continue to strive toward finding next generation vaccines that have strong immunogenicity and cost effective.

Recently, short synthetic self-assembled peptides showed promise as a vaccine platform. These peptides, similar to VLPs, spontaneously assemble into stable ordered amyloid-like fibrils. Unlike VLPs, the fibrils are extremely robust at varying temperatures, pH, and solvents. The self-assembled fibrils are also significantly larger than the small spherical VLPs. Thus, the fibrils allow for potential increased immunogenicity and cost effectiveness.

We hypothesize that self-assembled fibrils displaying HPV antigens will produce strong immune responses due to the geometrical and multivalent display of peptide antigens along the fibril. To test this hypothesis, we will synthesize previously identified HPV antigens that will be chemically conjugated to the self-assembling peptides fibrils. Immune responses will be assessed using a common murine model. Potential vaccines candidates will be further assessed via an HPV challenge model in mice.