THREAT AGENT DEFEAT MODELING AND TESTING USING WMD SIMULANTS

A Plug & Play Platform For Peptoid-nanoparticle Conjugates Tuned For Chemical And Biological Warfare Agent Detection And Mitigation

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Since their discovery over a decade ago, peptoid nanosheets have been investigated for use in a diverse range of applications, from anti-fouling coatings to biomimetic membranes. The peptoid sequences that form nanosheets are versatile in that they can be engineered to incorporate attachment points for proteins, small molecules, and/or fluorescence dyes, and can form single or bilayer membranes. We present here an application of peptoid nanosheets incorporating ligand ("tags") such as peptides, displayed on loops and/or terminii to capture threat-reducing nanoparticles (NPs) which have been conjugated with a matching chemical functionality or protein ("catchers"). The tag/catcher system enables the creation of a modular plug and play library of membrane-NP systems. The ultimate goal of the research is to develop coatable membranes for field work, in which specific and tailored NPs can be swapped in rapidly in response to evolving threats. We will describe recent progress in functional NP synthesis, sizing, and stabilization in aqueous buffer, and conjugation with tag proteins. We will also present recent results on attaching NPs to peptoid nanosheets using several different protein tag/catcher systems.