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Shark IgNAR-derived binding domains as potential diagnostic and therapeutic agents

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Abstract

Many of the most successful drugs generated in recent years are based upon monoclonal antibodies (mAbs). However, for some therapeutic and diagnostic applications mAbs are far from ideal; for example, while their relatively large size and inherent receptor binding aids their longevity in vivo it can also limit their tissue penetration. Further, their structural complexity makes them expensive to produce and prone to denaturation in non-physiological environments. Thus, researchers have been searching for alternative antigen-binding molecules that can be utilized in situations where mAbs are suboptimal tools. One potential source currently being explored are the shark-derived binding domains known as VNARs. Despite their small size VNARs can bind antigens with high specificity and high affinity. Combined with their propensity to bind epitopes that are inaccessible to conventional mAbs, and their ability to resist denaturation, VNARs are an emerging prospect for use in therapeutic, diagnostic, and biotechnological applications.

Keywords: shark, antibody, immunoglobulin, IgNAR, nanobody