Antibody Cross-Reactivity in Antivenom Research

Antivenom cross-reactivity has been investigated for decades to determine which antivenoms can be used to treat snakebite envenomings from different snake species. Traditionally, the methods used for analyzing cross-reactivity have been immunodiffusion, immunoblotting, enzyme-linked immunosorbent assay (ELISA), enzymatic assays, and in vivo neutralization studies. In recent years, new methods for determination of cross-reactivity have emerged, including surface plasmon resonance, antivenomics, and high-density peptide microarray technology. Antivenomics involves a top-down assessment of the toxin-binding capacities of antivenoms, whereas high-density peptide microarray technology may be harnessed to provide in-depth knowledge on which toxin epitopes are recognized by antivenoms. This review provides an overview of both the classical and new methods used to investigate antivenom cross-reactivity, the advantages and disadvantages of each method, and examples of studies using the methods. A special focus is given to antivenomics and high-density peptide microarray technology as these high-throughput methods have recently been introduced in this field and may enable more detailed assessments of antivenom cross-reactivity.
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