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Polyvalent Recognition of Biopolymers:The Design of Potent Inhibitors of Anthrax Toxin

RAVI KANE, Rensselaer Polytechnic Institute

Polyvalency – the simultaneous binding of multiple ligands on one entity to multiple receptors on another – is a phenomenon that is ubiquitous in nature. We are using a biomimetic approach, inspired by polyvalency, to design potent inhibitors of anthrax toxin. Since the major symptoms and death from anthrax are due primarily to the action of anthrax toxin, the toxin is a prime target for therapeutic intervention. We describe the design of potent polyvalent anthrax toxin inhibitors, and will discuss the role of pattern matching in polyvalent recognition. Pattern-matched polyvalent inhibitors can neutralize anthrax toxin in vivo, and may enable the successful treatment of anthrax during the later stages of the disease, when antibiotic treatment is ineffective.