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High-throughput selection of pathogen specific antimicrobials from random sequence peptide microarrays

Antimicrobial resistance is one of the biggest healthcare challenges. Overuse and misuse of conventional antibiotics along with their broad spectra have triggered development of multi-drug resistant superbugs.

Researchers at Arizona State University have developed a novel process for producing alternative antimicrobial agents specific for any particular bacterial pathogen. The bacteria of interest are applied to an array of 10,000 random sequence peptides; combination of intracellular staining and membrane labeling of bacterial cells allows distinguishing between binding and lytic peptides directly from the array; active peptides are screened for specificity. This permits design of antibacterial synthetic antibodies that are targeted to specific bacteria without the broad toxicity of naturally-occurring antibacterial peptides.

This process has been demonstrated for E. coli O111:B4, Pseudomonas aeruginosa, Staphylococcus aureus, Streptococcus mutans, and Bacilus subtilis, but this system is generalizable to create antimicrobial agents with defined characteristics for any pathogen (bacterial, protozoan, fungal, yeast).

Potential Applications

- High-throughput selection of antibacterial candidates specific for any particular pathogen
- Drug discovery
- Developing a treatment for antibiotic-resistant superbugs
- Developing a treatment for other pathogens like protozoa, fungi, yeast