

Antifungal Patent Awarded to USU Inventors

Takemoto's newly patented invention represents a novel and necessary advancement in the global fight against fungal pathogens.

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USU professors Tom Chang and Jon Takemoto have been awarded a patent for their invention of kanamycin derivatives — an innovation in antifungal therapeutics with far-reaching implications for global health and agriculture.

Kanamycins were once valued for their broad-spectrum antibacterial efficacy, but widespread bacterial resistance has significantly diminished their utility. Drs. Chang and Takemoto have repurposed them, developing new derivatives with enhanced antifungal and selective antibacterial properties.

The invention is particularly timely given the rise of the persistent, drug-resistant, and deadly *Candida auris* strain, which has been designated an “urgent threat” by the Centers for Disease Control and Prevention, causing devastating outbreaks in hospitals and long-term care facilities. A documented surge in *C. auris* cases has intensified the demand for broad-spectrum antifungal agents not limited by strain specificity.

The lead molecule, KI07, is synthesized in a single step using abundant, natural starting materials, yielding a compound effective against a broad spectrum of drug-resistant fungi while significantly lowering production costs. It features a long, linear alkyl chain that helps it permeabilize fungal cell membranes, and can be fine-tuned by adjusting exposure time and concentration, reducing the risk of resistance development.

KI07 can be applied in a variety of ways:

- **Therapeutic:** Treatment of resistant fungal infections
- **Diagnostic:** Real-time differentiation between bacterial and fungal infections
- **Agricultural:** A natural, low-cost fungicide for managing plant diseases.

With its broad-spectrum efficacy, low-cost production, and versatility across multiple sectors, Chang and