# Antimicrobial Activity of Basidiomycetes

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The number of cases of microbial infections caused by multidrug-resistant organisms has recently been increasing. Concurrently, development of new antimicrobial agents appears to have reached an impasse, owing to the difficulty in finding new chemical structures through exploration of traditional sources such as Actinomycetes (*Streptomyces*), *Penicillium*, and *Cephalosporium*. In this regard, mushrooms, plants, and marine microorganisms have contributed to the production of a variety of chemically and biologically significant secondary metabolites. We are studying primarily the antimicrobial activity of substances isolated from Basidiomycetes. Species of this class that we are studying are: *Pycnoporus sanguineus* (L.) Murr., *Ganoderma applanatum* (Pers.) Pat., *G. australe* (Fr.) Pat., *G. annulare* (Lloyd) Boedijn, *G. subamboinense* Henn., and *Rigidoporus lineatus* (Pers.) Ryv. The following substances were isolated from these species: (1) pigments: cinnabarin, cinnabarinic acid, and tramesanguin (2-amino-phenozaxin-3-one); (2) sterols: 5α-ergost-7en-3β-ol, 5α-ergost-7,22-dien-3β-ol, and 5,8-epidioxy-5α,8α-ergost-6,22-dien-3β-ol, and (3) triterpenes: applanoxidic acids, ganoderic acids, and ganoderanic acids. Various methods were used to detect the antibacterial activity of these substances. The extraction and purification process was biomonitored using bioautography and diffusion analyses. The isolated substances were tested using macro- and microdilution techniques. The substances isolated have been tested against Gram-positive (*Bacillus cereus, Corynebacterium diphtheriae, Staphylococcus aureus, S. saprophyticus* and *Streptococcus pyogenes*) and Gram-negative bacteria (*Escherichia coli* and *Pseudomonas aeruginosa*). A large proportion of these substances were active against Gram-positive bacteria, while few were active against Gram-negatives. The inhibitory concentration of the bioactive substances for Gram-positive bacteria ranged from 0.003 to 4 mg/ml, while the range for Gram-negative bacteria was 0.1–4 mg/ml. Those substances, which inhibited growth at concentrations <0.01 mg/ml, offer the best prospects for new drug development.

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