



This occasional section within the journal surveys visions and achievements, often not on the main track of the developing biomedical sciences, but all relating to discoveries and developments of medicinal – both ancient and modern. What they have in common, in one way or another, is providing further background and glances around the edges of the core discipline of pharmacognosy, as it has been and continues to evolve within our times.

The Potential of Cyanobacterial Compounds as Antibiotics

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A recent study in *Molecules* comprehensively reviews cyanobacterial chemistry and the compounds that have antibacterial activity.¹ This paper addresses a significant gap in current antimicrobial research by shedding light on the relatively underexplored potential of cyanobacterial compounds as sources of novel antibiotics. In a time when the rise of drug-resistant pathogens presents a significant global health challenge,² this paper highlights the importance of diversifying the sources of antimicrobial agents, offering fresh perspectives and potential solutions. The authors emphasize the need for further investigation, and encourage continued exploration and highlight priority areas in this promising area of study.

This study It not only reviews the known phytochemistry of cyanobacteria, but also provides a thorough evaluation of the effectiveness of these compounds against various types of pathogens, including bacteria, fungi, protozoa, and viruses, thereby broadening the scope of potential applications for

cyanobacterial-derived compounds and showcasing their versatility. Furthermore, the emphasis on the safety of these compounds and their potential for drug development is a significant contribution to the field, as it hints at the possibility of developing novel, low-toxicity antimicrobial agents. Overall, this paper is a valuable resource that not only consolidates existing knowledge but also serves as a catalyst for future research in the field of antimicrobial therapies, offering a promising avenue for the discovery of new and effective drugs in the fight against drug-resistant pathogens.

REFERENCE

1. Cock IE, Cheesman MJ. A review of the antimicrobial properties of cyanobacterial natural products. *Molecules*. 2023;28(20):7172. doi: 10.3390/molecules28207127, PMID 37894609.
2. Cheesman MJ, Ilanko A, Blonk B, Cock IE. Developing new antimicrobial therapies: are synergistic combinations of plant extracts/compounds with conventional antibiotics the solution? *Pharmacogn Rev*. 2017;11(22):57-72. doi: 10.4103/phrev.phrev_21_17, PMID 28989242.



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***Cannabis sativa* L. Compounds may Prevent SARS-CoV-2 Infections**

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Whilst the development of effective and widely available SARS-CoV-2 vaccines have greatly reduced the spread and adverse effects of the COVID-19 respiratory disease, this disease continues to cause morbidities and mortalities, particularly in elderly and/or immunocompromised people. Additionally, the continually evolving nature of viruses results in new viral strains, some of which may evade the actions of the current vaccines. Therefore, new chemotherapies are needed to reduce the symptoms of this disease and thereby reduce mortalities and the further spread of this disease. Several natural therapeutics that may be useful in conjunction with vaccines has already been identified and have previously been highlighted in this journal.¹⁻⁴

A recent study published in the Journal of Natural Products has reported that cannabinoid acids isolated from *Cannabis sativa* L. have potential to prevent SARS-CoV-2 infections, and to treat the illness once the disease is established.⁵ That study utilised affinity selection-mass spectrometry to search for botanical ligands to the viral spike protein. The study determined that the

cannabiooid acids had both allosteric and orthosteric ligand effects. Furthermore, these compounds prevented the infection of human epithelial cells *in vitro* by SARS-CoV-2. Interestingly, two of the tested compounds (cannabigerolic acid and cannabidiolic acid) were equally effective against an α variant (B.1.1.7) and a β variant (B.1.351).

REFERENCE

1. Alcorn SR. The 2020 coronavirus (COVID-19) global pandemic, a call to arms to pharmacognosy researchers – plant-based antiviral approaches. *Pharmacogn Commun.* 2021;11(1):2-8. doi: 10.5530/pc.2021.1.2.
2. Cock IE. A recent study identified three marine natural products with potent SARS-CoV-2 inhibitory activity. *Pharmacogn Commun.* 2022;12(4):154.
3. Cock IE. South African researchers are screening traditional southern African medicinal plants as leads for COVID-19 treatments. *Pharmacogn Commun.* 2022;12(3):120-1. doi: 10.5530/pc.2022.3.23.
4. Cock IE. An opinion: herbal medicines may provide a means of controlling the Covid-19 pandemic. *Pharmacogn Commun.* 2020;10(3):140-2. doi: 10.5530/pc.2020.3.28.
5. van Breemen RB, Muchiri RN, Bates TA, Weinstein JB, Leier HC, Farley S, *et al.* Cannabinoids block cellular entry of SARS-CoV-2 and the emerging variants. *J Nat Prod.* 2022;85(1):176-84. doi: 10.1021/acs.jnatprod.1c00946, PMID 35007072.



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A Novel Class of Natural Antibiotics has been Identified in Symbiotic Bacteria in Nematodes

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Bacterial resistance to current antibiotics is one of the most concerning threats facing medical science and new chemical antibiotics are urgently required.¹ A study published in Molecular Cell has identified a class of compounds and reported them to be a new class of antibiotics.² The compounds, named Odilorhabdins (ODLs), are produced by *Xenorhabdus nematophila*, a symbiotic bacterium that occurs in soil nematodes. The authors of that study screened the ODLs against a panel of bacterial pathogens and reported noteworthy activity against both gram positive and gram-negative bacteria, including carbapenem-resistant *Enterobacteriaceae* strains. Additionally, the authors examined the antibiotic mechanism of the ODLs and reported that they inhibit protein synthesis by binding to the small ribosomal unit. Notably, the ODLs bound at a different site to all other known antibiotic

classes. Through binding to the small ribosomal subunit, the ODLs induce miscoding and therefore misincorporation of amino acids, and premature stop codon bypass. As the bactericidal mechanism of the ODLs is unique, it is likely that they may be effective in treating antibiotic resistant infections, although this remains to be verified.

REFERENCE

1. Cheesman MJ, Ilanko A, Blonk B, Cock IE. Developing new antimicrobial therapies: are synergistic combinations of plant extracts/compounds with conventional antibiotics the solution? *Pharmacogn Rev.* 2017;11(22):57-72. doi: 10.4103/phrev.phrev_21_17, PMID 28989242.
2. Pantel L, Florin T, Dobosz-Bartoszek M, Racine E, Sarciaux M, Serri M, *et al.* Odilorhabdins, antibacterial agents that cause miscoding by binding at a new ribosomal site. *Mol Cell.* 2018;70(1):83-94.e7. doi: 10.1016/j.molcel.2018.03.001, PMID 29625040.