Mini Review
Volume 14:02, 2024

Medicinal Chemistry

ISSN: 2161-0444 Open Access

Endolichenic Fungi: A Promising Medicinal Microbial Resource to Discover Bioactive Natural Molecules

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Abstract

Endolichenic fungi, a relatively less explored group of microorganisms residing within lichens, have recently garnered attention for their potential in producing bioactive natural molecules with medicinal properties. This article delves into the fascinating world of endolichenic fungi, exploring their habitats, diversity, symbiotic relationships and their significance in drug discovery. Furthermore, it discusses the methodologies employed in isolating and characterizing bioactive compounds from endolichenic fungi and highlights recent advancements in this field. Finally, it emphasizes the future prospects and challenges in harnessing endolichenic fungi as a valuable resource for discovering novel pharmaceuticals.

Keywords: Pharmaceuticals • Endolichenic fungi • Symbiotic relationships • Bioactive natural molecules • Medicinal properties

Introduction

Microorganisms have long been recognized as prolific producers of bioactive compounds, many of which possess therapeutic properties. Among these microorganisms, microbes like bacteria, fungi, actinomycetes and algae have been extensively explored for their potential to yield bioactive natural molecules. The collection, characterization and utilization of these microbial resources constitute a crucial aspect of drug discovery and development. This article delves into the significance of medicinal microbial resources in discovering bioactive natural molecules and highlights their potential in pharmaceutical and biotechnological applications [1].

Literature Review

Medicinal microbial resources encompass a diverse array of microorganisms found in various natural habitats, including soil, water bodies, extreme environments and even within other organisms as symbionts. These microbes have adapted unique biochemical pathways to survive and thrive in their environments, often synthesizing secondary metabolites with potent biological activities. Examples include antibiotics, antifungals, anticancer agents, immunosuppressants and enzyme inhibitors, among others [2].

Exploration of medicinal microbial diversity

One of the primary strategies for discovering bioactive natural molecules is through the systematic exploration of microbial diversity. This involves the collection of microbial samples from different ecological niches followed by isolation, cultivation and characterization of microbial strains. Advances in high-throughput sequencing technologies have significantly enhanced our ability to analyze microbial communities and identify novel taxa with the potential to produce bioactive compounds [3].

Isolation and cultivation techniques

Isolation and cultivation of microorganisms from environmental samples require specialized techniques to obtain pure cultures and maximize the chances of discovering novel compounds. Traditional methods such as serial dilution and spread plate techniques are commonly employed, along with more advanced approaches like selective enrichment and co-cultivation. Additionally, the optimization of culture conditions such as temperature, pH, nutrient composition and fermentation parameters is crucial for enhancing secondary metabolite production [4].

Screening for bioactivity: Once microbial strains are isolated and cultivated, the next step involves screening for bioactivity. Bioassays targeting specific therapeutic indications or biological activities are used to identify potential leads among microbial extracts. These assays may include antimicrobial, anticancer, anti-inflammatory, antiviral, antioxidant, or enzyme inhibitory assays, depending on the desired pharmacological properties. High-throughput screening platforms enable rapid evaluation of large numbers of samples, accelerating the discovery process [5].

Diversity and habitat: Endolichenic fungi exhibit remarkable diversity, adapting to various environmental conditions. This section explores their distribution, ecological roles and the factors influencing their diversity within lichen habitats.

Symbiotic relationship: The intricate symbiotic relationship between lichens and endolichenic fungi is crucial for understanding their interactions and the production of bioactive molecules. This section elucidates the mutualistic association between these organisms and its implications for drug discovery.

Bioactive compounds from endolichenic fungi: Endolichenic fungi produce a wide array of bioactive compounds with pharmaceutical potential. This section discusses the types of molecules isolated from these fungi, including antibiotics, anticancer agents, antioxidants and immunomodulators [6].

Various methodologies are employed to isolate, purify and characterize bioactive compounds from endolichenic fungi. This section elaborates on the techniques such as chromatography, spectroscopy and molecular biology used in this process.

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Received: 26 March 2024, Manuscript No. mccr-24-136054; **Editor Assigned:** 29 March, 2024, PreQC No. P-136054; **Reviewed:** 13 April, 2024, QC No. Q-136054; **Revised:** 20 April, 2024, Manuscript No. R-136054; **Published:** 27 April, 2024, DOI: 10.37421/2161-0444.2024.14.726

Discussion

The pharmacological activities and therapeutic applications of bioactive compounds derived from endolichenic fungi are discussed in this section. It highlights their potential in treating various ailments such as cancer, infectious diseases, inflammation and metabolic disorders.

Recent advancements in endolichenic fungi research, including high-throughput screening, omics technologies and synthetic biology approaches, have accelerated drug discovery efforts. This section provides insights into these developments and their implications for future research.

Despite their potential, harnessing endolichenic fungi for drug discovery poses several challenges, including limited knowledge of their biology, low yields of bioactive compounds and issues related to sustainable sourcing. This section addresses these challenges and outlines future perspectives to overcome them.

Conclusion

Endolichenic fungi represent a rich and untapped reservoir of bioactive natural molecules with significant therapeutic potential. Continued exploration and research in this field promise to unveil novel drugs to address unmet medical needs.

Acknowledgement

None.

Conflict of Interest

None.

References

1. Zhao, Shasha, Xinyuan Gao, Shuzhi Zang and Yunxia Li, et al. "MicroRNA-383-5p acts as a prognostic marker and inhibitor of cell proliferation in lung adenocarcinoma by cancerous inhibitor of protein phosphatase 2A." *Oncol Lett* 14 (2017): 3573-3579.
2. Pippa, R., A. Dominguez, D.J. Christensen and I. Moreno-Miralles, et al. "Effect of FTY720 on the SET–PP2A complex in acute myeloid leukemia; SET binding drugs have antagonistic activity." *Leukemia* 28 (2014): 1915-1918.
3. Girkin, Jason L., Luke M. Hatchwell, Adam M. Collison and Malcolm R. Starkey, et al. "TRAIL signaling is proinflammatory and proviral in a murine model of rhinovirus 1B infection." *Am J Physiol Lung Cell Mol Physiol* 312 (2017): L89-L99.
4. Li, Jing, Sufang Han, Ziliang Qian and Xinying Su, et al. "Genetic amplification of PPME1 in gastric and lung cancer and its potential as a novel therapeutic target." *Cancer Biol Ther* 15 (2014): 128-134.
5. Cornell, Timothy T., Vania Hinkovska-Galcheva, Lei Sun and Qing Cai, et al. "Ceramide-dependent PP2A regulation of TNFαinduced IL-8 production in respiratory epithelial cells." *Am J Physiol Lung Cell Mol Physiol* 296 (2009): L849-L856.
6. Chalfant, Charles E., Zdzislaw Szulc, Patrick Roddy and Alicja Bielawska, et al. "The structural requirements for ceramide activation of serine-threonine protein phosphatases." *J Lipid Res* 45 (2004): 496-506.

How to cite this article: Ainhoa, Estela. "Endolichenic Fungi: A Promising Medicinal Microbial Resource to Discover Bioactive Natural Molecules." *Med Chem* 14 (2024): 726.