

## Metabolomics in Drug Discovery: Restoring Antibiotic Pipelines

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### Abstract

The discovery and development of antibiotics for the treatment of bacterial infections is one of the biggest achievements in modern medicine. However, due to multi-resistant pathogens, the spread and emergence of antibiotic resistance pose a threat to public health around the globe, especially in upper- and middle-income countries. The metabolomics approach is valuable in screening novel antibiotics from natural sources, as well as identifying the target points in bacterial metabolism. Mass-spectrometry and NMR-based metabolomics approaches are successful approaches for the discovery of lead compounds. This review highlights the application of the metabolomics in drug discovery and development. Different strategies such as, pathway analysis, classification strategy or integration of genomics, transcriptomics and metabolomics are done for the determination of antibiotic modes of action. However, comparative metabolomics and integrative approach enable the study of the bacterial mechanism of resistance. We believe that metabolomics approaches are the most powerful techniques for the diagnosis of infectious diseases and development of novel antibiotics. Despite the high price and complexity in analyzing the product, the key for portability and boost robustness of metabolomics approaches is the upgradation of separation techniques. Therefore, the use of metabolomics approach in the development of novel antibiotics is an interesting alternative for the discovery of new antibiotics as well as for the improvement of known compounds.

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### Biography

Faiza Azhar is a Lecturer (Biochemistry) in Lords College of Pharmacy, one of the best affiliated colleges of the University of the Punjab, Lahore, Pakistan. In 2017, she graduated from the University of the Punjab, Lahore, Pakistan with a five years degree in Pharmacy. After completing her graduation, she worked in various fields as a community pharmacist, hospital pharmacist, quality control officer and clinical research associate. During this time, she learned a lot about herself and about working with people in different disciplines and she strongly believes in team work. Through her years of studying and

Professional experiences, she became fascinated by the research field in discovery of the lead compounds. For this reason, she got admission in M. Phil. in Pharmaceutical Chemistry in the same prestigious university i.e., University of the Punjab. During her post-graduation period, she worked on the phytochemical and biological activities of the natural source using various analytical techniques with which she got an excellent cGPA of 3.92/4.0 and therefore a meritorious qualification. Moreover, during this tenure, she also worked part-time as a research assistant and published 8 articles on antibiotics and its resistance in peer-reviewed journals. She also strengthened her conviction to be a scientist.

