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FROM BASIC BIOCHEMISTRY CONCEPTS TO ANTIMICROBIAL DRUG DISCOVERY

Biochemistry is the study of the chemistry of life. To understand life at the molecular level, biochemists study chemical processes that take place in all living organisms. Biochemistry is a field that is continuously growing, and the emergence of new knowledge and technologies continue to change our understanding of the discipline. This necessitates that the curriculum be reviewed and updated regularly, but this should not be at the expense of basic biochemistry concepts that strengthen our understanding of complex systems. In a research-intensive university, teaching must be combined with cutting-edge research to produce graduates capable of solving global and local challenges, such as COVID-19, HIV/AIDS, malaria, tuberculosis, cancer, diabetes, and antimicrobial resistance (AMR). AMR is a threat to modern medicine and referred to as the “silent pandemic” impacting human and animal health. Due to the rapidly growing resistance of pathogenic micro-organisms to antimicrobial agents, there is an urgent need to develop new alternatives. Synthetic peptides based on the sequence of naturally occurring antimicrobial peptides are promising leads for developing novel anti-infective drugs. This lecture will present an overview of research undertaken to develop peptide-based antimicrobial drugs against bacterial and yeast infections, and more recently, targeting resistant Gram-negative infections. It will also show the link between basic biochemistry concepts and antimicrobial drug discovery. Furthermore, it will highlight the importance of multidisciplinary, international collaboration for capacity building in peptide-based antibiotic drug discovery and the training of the next generation of scientists in advanced AMR state-of-the-art technologies.