Can the use of artificial intelligence reduce antibiotic resistance?

Shameeran Salman Ismael[1*]

1. Medical Laboratory Sciences Department, College of Health Sciences, University of Duhok, Iraq.

*Corresponding author: shameeran.ismael@uod.ac

ABSTRACT

The global issue of antibiotic resistance has become a significant concern for the medical community due to the increasing number of infections that are difficult to treat. As a result, there is a growing need for innovative solutions to combat this problem. In recent years, artificial intelligence (AI) has garnered attention as a potential tool for reducing antibiotic resistance. This article aims to discuss the potential impact of AI on antibiotic resistance and examine its effectiveness in addressing this issue.

1. Introduction:

Antibiotic resistance has become a pressing global issue, leading to significant challenges for the field of medicine. The misuse and overuse of antibiotics have resulted in the emergence of resistant bacterial strains, rendering once-effective treatments ineffective (1, 2, 3). As such, there is a critical need for innovative solutions to address this problem. Recently, artificial intelligence (AI) has gained attention as a potential tool for combating antibiotic resistance. Through its ability to analyze large volumes of data and identify patterns, AI has the potential to significantly reduce the prevalence of antibiotic resistance. This article aims to explore the role of AI in antibiotic resistance and its potential impact on the field of medicine.

2. Artificial intelligence:

The use of computers and devices to simulate human problem-solving abilities is called Artificial Intelligence (AI) (4). AI can enhance medical diagnosis and therapy. Antibiotic resistance diagnosis techniques that are currently in use are neither quick nor simple. For instance, whole-genome sequencing for antimicrobial susceptibility testing necessitates the skills of a bioinformatician and the processing of a substantial volume of data, while standard antibiotic susceptibility testing takes longer than twenty-four hours (5)

In recent years, artificial intelligence (AI) has proven to be more effective in the area of antibiotic-resistant control. For instance, antibiotic resistance has been investigated using artificial intelligence technologies based on sequencing (6). Furthermore, the creation of novel antibiotics and the investigation of synergistic drug combinations frequently involve the use of artificial intelligence systems (7). Researchers at McMaster University and the Massachusetts Institute of Technology have discovered a novel antibiotic that can eradicate a particular type of bacteria that causes many drug-resistant diseases by using an artificial intelligence system (5). The method they employed may also expedite the development of other medications to combat a variety of other difficult pathogens (5)

AI has proven notable effectiveness for antibiotic - resistant control in recent years (8). Applications of AI based on sequencing, for instance, have been used to research AMR (9). Additionally, gathering clinical data to develop systems for clinical decision-support may enable doctors to keep an eye on AMR trends and prescribe antibiotics more sensibly (10). Additionally, the development of novel antibiotics and studies of synergistic medication combinations also frequently employ AI applications (11, 12).

AI is a cutting-edge strategy that is speeding up the development of new drugs due to its rapid pace, cost-effectiveness, reduced labor needs, and decreased failure rate. AI has been applied to the discovery of several beta-lactamase inhibitors and substitutes for antibiotics from marine natural products, nonribosomal peptides, antimicrobial peptides, and bacteriocins. Pharmaceutical companies have recently increased their usage of AI platforms significantly, which may lead to the discovery of effective antibiotic substitutes with a decreased risk of resistance development (13)

3. Conclusion:

The risks and difficulties associated with the worldwide antibiotic resistance problem may be resolved via artificial intelligence. We undoubtedly have better prospects to protect ourselves and a far more promising future for generations to come with the right policies and procedures in place. Furthermore, the use of AI uses the least amount of money, time, effort, and the possibility of antibiotic resistance.

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