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From the Single Bacterial Cell to the Microbial Community: A Round Trip to better understand the Secrets of Complex Microbiological Ecosystems

There is increasing evidence of the difficulty in understanding the “biological functioning” of some complex microbial communities. Complex microbial communities exist everywhere in nature, and the interactions among their constituent microorganisms are a crucial aspect that influences their development. The ability of microorganisms to colonize an environment includes their ability to interact with other species in the same ecosystem, as well as their ability to adapt and integrate into the evolving community. The interactions among microorganisms and not just their numbers, or the presence of different species, biotypes, and variants, in many cases, seems to become a decisive factor in understanding and analyzing the development of microbial ecosystems and the biological function of the individual microbial entities that are part of them.
After working to isolate individual microbial cells and study the mechanisms of their functioning and development, it is time to embark on a backward journey “from the small to the complex” for a better understanding of complex microbial ecosystems and their application potential. The purpose of this brief contribution is to further the development of the understanding of the role of microbial communities in nature and the mode of their development and evolution.

Research Article **Published Date:- 2024-01-12**

Trends of Antibiotic Resistance among Uropathogens in Medical vs. Non-Medical Departments of Al-Shifa Medical Complex in Gaza Strip: A Retrospective, Cross-Sectional Study

Antibiotic resistance is a growing global crisis, straining healthcare systems and leaving us with limited options to combat drug-resistant bacteria. This retrospective, cross-sectional study examines the prevalence of antibiotic resistance patterns among urinary tract infections (UTIs) in Al-Shifa Hospital’s medical departments in comparison with non-medical departments using data from microbiology laboratory archives over a one-year period.
From the examined urine cultures about 25% were obtained from internal medicine departments and double the number was obtained from non-medical departments. The positive rate was around 35% and about two-thirds of the samples were collected from female patients.
Among all departments, Enterobacteriaceae spp. were found to be the most frequently isolated uropathogens, accounting for 80% of cases. However, resistance rates varied depending on the specific organism and antibiotic used. For instance, E. coli showed a resistance rate of only 5% against meropenem, while amoxicillin-clavulanic acid exhibited a resistance rate exceeding 95%.
Importantly, the study revealed a significant disparity in resistance rates between medical and non-medical departments, specifically concerning third-generation cephalosporins. In internal medicine departments, resistance rates were alarmingly high, with cefotaxime, ceftriaxone, and ceftazidime showing resistance rates of 75%, 75% and 66.5% respectively. In contrast, non-medical departments displayed lower resistance rates, approximately 60%, 60% and 40%, respectively.
In summary, this research sheds light on the escalating problem of antibiotic resistance in UTIs and emphasizes the discrepancy in resistance rates between medical and non-medical departments. Urgent efforts are required to address this issue and find effective solutions to prevent the rise of untreatable bacterial infections.
