

Book review

FROM THE ANTIBIOGRAM TO PRESCRIPTION

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The 2-nd edition of the book “**From the antibiogram to prescription**”, it was published under the coordination of Philippe Thévenot. The Romanian translation was made by prof.dr.Olga Mihaela Dorobat. This book offers a logical presentation of the relations between bacteria and antibiotics and both theoretical and practical aspects to laboratory staff. The authors make a pertinent statement of the mechanisms of how antibiotics work at the level of bacterial cell wall, the mechanisms of proteins and nucleic acids synthesis and mechanisms of action of anti-tuberculosis and atypical antimycobacterium substances. There are described the mechanisms of action of β -Lactams, Glycopeptides, Fosfomycin, Aminoglycosides, Quinolones, Macrolides, Lincosamides – Sinergistine - Ketolide and other antibiotics. In other chapter there is presented bacterial resistance to antibiotics, detailing the mechanisms of gained resistance and describing the mechanisms of resistance to these antibiotics.

The pharmacodynamics of the antibiotics, with fundamental and practical aspects, underlines the main pharmacodynamics parameters, describing the period of time when serum concentrations are above of minimal inhibitor concentrations (MIC), the areas under curves reported

to MIC (AUC/MIC) and the inhibited quotient (IQ) on one hand. On the other hand there is presented the pharmacodynamics of Aminoglycosides with detailed aspects of kinetics of bactericidal effects, post-antibiotics effect (PAE), adaptive resistance and also pharmacokinetics and key pharmacodynamics parameters of this group of antibiotics.

Also there are presented the pharmacodynamics of β -Lactams, Quinolones and Glycopeptides and the practical importance of the antibiotics pharmacodynamics.

The clinical repartition of the antibiotics regarding their activity has introduced and almost explained the notion of critical concentrations or ponderate medium concentrations, sensitive, intermediate or resistant strain and the spectrum of antibiotic activity.

The authors offer precise conditions about when antibiogram is not necessary, when and how it must be done, the choice of methods, and the main causes of error and quality control.

There are presented the main phenotypes of resistance to the major antibiotics for every group of aerobic Gram-negative bacteria. Thus, there are described phenotypes of resistance to β -Lactams in the group of

enterobacteria and *Pseudomonas aeruginosa*, *Stenotrophomonas maltophilia* and *Burkholderia cepacia*. The last one has a natural resistance to numerous antibiotics by enzymatic mechanisms, through a natural low membrane permeability and a phenomenon of efflux.

Related to the *Aeromonas* spp., there is mentioned the highly heterogeneity of the resistance phenotypes, which is explained by the diversity of enzymes which are synthesized by this group.

As concerns the *Haemophilus influenzae*, resistant to lincosamide and with a lower sensitivity to macrolide and ketolide, there is explained its resistance through β -lactamases production and modification of PLP. The mechanism of resistance to imipenem was not yet elucidated.

Mentioning the natural resistance of *Neisseria meningitidis*, *N.gonorrhoeae* and *Branhanella cataralis* to lincosamides, glycopeptides and trimethoprim, there is explained their resistance by beta-lactamases synthesis and chromosomal mutates, but also the possibility of a gained resistance to tetracycline, quinolones and other antibiotics.

The chapter referring to the main phenotypes of resistance of the Gram-positive bacteria presents the mechanisms of resistance of *Staphylococcus* and *Streptococcus* groups. The resistance of staphylococci to β -Lactams is due to the synthesis of plasmid penicillinase, which inactivates penicillins and the resistance to methicillin could be due to many mechanisms. Thus, the resistance is due to the presence of a supplementary protein bounded of penicillin PLP2a or PLP2' which synthesis is codified by a *mecA* chromosomal gene which belongs

to a DNA fragment integrated in chromosome of MRSA strains.

There were also described another three mechanisms of resistance to oxacillin, codified by the gene *mecA*. There are strains which over produce β -lactamases and methicillinase are able to hydrolyze methicillin and strains which have a modification of their affinity of the normal PLP face to β -lactams.

Also, there are described the mechanisms of resistance to aminosides, tetracycline, macrolides, lincosamides, streptogramins, ketolides, chloramphenicol, trimethoprim/sulfamethoxazole and other antimicrobial agents. There is mentioned that the antibiotics that remain active on staphylococci are glycopeptides, fusidic acid, rifampicin, streptogramins and oxazolidones.

Referring to the antibiotics resistance phenotypes of *Enterococcus* there are detailed presented the mechanisms of resistance to β -Lactams, aminosides, macrolides, lincosamide, streptogramins, ketolides, glycopeptides and oxazolidones.

Streptococcus pneumoniae can develop resistance to β -Lactams, macrolide, lincosamide, streptogramin, ketolides, chloramphenicol, tetracyclines, glycopeptides, quinolones, oxazolidones, rifampicin and aminoglycosides.

The presentation of clinical cases with infectious diseases, in a laborious manner, illustrates the therapy approach with chances of success.

There were mentioned the criteria which have to be taken into account in choosing the antibiotic/antibiotics in the treatment of infectious diseases, in the order of their importance. There

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were presented the bacteriologic, pharmacokinetics, tolerance, background, and ecological and economical criteria.

The drafts of utilization of antibiotics in the therapy of initial intention (type, dose, the way of administration, period of treatment), according to the type of infection and the bacteria species involved, will be useful for clinical physicians of different specialities.

The presentation of the limit values of MIC (mg/l) (dilutions method), limit values of the inhibition diameters (mm) (diffusion method in agar) for different antibiotics in the case of four strains ATCC and the list of international antibiotics classifications,

reviewed in 2003, are of a great importance to microbiologists and medical doctors.

This book is of a real use and help both for the laboratory staff and clinicians. The knowledge and the use of the notions from this book in practical activity will conduce to the improvement of the therapeutic drafts and to reducing the evolution process of resistance of bacteria.

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