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Chapter Outline

GENETICS AND CHEMOTHERAPY
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1. Introduction to define problem: Example, clinical failure of sulfonamides in therapy of gonorrhea.

2. Background information on drugs. Theory of biological antagonism. (Appendix with chemical classification of antibiotics?)

3. Adaptations of individual organisms
   A. Drug tolerance and addiction in mammals
   B. Enzymatic adaptation in microorganisms
   (Both physiological and not heritable)

4. Individual variation (higher animals(and plants)) in response to drugs.
   A. ? Ex. Rabbit/atropine esterase (single gene)
   B. DDT resistance in insects (multiple genes)

5. Drug resistance in microbial populations
   [Content similar to 1953 review]
   A. Pre- and post-adaptation theories and their experimental decision
   B. Multi-step resistance
   C. Physiology of resistance (mechanisms; cross-resistance; secondary effects)

6. Genetic effects of drugs [other than adaptation] (mutagenic; anti-mitotic; removal of cytoplasmic particles)

7. Specific examples of drug resistance in bacteria and other parasites. Laboratory and clinical studies

8. Resistance as a genetic marker (genetic analysis in microorganisms; mutation and recombination studies)

9. Genetic improvement of antibiotic production

10. Genetic theory and clinical practice in chemotherapy.
    A. Correlation in lab. and in practice
    B. Synergism and combined therapy
    C. Future prospects in chemotherapy
    (~~[illegible]~~ (can resistance be prevented or reversed?
    (cross-resistance; pathogenicity of resistant mutants; evolutionary trends in microbial populations; the strategy (vs. tactics) of chemotherapeutic practice.)

The book is indended primarily for bacteriologists and medical students and practitioners of chemotherapy who want a theoretical understanding of the drug-resistance they inevitably encounter in practice. However, resistance will also be stressed as a model of adaptation and evolution in microorganism biological