CHAPTER 9

INTERACTION OF ANTIBIOTICS, ANAEROBIC BACTERIA AND HOST DEFENCES

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ABSTRACT

Much of our knowledge of the opsonic requirements of anaerobic bacteria has been developed from the study of various aerobic bacteria. In particular Gram-positive bacterial activate the alternate complement cascade in the absence of any specific antibody, whereas Gram-negative species activate the classical complement cascade usually in the presence of specific antibody. However a combination of both pathways has been described for members of the genus Bacteroides. The presence of capsular polysaccharide on the cell surface is recognised as being important in this activation process which may or may not lead to efficient phagocytic ingestion and killing of the bacteria by polymorphonuclear leukocytes (PMNL).

Several antibiotics are concentrated within PMNL but only one drug with activity against anaerobes, clindamycin, can be concentrated up to 40-fold within the phagosome of the PMNL and remain biologically active therein. Alternatively some antibiotics at low concentrations (especially concentrations below the MIC's) have been shown to modify the introduction of various bacteria with PMNL. Again clindamycin has been shown to repress polysaccharide capsule biosynthesis in Bacteroides fragilis, and by so doing, to enhance opsonophagocytosis. In contrast, other antibiotics including penicillin and cefoxitin, cause filamentation, increase capsule formation and reduce opsonophagocytosis in the same experimental situation. The significance of these findings in vivo in the treatment of the anaerobic abscess remains to be seen.