ABOUT THE AFFINITY OF CEFOTAXIME AND ITS *ANTI* ISOMER FOR THE PENICILLIN-BINDING PROTEINS

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Recently COSTA and BOTTA[1] published a study of the interactions with penicillin-binding proteins (PBPs) of *Escherichia coli* of cefotaxime, its *anti* isomer and the analogue without the oxime function. They concluded that the differences in antibacterial activities of the compounds was much related to differences in their ability to penetrate the outer cell layers, rather than their affinity for the target PBPs. We have also performed similar work[2], but concluded that the difference in antibacterial activities between cefotaxime and its *anti* isomer is closely related to their affinities for the PBPs.

SHIGI *et al.*[3] have described a similar study using ceftizoxime and its *anti* isomer. They have suggested that the difference in antibacterial activity of the two isomers is "likely to be due to difference between the two compounds in their abilities to inhibit peptidoglycan polymerization". SHIGI *et al.*, as in our investigation, employed *E. coli* DC 0 whereas COSTA and BOTTA used *E. coli* KN 126. Nevertheless, these two strains, each derived from *E. coli* K 12 might be expected to behave similarly towards β-lactam antibiotics. In fact, the MICs 1.45 and 400 μg/ml found for cefotaxime and its *anti* isomer respectively using *E. coli* KN 126[1], differ considerably from the values 0.032 and 3.2 μg/ml respectively obtained by us using *E. coli* DC 0. These are very similar to those found for ceftizoxime and its *anti* isomer (viz., 0.05 and 1.56 μg/ml) by SHIGI *et al.*[3]. It should also be noticed that the MIC values obtained by COSTA and BOTTA using cefotaxime seemed unusually high for an *E. coli* strain[4].

E. coli KN 126 has been used, frequently, by SPRATT for PBPs studies (*inter al*, ref 5). It was originally described by NAGATA[6] and has been derived from *E. coli* K 12-9829, a strain from the collection of OZEKI[7]. *E. coli* DC 0, which originated from RICHMOND[8] is also named UB 1005. Few hypersensitive mutants have been prepared[8,9] from this strain. The strain DC 2 has been subject to extensive studies, particularly in the field of penetration of β-lactam antibiotics in bacteria. *E. coli* KN 126 and *E. coli* DC 0 have been found to be sensitive to most of the well-known β-lactam antibiotics.

We suggest that the difference in the conclusions in the two papers[1,2] is most reasonably attributable to a spontaneous mutation, or alteration, probably in the porin system, of COSTA and BOTTA's *E. coli* KN 126. We still think that for the majority of *E. coli* strains the difference between the antibacterial activity of cefotaxime and its *anti* isomer is mostly related to different capacities for binding to the penicillin-binding proteins.

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