THE ANTIMICROBIAL ACTIVITY OF PIPERIDINE CHLORIDE DERIVATIVES

ANNA CZARNY¹, ZOFIA DEGA-SZAFRAN², BOŻENNA RÓŻYCKA-ROSZAK³, MAJA KOCIĘBA⁴ and EDYTA WOŹNIAK⁵

¹Institute of Immunology and Experimental Therapy, Polish Academy of Sciences, Wrocław, Poland, ²Department of Chemistry, University of Poznań, Poznań, Poland, ³Department of Physics and Biophysics, Agricultural University of Wrocław, Wrocław, Poland

Despite the progress in the medical sciences and health care, morbidity and mortality following nosocomial infections are still commonplace. It is important to underline the role of opportunistic pathogens, which may be part of the normal human bacterial flora and cause disease especially when host immunity becomes impaired. The first step to reduce the risk of nosocomial infections is prophylactic procedure, which includes the desinfection of medical equipment using effective antimicrobial agents. Unfortunately, in recent years a steady increase in the number of bacterial strains resistant to disinfectants has been observed. In view of these considerations, further efforts are needed to develop a new group of antimicrobial compounds. Therefore, we turn our attention to quaternary ammonium salts (QAS), the membrane-disruptive, antibacterial and antifungal activities of which are well recognized. A series of QAS that are piperidine chloride derivatives containing hydrophobic chains of varying length were tested against some selected micro-organisms. In order to obtain some information about the activity of investigated agents, they were tested on gram-negative (E. coli, P. aeruginosa, K. pneumoniae) and gram-positive (B. subtilis, S. aureus, E. faecalis) bacteria. Apart from their antibacterial properties, investigations on the antifungal activities of QAS were carried out on species of Candida which are the primary etiologic agent of candidiasis, a disease that remains a major complication in immunocompromised patients following nosocomial infections. Some bacterial and Candida strains used in this study were clinical isolates obtained from patients. The results indicate that the newly-synthesised QAS have antimicrobial activity. We found that the differences in activity depend on the structure of the lipophilic moiety. Based on these promising results, further efforts are needed to investigate the potential spectrum of antimicrobial activity of the tested agents. We hope that our results may contribute to a better understanding of the interaction between cationic surfactants and microbial cells.