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Effects of different generation dendrimers mutagenicity; Ames test method

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Introduction and Objectives: The treatment of septicemia caused by antibiotic-resistant bacteria is a great challenge in the clinic. Because traditional antibiotics inevitably induce bacterial resistance, which is responsible for many treatment failures, there is an urgent need to develop novel antibiotic drugs. Dendrimers (PAMAM-NH2) are reported to have antibacterial activities. Considering the wide range of applications of dendrimers, the need to assess the mutagenic effects of this substance and the assessment is determined. In this study, mutagenic and carcinogenic effects of PAMAM (G2, G3, G4 and G5) and aljinat dendrimer, Ames test method is discussed.

Materials and Methods: Amino-terminated generation 1 PAMAM (G1.0 PAMAM-NH2, 9.98% (w/w) in H2O), generation 2 PAMAM (G2.0 PAMAM-NH2, 10.04% (w/w) in H2O), generation 3 PAMAM (G3.0 PAMAM-NH2, 10.01% (w/w) in H2O), and generation 4 PAMAM (G4.0 PAMAM-NH2, 9.76% (w/w) in H2O) were purchased from Dendritech (Midland, MI) and Aljinatedendrimer (G2.0 PAMAM- Aljinate). All other chemicals and solvents were of analytical grade. Next, confirmatory testing of mutant strains of Salmonella typhimurium (TA100) in the case of lipids was investigated. Confirmatory tests include: Histidine dependence (his), Biotin dependence (bio), Biotin and histidine dependence (bio;his), rfa marker, uvrB deletion, presence of plasmid pKM101 (ampicillin resistance). Then the Ames test in the presence of liver microsomes and in the absence of liver microsomes was studied.

Results: The results show that increasing the generation of PAMAM significantly increases the rate of mutagenesis. The number of colonies in Alginate was similar to the third generation PAMAM.

Discussion: The comparison of result of this study with others shows that these materials have no effect of mutagenicity.

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