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Epoxomicin affects proliferating neural progenitor cells of rat

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Developmental neurotoxicity (DNT) entails the toxic effects imparted by various chemicals on brain during the early childhood period. As human brains are vulnerable during this period, various chemicals would have their maximum effects on brains during early childhood. Some toxicants have been confirmed to induce developmental toxic effects on CNS e.g. lead, however; most of agents cannot be identified with certainty due the defective nature of predictive toxicology models used. A novel alternative method that can overcome most of the limitations of conventional techniques is the use of 3D neurospheres system. This in-vitro system can recapitulate most of the changes during the period of brain development making it an ideal model for predicting neurotoxic effects. In the present study we verified the possible DNT of epoxomicin, a naturally occurring selective proteasome inhibitor with anti-inflammatory activity. Rat neural progenitor cells were isolated from rat embryos (E14) extracted from placental tissue. The cortices were aseptically dissected out from the brains of the fetuses and the tissues were triturated by repeated passage through a fire-polished constricted Pasteur pipette. The dispersed tissues were allowed to settle for 3 min. The supernatant was, then, transferred to a fresh tube and centrifuged at 1,000 g for 5 min. The pellet was placed in Hank's balanced salt solution cultured as free-floating neurospheres in proliferation medium. Two doses of epoxomicin (1 μ M and 10 μ M) were used in cultured neurospheres for a period of 14 days. For proliferation analysis, spheres were cultured in proliferation medium. After 0, 4, 5, 11 and 14 days, sphere size was determined by software analyses. Diameter of each neurosphere was measured and exported to excel file further to statistical analysis. For viability analysis, trypsin-EDTA solution were added to neurospheres for 3 min to dissociate them into single cells suspension, then viability evaluated by the Trypan Blue exclusion test. Epoxomicin was found to affect proliferation and viability of neurospheres, these effects were positively correlated to doses and progress of time. This study confirms the DNT effects of epoxomicin on 3D neurospheres model. The effects on proliferation suggest possible gross morphologic changes, while the decrease in viability propose possible focal lesion on exposure to epoxomicin during early childhood.

Biography

Bahaa Eldin is a junior researcher at the Medical Experimental Research Center (MERC) and a 6th year student at the Faculty of Medicine Mansoura University. He Likes biology that is why he chose to join Faculty of Medicine in September 2008 to study the human body. He joined the Medical Experimental Research Center to follow his old interest in research and critical thinking. He exploited that to do his research with his team supervised by Prof. Dr Mohamed Sobh, Dr. Mohamed Salama and Biochemist Ahmed Lotfy. During this period he learned about Stem Cells and methods of culturing of neural progenitor cells of rats. Bahaa Eldin got enrolled in a course about Medical research, critical thinking and basics of statistics to boost him in his future career as a clinician interested in research. He exploited these basics to study "Knowledge And Attitudes of Medical Students Towards Organ Donation". Bahaa Eldin is said to be an active good-standing student. He found that the culture of student conferences was not prevailing in his scientific society that is why he and two of his colleagues worked to launch The First Annual Student Conference at Faculty of Medicine Mansoura University. It is expected for Bahaa Eldin to graduate by the end of 2015. Bahaa Eldin hopes to work in an outstanding university and find his way to excellence

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