Umbilical cord mesenchymal stem cells suppress genotoxic effects of dextran sulfate sodium (DSS) induced acute colitis in immunodeficient NOD.CB17-Prkdc^{scid}/J mice.

Antara Banerjee
Chettinad Academy of Research and Education, India

Ulcerative colitis is a disease which involves inflammation and sores in the colonic lamina propria of large intestine. This results in the increased breakdown of extracellular matrix and interference of the mucosal barrier with imprudent production of inflammatory mediators which includes cytokines, reactive oxygen species, enzymes, growth factors, etc. Since mesenchymal stem cells are reported to be a potential candidate for cellular therapeutics, we hereby highlight the protective potential of exogenously administered human umbilical cord derived mesenchymal stem cells (UCMSCs) against Dextran Sulfate Sodium (DSS) induced acute colitis in immunodeficient NOD.CB17-Prkdcscid/J mice with specific response to endoplasmic reticulum (ER) stress.

To verify attenuation of DSS induced damage by UCMSCs, Disease Activity Index, colon length, histological changes, myeloperoxidase/catalase activities, chromosome aberrations (CA), sperm head anomalies, matrix metalloproteinase 2/9 expression and Endoplasmic reticulum (ER) stress related proteins were evaluated. It is also been observed from the results that the ER stress induces chromatin changes, which can also facilitate cell survival.

There seemed to be a palpable increase in the frequencies of various types of CA level and significant downregulation of colonic tissue damage after administration of UCMSCs. The data validated that UCMSCs were able to prevent DSS-induced colitis in immunodeficient mice. The reduction of frequencies of chromosomal aberrations and sperm head anomaly suggests that the UCMSCs prevent the genotoxic damage rendered by DSS administration to the colon. Additionally we demonstrated a key function of MMPs and ER stress in the establishment of colitis suggesting them to be imminent therapeutic targets for treatment of Ulcerative colitis.

Keywords: Dextran Sulphate sodium, Umbilical cord mesenchymal stem cells, genotoxicity, ER stress, matrix metalloproteinase.

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Biography

Dr. Antara Banerjee is working as an Associate Professor at Faculty of Allied Health Sciences, Chettinad Academy of Research and Education, Chennai. She has done her Post-Doctoral research at University of Padova, Italy and University of Linkoping, Sweden for over 10 yrs. Her research areas includes Regenerative biology, Stem cell Biology and Oncology and Gastroenterology. She has published 55 high impact peer reviewed articles in International/ National Journals. She has been awarded with the Young Scientist Research grant award by Goverment of India and other Industry sponsered projects. She is in the editorial board of several reputed journal and edited books from Springer nature and Elsevier.