Células tronco. Serotonina mais um efeito desta biomolécula; proteção das células tronco e proteção mitocondrial

Promoting effects of serotonin on hematopoiesis: ex vivo expansion of cord blood CD34+ stem/progenitor cells, proliferation of bone marrow stromal cells, and antiapoptosis
Li Ka Shing Institute of Health Sciences, Department of Paediatrics, The Chinese University of Hong Kong, Hong Kong, China.
Serotonin is a monoamine neurotransmitter that has multiple extraneuronal functions. We previously reported that serotonin exerted mitogenic stimulation on megakaryocytopoiesis mediated by 5-hydroxytryptamine (5-HT)2 receptors. In this study, we investigated effects of serotonin on ex vivo expansion of human cord blood CD34+ cells, bone marrow (BM) stromal cell colony-forming unit-fibroblast (CFU-F) formation, and antiapoptosis of megakaryoblastic M-07e cells. Our results showed that serotonin at 200 nM significantly enhanced the expansion of CD34+ cells to early stem/progenitors (CD34+ cells, colony-forming unit-mixed [CFU-GEMM]) and multilineage committed progenitors (burst-forming unit/colony-forming unit-erythroid [BFU/CFU-E], colony-forming unit-granulocyte macrophage, colony-forming unit-megakaryocyte, CD61+ CD41+ cells). Serotonin also increased nonobese diabetic/severe combined immunodeficient repopulating cells in the expansion culture in terms of human CD45+, CD33+, CD14+ cells, BFU/CFU-E, and CFU-GEMM engraftment in BM of animals 6 weeks post-transplantation. Serotonin alone or in addition to fibroblast growth factor, platelet-derived growth factor, or vascular endothelial growth factor stimulated BM CFU-F formation. In M-07e cells, serotonin exerted antiapoptotic effects (annexin V, caspase-3, and propidium iodide staining) and reduced mitochondria membrane potential damage. The addition of ketanserin, a competitive antagonist of 5-HT2 receptor, nullified the antiapoptotic effects of serotonin. Our data suggest the involvement of serotonin in promoting hematopoietic stem cells and the BM microenvironment. Serotonin could be developed for clinical ex vivo expansion of hematopoietic stem cells for transplantation. Disclosure of potential conflicts of interest is found at the end of this article.
PMID: 17446559