Improvement of peripheral blood stem cell mobilization using human chorionic gonadotropin in addition to current mobilization approaches with granulocyte-colony stimulating factor

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Introduction. The mobilization technique currently represents an essential step in peripheral blood stem cell transplantation (PBSCT) and post-chemotherapy granulocytopenia. However, insufficient mobilization represents one of the most important limitations of the standard approach with granulocyte-colony stimulating factor (G-CSF). Mesenchymal stem cells (MSCs) offer a structural (stromal) and functional (paracrine) support for the physiology and homeostasis of the hematopoietic system and their stimulation could have relevant implications for the current mobilization strategies. Our preliminary results *in-vitro* have shown that human chorionic gonadotropin (HCG) treatment leads to the selection of more primitive and potent MSCs from the bone marrow.

Material and methods. We evaluated HCG as a complementary approach for peripheral blood stem cell mobilization *in vivo* on a rat model. To validate the additional mobilization capability of HCG obtained in the rat model, we validated the effect on a mouse model where we evaluated cell surface markers before and after the addition of HCG to G-CSF.

Results. Our approach showed a superior mobilization capability of HCG+G-CSF than G-CSF alone for the number of monocytes and lymphocytes in the rat model. The effect in the mouse model showed a 9.4% increase in CD34 expression and a 21% increase in CD29 expression. As CD34 is expressed on hematopoietic stem cells and CD29 is widely expressed of monocytes and lymphocytes, the results support our findings on the rat model, confirming an increased capability of HCG to stimulate the additional mobilization of hematopoietic stem cells, monocytes and lymphocytes.

Conclusions. Our findings have relevant clinical implications residing in the potential of improving the outcomes of PBSCT by increasing the mobilization of hematopoietic stem cells and for reducing infectious complications following post-chemoterapy granulocytopenia by mobilizing monocytes and lymphocytes more efficiently. This prompts for the validation of the mobilization capability of HCG+GCSF combination in a proof-of-principle feasibility clinical trial.