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Evaluation of the effect of growth factors on the mobilization and the genetic traits of stem cells and circulating tumor cells in the peripheral blood

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INTRODUCTION: Granulocyte-colony-stimulating factor (G-CSF) is currently used in hematopoietic stem cell transplantation serving as a potent mobilizer of progenitor cells in the peripheral blood. However, recent findings have attributed G-CSF a significant role in cancer progression. Identifying growth factors with potent effects on the mobilization of peripheral blood of progenitor cells with little or no effects on cancer progression represents the Wholly Grail in the treatment of granulocytopenia after chemotherapy as well as for peripheral blood hematopoietic stem cell transplantation (PBSCT).

METHODS: Based on our previous findings in-vitro on the stimulating effects on progenitor cells, we tested the effect of recombinant human chorionic gonadotropin (rHCG) on progenitor cell mobilization in the peripheral blood on a mouse model and compared its efficacy with G-CSF or the combination. We then treated BRD-2 transgenic mice developing B cell lymphoma with rHCG and/or G-CSF and isolated progenitor cells and circulating tumor cells for the evaluation of the expression level of stemness genes, oncogenes and tumor suppressor genes.

RESULTS: Our study showed a distinct expression profile of stemness genes, oncogenes and tumor suppressor genes of the circulating tumor cells and stem cells relative to the exposure to G-CSF, rHCG or the combination of the two growth factors accordingly.

CONCLUSIONS: Our findings bring new insights into the perspective of using rHCG alone or in combination with G-CSF for progenitor cell mobilization in PBSCT and treatment of granulocytopenia after chemotherapy.