

PLC-beta 1 regulates the expression of miR-210 during mithramycin-mediated erythroid differentiation in K562 cells

Irene Faenza³, Alberto Bavelloni¹, Alessandro Poli³, Alessandro Matteucci⁴, Lucio Cocco³

¹ SC Laboratory of Musculoskeletal Cell Biology, Rizzoli Orthopedic Institute, Bologna, Italy; ²Laboratory RAMSES, Rizzoli Orthopedic Institute, Bologna, Italy

³ Cell Signalling Laboratory, Department of Biomedical Sciences, University of Bologna, Bologna, Italy

⁴ CNR-National Research Council of Italy, Institute of Molecular Genetics, Bologna, Italy

PLC-beta 1 (PLC β 1) inhibits erythroid differentiation induced by mithramycin (MTH) by targeting miR-210 expression. MicroRNA-210 (miR-210) has been reported to be upregulated in various types of human malignancy suggesting that it has an important role in tumorigenesis. Inhibition of miR-210 affects the erythroid differentiation pathway and it occurs to a greater extent in MTH-treated cells. In this paper we have analyzed the effect of MTH on human K562 cells differentiation. Overexpression of PLC β 1 suppresses the differentiation of K562 elicited by MTH as demonstrated by the absence of γ -globin expression. Inhibition of PLC β 1 expression is capable to promote the differentiation process leading to a recovery of γ -globin gene even in the absence of MTH. Our experimental evidences suggest that PLC β 1 signalling regulates erythropoiesis through miR-210. Indeed overexpression of PLC β 1 leads to a decrease of miR-210 expression after MTH treatment. Moreover miR-210 is up-regulated through both proliferation and differentiation events when PLC β 1 expression is down-regulated. Therefore we suggest a novel role for PLC β 1 in regulating miR-210 and our data hint at the fact that, in human K562 erythroleukemia cells, the modulation of PLC β 1 expression is able to exert an impairment of normal erythropoiesis as assessed by γ -globin expression.

Reference

Faenza I, Fiume R, Piazzzi M, Colantoni A, Cocco L. Nuclear inositide specific phospholipase C signalling - interactions and activity. *Febs J.* 2013;280:6311-6321.

Key words

phospholipase C β 1, erythropoiesis, K562, miR-210, γ -globin,