

Mehdi Banan

Post-doc: University of California at Berkeley (USA)

PhD: University of Texas at Austin (USA)

Assistant Professor

mbbanan@yahoo.com

Research Interests

β -thalassemia is the most common single gene disorder in Iran. To prevent its spread, a national program for premarital screening has been put into effect. However so far, no cure exists for those who are affected. One approach for treatment of β -thalassemia is reactivation of the fetal γ -globin gene. This reactivation can be mediated through certain drugs (e.g. hydroxyurea). However these drugs have major side effects. Therefore efforts are underway to create drugs that could selectively upregulate γ -globin expression. The research interest in our group revolves around γ -globin reactivation.

Current Projects

One set of projects centers around a better understanding of γ -globin upregulation by hydroxyurea (HU)—the only FDA approved drug for patients with hemoglobinopathies. Using an RNAi approach, we have shown that Creb1 is required for γ -globin induction in K562 cells. We are expanding our findings to better understand the HU/ γ -globin induction pathway in this cell line. Moreover, we are carrying out association studies of HU-responsiveness in patients with SNPs in well characterized quantitative trait loci (QTLs). Results of such experiments could be applied towards drug (HU) prescription for the Iranian β -thalassemia patients.

A second set of projects involves using siRNAs against γ -globin repressors to induce its expression. So far, we have shown that siRNAs against MBD2 can be used to induce γ -globin expression in K562 cells. These cells are being used to better characterize the mechanism of MBD2-mediated repression. A more long-term goal is to use this approach to induce γ -globin expression in primary erythroid precursor cells of β -thalassemia patients.

Selected publications

Banan M, Esmailzadeh E, Deilami Z, Farashi S, Esteghamat F, Imam A, Philipsen S, and Najmabadi H (2011). Creb1 is required for hydroxyurea-mediated induction of γ -globin expression in K562 cells. (submitted)

Banan M, Farashi S, Hosseini M, Esteghamat F, Gharesouran J, Pourfarzad F, Philipsen S, and Najmabadi H (2011). MBD2 can mediate γ -globin repression in K562 cells Mol Biol Rep (under revision).

Latham K, Pallotta V, Ford L, Byrom M, Banan M, Ku P-S, and Brown D. Six methods of inducing RNAi in mammalian cells. In "RNA Interference Technology: From Basic Science to Drug Development (eds. K Appasani)." Cambridge University Press, 2005.

Banan M, Puri N (2004). The Ins and outs of RNAi in mammalian cells. Current Pharmaceutical Biotechnol. 5(5): 441-450

Banan M, Rojas IC, Lee W-H, King H, Harriss J, Kobayashi R, Webb CF and Gottlieb PD (1997). Interaction of nuclear matrix-associated region (MAR)-binding proteins, SATB1 and CDP/Cux, with a MAR element in an upstream region of mouse CD8 α gene. J. Biol. Chem. 272(29): 18440-18452.