

MicroRNA that Utilizes Stem Cells for Functionally Impaired Bone Marrow

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Keywords: Therapeutic, cancer, microRNA, bone marrow, stem cell, transplantation

Summary:

The National Cancer Institute's [Laboratory of Cellular Oncology](#) is seeking parties interested in co-developing microRNAs for the treatment of damaged or impaired bone marrow.

Technology:

Researchers at the National Cancer Institute have discovered that a microRNA, miR126, mobilizes hematopoietic stem/progenitor cells (HSPCs) from the bone marrow into blood. These mobilized HSPCs can be easily collected from blood and used for reconstitution of ablated or functionally-impaired bone marrow. miR126 may also facilitate mobilization of bone-resident cancer cells into the circulation where they could be more easily targeted by cancer therapeutics. This discovery could replace current bone marrow transplantation. Rather than using the current non-selective agent G-CSF (which preferentially mobilizes mature myeloid cells rather than stem/progenitor cells), miR126 could be used for selective mobilization of the HSPCs needed for hematopoietic cell transplantation.

Additionally, miR126 could be used to mobilize malignant cells from the bone marrow and render them more easy targets for therapy. It was previously shown that the bone marrow cavity promotes the survival of many cells including tumor cells, and that such cells may easily die when removed from the bone marrow niche and moved to the blood. Therefore, this discovery could also change treatment of many cancers that arise within the bone marrow or metastasize to the bone. Since the mechanism by which miR126 promotes HSPCs/tumor cell mobilization is attributable to the inhibition of VCAM-1 expression, miR126 could be used to treat inflammatory states where the expression of VCAM1 provides an anchor for inflammatory cells at sites of inflammation.

Potential Commercial Applications:

- Method of mobilizing hematopoietic stem/progenitor cells (HSPCs) from the bone marrow to the blood
- Use in hematopoietic cell transplantation, and treatment of hematopoietic deficiency, hematological failure, and cancer treatment.
- To help mobilize cancer cells from the bone marrow and thus serve as adjuvant cancer therapy
- As an anti-inflammatory agent to reduce inflammatory cell infiltrates at sites of inflammation.

Competitive Advantages:

- Mobilization of HSPCs yielding high-level, selective and rapid mobilization of HSPCs to the peripheral blood.

Development Stage: Pre-clinical, *in vivo* data available

Patent Status: US provisional application 61/542,468 filed 02 Oct. 2011.

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