Inhibition Of Protein Tyrosine Phosphatase - Sigma For Hematopoietic Regeneration

Tech ID: 27473 / UC Case 2016-518-0

SUMMARY

UCLA Researchers have identified a novel pharmacological target for hematopoietic stem cell regeneration. They have developed small molecule inhibitors against the target and shown that the inhibitors cause rapid stem cell regeneration.

BACKGROUND

Depletion of white and red blood cells also known as Myelosuppression is a common side effect of chemotherapy and radiotherapy. Currently, one FDA approved growth factor is used that increases white blood cell count but there are no therapies for total blood cell regeneration. Hematopoietic stem cells (HSCs) offer an alternative therapy, as they are a reservoir of both white and red blood cells. However, the mechanistic details of factors that govern HSC regeneration and proliferation are not known and no therapeutics that can increase HSC regeneration are available.

INNOVATION

UCLA researchers in the Departments of Medicine and Chemistry and Biochemistry have identified a novel receptor, Protein tyrosine phosphatase sigma (PTPS) expressed on hematopoitic stem cells. They have characterized the mechanism extensively in vivo by knockout studies and found that PTPS regulates HSC regeneration. Based on their discovery, they have developed novel inhibitors targeting PTPS that cause dramatic hematopoitic stem cell regeneration in mice models and significantly improve the life span in mice receiving fatal irradiation.

APPLICATIONS

- Treatment of patients undergoing hematopoietic cell transplantation
- Treatment of myelosuppressive chemotherapy
- Treatment of anemia caused by chronic kidney disease in patients on dialysis

ADVANTAGES

- 15 fold increase in hematologic recovery
- Applicable for both white and red blood cell regeneration
- Extensively characterized mechanism of action

STATE OF DEVELOPMENT

- Identification and validation of PTPS receptor by knockout studies in mice
- Inhibitors developed and tested in mice models

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,822,299	11/03/2020	2016-518

RELATED MATERIALS

CONTACT

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OTHER INFORMATION

KEYWORDS

Hematopoietic stem cells, HSC, stem cells, long-term regeneration, HSC transplantation, protein tyrosine phosphatases, PTP, PTPS, myelosuppression, cancer, anemia

CATEGORIZED AS

- **Medical**
  - Disease: Autoimmune and Inflammation
  - Disease: Blood and Lymphatic System
  - Disease: Cancer
  - Stem Cell
  - Therapeutics

RELATED CASES

2016-518-0

▶ Quarmyne, M., Doan, P.L., Himburg, H.A., Yan, X., Nakamura, M., Zhao, L., Chao, N.J., and Chute, J.P. (2015). Protein tyrosine phosphatase-s regulates hematopoietic stem cell-repopulating capacity. J. Clin. Invest. 125, 177–182.

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Targeting Protein Tyrosine Phosphatase-Sigma to Augment Hematopoietic Reconstitution

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