Unappreciated dynamism of blood cell production

February 7 2011

The bone marrow stem cells responsible for generating new blood cells are less fixed and more flexible than previously thought, according to a paper published online on February 7 in the *Journal of Experimental Medicine*.

Some earlier studies suggested that these hematopoietic stem cells (HSCs) come in two distinct varieties: those that remain dormant during times of health but possess the ability to regenerate the whole blood system after trauma such as irradiation or chemotherapy, and those that divide frequently and contribute to new blood production during times of health but lack the capability of restoring the whole blood system after trauma.

Using a new technique to label and track mouse HSCs, Markus Manz and colleagues find that at any given time, cells harboring the capacity to restore a wiped-out blood system can actually be found in both rapidly dividing and dormant HSC populations. In fact, with age, HSCs tend to shift status from rapidly dividing to dormant. Yet upon encounter with life-threatening bacteria, dormant HSCs quickly awake, divide and replicate themselves.

These findings suggest that the burden of blood cell production may be more equally shared than previously realized among all HSCs. Whether human HSCs exhibit similar on-demand adaptability remains to be determined.

More information: Takizawa, H., et al. 2011. *J. Exp. Med.* doi:10.1084/jem.20101643