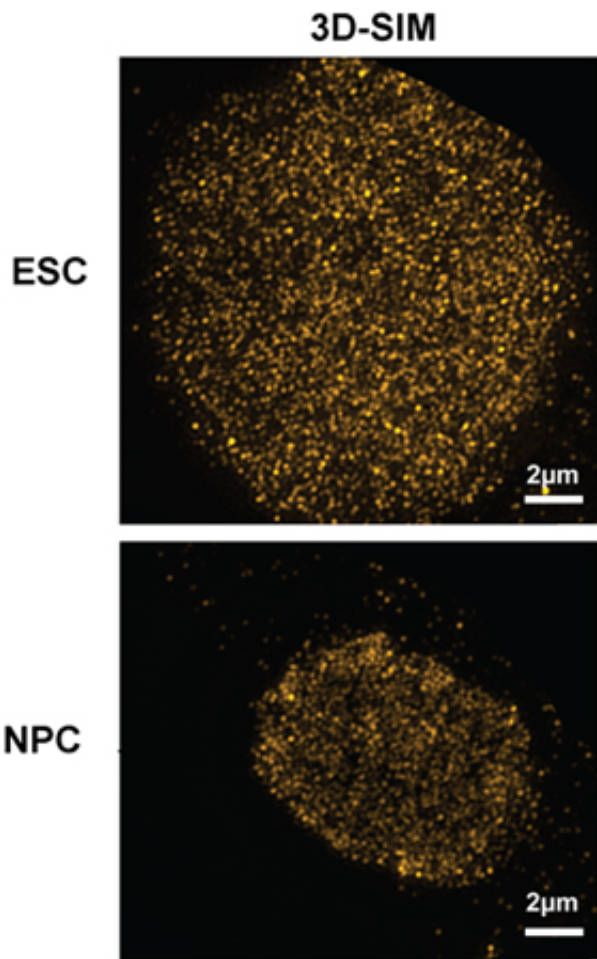


Stem cells have more reserves for DNA replication

July 17 2015, by Bill Hathaway



Embryonic stem cells, which give rise to all cells, have greater reserves of molecular complexes called dormant origins than specialized stem cells such as neural progenitor cells shown here. The complexes help dividing cells respond to stress and accurately copy DNA.

In cell division, nothing is as important as the precise replication of billions of genetic letters that make up DNA. Since this genomic integrity is so fundamental to survival, scientists had assumed that replication mechanisms operate the same way in all cells, which depend in part on molecular reserves called dormant origins. However, stem cells—which give rise to many different cell types—have more of these reserves at hand that help them deal with the ill effects of stress, reported Yale researchers on July 16 in the journal *Stem Cell Reports*.

Senior author Haifan Lin, director of the Yale Stem Cell Center, explains these molecular reinforcements are normally dormant but in times of stress are activated. "They are like construction workers that can be called in during bad weather to make sure the job is completed," Lin said.

Embryonic stem cells have more of these reinforcements than any type of cell, but if they lack these reserves, the specialized stem cells they generate, such as [neural stem cells](#), will also lack dormant origins

Neural stem cells lacking these reserves do not respond well to stress, and in mice with this lack, brain development progresses much more slowly. A shortage in dormant origins might cause the human condition Meier-Gorlin Syndrome, a form of dwarfism that starts during fetal development.

More information: "Embryonic Stem Cells License a High Level of Dormant Origins to Protect the Genome against Replication Stress."
DOI: [dx.doi.org/10.1016/j.stemcr.2015.06.002](https://doi.org/10.1016/j.stemcr.2015.06.002)

Provided by Yale University

Citation: Stem cells have more reserves for DNA replication (2015, July 17) retrieved 17 April 2024 from <https://phys.org/news/2015-07-stem-cells-reserves-dna-replication.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.