MedicalXpress

Nixing immaturity in red blood cells

May 4 2008

A process of self-digestion called autophagy prompts the maturation of red blood cells. Without a protein called Nix, the cells would not effectively rid themselves of organelles called mitochondria and consequently become short-lived, leading to anemia, said researchers at Baylor College of Medicine in Houston in a report that appears online today in the journal *Nature*.

“It’s changed our thinking on autophagy,” said Dr. Jin Wang, assistant professor of immunology at BCM and senior author of the report. During autophagy, the cell forms an envelope or vesicle around components of the cell that need to be degraded and removed. The vesicle then fuses with a cellular component called a lysosome that degrades its contents. The inclusion of components in the cell by autophagy vesicles was generally considered to be nonspecific.

“This is not a random process,” said Wang. “Nix is instructing the cell to get rid of these mitochondria.”

Nix accomplishes this task by disrupting the mitochondrial membrane potential (represented by difference in voltage across the inner membrane of the mitochondria. The interior is negative and the outside positive. The difference generates a force that drives the synthesis of ATP, the cell’s energy molecule).

“We think the finding is not limited to the clearance of mitochondria in red blood cells,” said Wang. “When other cells get old or stressed, their organelles may become damaged and need to be cleared by autophagy

for quality control. If the cells lack such quality controls, they might have problems that result in aging, cancer and neurodegenerative diseases."

"It helps get rid of old or damaged mitochondria," he said. "It is a way to keep the cell functioning without going through programmed cell death (apoptosis)."

"Such specific regulation of autophagy may also be important for cell types in the muscle, brain and pancreas," said Dr. Min Chen, assistant professor of immunology at BCM and a corresponding author of this work. "The next step is to identify proteins interacting with Nix for mitochondrial quality control by autophagy". Other factors may also regulate this process in addition to Nix, said Hector Sandoval, a BCM graduate student who is the first author of this paper.

Source: Baylor College of Medicine

Citation: Nixing immaturity in red blood cells (2008, May 4) retrieved 20 April 2024 from https://medicalxpress.com/news/2008-05-nixing-immaturity-red-blood-cells.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.