

Keeping up with demand for red blood cells

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(Medical Xpress) -- Two cellular proteins team up to provide a steady supply of red blood cells (RBCs), according to a study by Lizhao Wu, PhD, of the University of Medicine and Dentistry of New Jersey-New Jersey Medical School, and colleagues. The findings have been published in the journal *Blood*.

RBCs express [hemoglobin](#), which carries essential [oxygen](#) to the body's tissues and organs. When RBCs are in short supply or are destroyed in large numbers, anemia ensues. Researchers have previously shown that an anti-cancer protein called retinoblastoma (Rb) is essential for the efficient differentiation of new RBCs, as its absence results in mild anemia.

Prior research has shown that many of Rb's functions rely on its binding to a family of proteins called E2F transcription factors, which either activate or repress gene expression. Wu and colleagues demonstrate for the first time that Rb can also functionally interact with E2F family members (i.e., E2F6, E2F7, E2F8) that lack the Rb-binding domain, suggesting a novel mechanism of Rb as an anti-cancer protein by its functional (rather than physical) interaction with non-Rb-binding E2Fs.

For this study, investigators focused on whether this mechanism would permit E2F8 to be a potential catalyst for RBC production when combined with Rb, and they found that mice whose RBC precursor cells lacked both Rb and E2F8 developed severe anemia, despite substantially increased production of erythropoietin, a protein that drives early RBC differentiation. The anemia was attributed to a profound defect in the

late stages of RBC differentiation and the destruction of mature RBCs.

Exactly how these proteins prompt the generation of [red blood cells](#) is not yet clear, but they most likely co-repress common genes that are critical for RBC terminal maturation. This study may help identify new strategies to treat anemia, particularly in patients who fail to respond to erythropoietin.

The University of Medicine and Dentistry of New Jersey (UMDNJ) is New Jersey's only health sciences university with more than 6,000 students on five campuses attending the state's three medical schools, its only dental school, a graduate school of biomedical sciences, a school of health related professions, a school of nursing and New Jersey's only school of public health. UMDNJ operates University Hospital, a Level I Trauma Center in Newark, and University Behavioral HealthCare, which provides a continuum of healthcare services with multiple locations throughout the state.

More information: [bloodjournal.hematologylibrary ... 119/19/4532.abstract](#)

Provided by University of Medicine and Dentistry of New Jersey

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