

Stem Cell Research Made Safer with Latest Discovery

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(PhysOrg.com) -- A new development in stem cell research has resulted from a completed study by a collaboration of scientists using the drug Rapamycin to inhibit mTOR, an intracellular protein necessary in cell proliferation. UCR's Jiayu Liao, assistant professor in the Department of Bioengineering at Bourns College of Engineering, recently published a paper on the results in the Proceeding of the National Academy of Sciences dealing with human embryonic stem cell pluripotency.

His team inhibited mTOR using Rapamycin, a drug approved by the [Food and Drug Administration](#), and found that pluripotency (the ability to create all cell types) was impaired, stem cell self-renew was prevented, and endodermal and mesodermal differentiation were enhanced.

“Stem cells can potentially develop into cancer,” Liao said. “That’s why it is important to be certain that any stem cells introduced into patients do not remain pluripotent, which has the potential to form tumors. The use of Rapamycin could potentially prevent this problem.”

Stem cells can differentiate into and of the three germ layers: the endoderm (interior stomach lining, [gastrointestinal tract](#), the lungs), the mesoderm (muscle, bone, blood, urogenital), or the ectoderm (epidermal tissues and nervous system). Pluripotent stem cells can give rise to any fetal or adult cell type. However, alone they cannot develop into a fetal or adult animal because they lack the potential to contribute to extra embryonic tissue, such as the placenta.

“You don’t want to maintain pluripotency when using stem cells for treatment,” Liao said. “You want them all to differentiate into one of the three germ layers.”

The discovery could have a significant impact on the future use of [stem cells](#) in regenerative medicine, he added. Rapamycin itself is also an [immunosuppressant](#) which prevents rejection of organ transplantation from the host.

“It really opens the door for [stem cell research](#) towards translational medicine” he said.

In addition, because the drug is FDA approved, there is no need to order clinical trials for safety so the method can be placed into treatment immediately.

Provided by University of California, Riverside

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