New approach to treating breast and prostate cancers

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In a new approach to developing treatments for breast cancer, prostate cancer and enlarged hearts, Loyola University Chicago Stritch School of Medicine researchers are zeroing in on a workhorse protein called RSK.

When activated, RSK is involved in cell survival, cell proliferation and cell enlargement. These properties contribute towards cancer progression, heart enlargement and tumors associated with a genetic disease called Carney complex. Loyola researchers have discovered that a regulatory protein binds to RSK. This regulatory protein effectively keeps RSK's activity in check.

In a study to be published in the Journal of Biological Chemistry, Patel and colleagues located the specific region of the regulatory protein that binds to RSK. The study was published online Jan. 4 in advance of print publication.

"The implications are widespread, and will also change textbooks for students," said Tarun Patel, PhD, chairman of the Department of Molecular Pharmacology & Therapeutics at Loyola University Chicago Stritch School of Medicine.

It was previously known that the regulatory protein that binds RSK is also associated with another enzyme known as PKA. PKA is critical in maintaining normal body functions including heart rate, contraction of the heart, blood pressure, hormone release, learning and memory. PKA also is involved in modulating tumor growth and progression. Because

RSK and PKA compete for binding with the same regulatory protein, they end up modulating each other's activities.

These fundamental findings could point toward new approaches to developing drugs to keep RSK or PKA in check. Such drugs would, in effect, do the job of the regulatory protein. This could prove useful in treating conditions in which RSK is activated, such as breast and prostate cancer and heart enlargement.

Patel said this discovery is also of great importance for patients with Carney complex. Carney complex is an inherited disease that includes such symptoms as spotty skin pigmentation, benign or cancerous tumors of hormone-producing glands, and unusual benign tumors in the heart that can cause fatal heart attacks. Approximately 500 cases have been reported in the United States.

It's been known for years that Carney complex is associated with mutations that cause a deficiency of the regulatory protein that the Patel lab discovered binds to RSK. This would lead to activation of RSK in Carney complex patients and contribute to tumor growth. Currently there are no drugs to specifically treat Carney complex. Therefore, developing medications to inactivate RSK could prove to be an important new therapeutic approach for Carney complex patients.

Provided by Loyola University