Study finds tree compound kills cancer cells

A new derivative of a compound found in the bark of a rare Chinese tree has powerful anticancer properties and a low toxicity profile, according to researchers at Roswell Park Comprehensive Cancer Center.

Results of their study of the effects of the compound F118 in pancreatic cancer were published this month in the Journal of Experimental & Clinical Cancer Research.

Pancreatic cancer is one of the most difficult cancers to treat. Even with aggressive treatment, only 6 to 8 percent of patients will survive five years beyond the time of diagnosis.

Pancreatic tumors are very dense, making the delivery of cancer-fighting drugs challenging, and most tumors quickly develop resistance to treatment.

Camptothecin, a compound naturally found in tree bark and used in traditional Chinese medicine for centuries, was first isolated more than 50 years ago for use as an anticancer agent. Although several thousand synthetic camptothecin analogues have since been developed and tested, only two – irinotecan and topotecan – have been approved by the FDA for cancer treatment.

Both target a protein critical for the growth and spread of cancer cells, but because that protein is also needed for renewal and growth of normal tissue, irinotecan and topotecan are highly toxic to humans, severely limiting their treatment benefit. A team of Roswell Park researchers led by Fengzhi Li, associate professor of oncology in the Department of Pharmacology and Therapeutics, previously found that a novel approach that does not use the protein as its anticancer therapeutic target effectively eliminated human colorectal and head/neck tumors that had become resistant to the two FDA-approved camptothecin compounds.

Encouraged by these results, Li and his team tested the effectiveness in preclinical pancreatic cancer models. In the current study, researchers found that the newly derived compound, either alone or in combination with other chemotherapeutic agents, preferentially killed drug-resistant cancer cells and reduced the formation of new tumor spheres by killing cancer stem cells. The approach also was generally well tolerated at therapeutic dose levels.