

Innovative approach to treating pancreatic cancer combines chemo- and immunotherapy

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VCU Massey Cancer Center and VCU Institute of Molecular Medicine (VIMM) researchers discovered a unique approach to treating pancreatic cancer that may be potentially safe and effective. The treatment method involves immunochemotherapy - a combination of chemotherapy and immunotherapy, which uses the patient's own immune system to help fight against disease. This pre-clinical study, led by Paul B. Fisher, M.Ph., Ph.D., and Luni Emdad, M.B.B.S., Ph.D., found that the delivery of [pIC]PEI - a combination of the already-established immune-modulating molecule, polyinosine-polycytidylic acid (pIC), with delivery molecule polyethlenimine (PEI), a polymer often used in detergents, adhesives and cosmetics - inside pancreatic cancer cells triggers cancer cell death without harming normal pancreatic cells.

Pancreatic cancer is one of the deadliest cancers, with an overall five-year survival rate of less than six percent. Its high fatality is attributed to failure to diagnose the disease before it spreads to other organs, as well as its resistance to current therapies. Surgical removal of the cancer, chemotherapy and radiation each offer little resistance against this aggressive disease.

"Pancreatic cancer is currently the fourth leading cause of cancer death in the US. Developing an effective treatment is a vital step, and immunochemotherapy may be the key," said Emdad, member of the Cancer Molecular Genetics research program at VCU Massey, assistant

professor in the Department of Human and Molecular Genetics at VCU School of Medicine and member of the VIMM.

Published in *Cancer Research*, this is the first study that links the proteins involved in programmed cell death as prime mediators in cancer-specific killing by [pIC]PEI. Emdad and Fisher have found that, in vitro (in cell cultures), [pIC]PEI selectively induces cell death in pancreatic [cancer cells](#), and that, in vivo (in animal models), [pIC]PEI also inhibited tumor growth via [cell death](#).

"Since [pIC]PEI is extremely and selectively toxic to pancreatic cancer cells both in vitro and in vivo, the use of this compound, alone and in combination with other therapeutic agents, could potentially lead to a novel, safe and effective approach for treating pancreatic cancer by directly attacking the cancer cell chemotherapeutically and stimulating the immune system to confront the cancer, an immunochemotherapy approach," said Fisher, Thelma Newmeyer Corman Chair in Cancer Research and co-leader of the Cancer Molecular Genetics research program at VCU Massey, professor and chair of the VCU Department of Human and Molecular Genetics, and director of the VIMM . "The results are promising, and we look forward to conducting more extensive pre-clinical studies. Our ultimate hope is to bring this innovative scheme into the clinic to treat patients with pancreatic cancer."

As the need exists for newer and more effective strategies to treat pancreatic cancer, these findings are critical. And while the current focus of this research is on [pancreatic cancer](#), this approach also has applications for melanoma, breast cancer and hepatocellular carcinoma. Several important questions related to [pIC]PEI will be explored in future research, including assessing its efficacy in additional and expanded in vitro and in vivo studies, and testing it in new combinations with conventional chemotherapies.

More information: *Cancer Research*,
www.ncbi.nlm.nih.gov/pubmed/25205107

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