

■ Feature

Ad-REIC vaccine: A magic bullet for cancer treatment

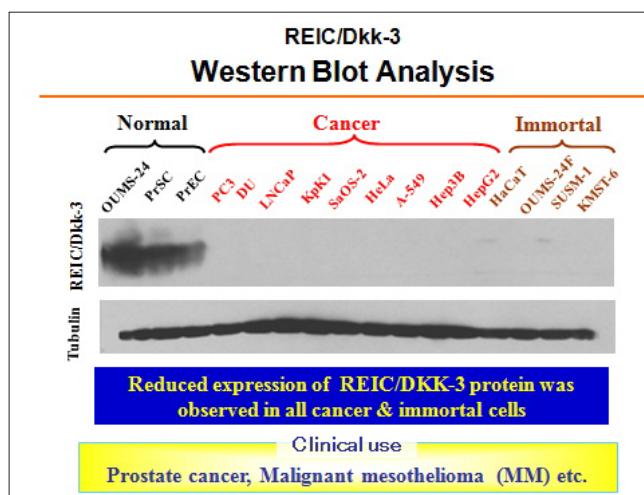
Hiromi Kumon

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Direct targeting and induction of immunological attacks on cancer cells are two widely used approaches for the treatment of cancer. But Professor Hiromi Kumon and colleagues at Okayama University have developed a third and potentially more effective approach based on Reduced Expression in Immortalized Cells (REIC)—a tumor suppressor gene discovered at Okayama University. “In 2005 researchers at the Okayama University Medical School forced its expression using adenoviral vector (Ad-REIC) and discovered it caused selective death (apoptosis) of prostate cancer cells without damaging normal cells,” explains Kumon. “Our approach is a combination of targeting and immunology for the treatment of cancer. Some people have referred to this as a ‘magic bullet’. We are working with international partners to develop an Ad-REIC/DKK3 vaccine to treat various intractable solid tumors.”



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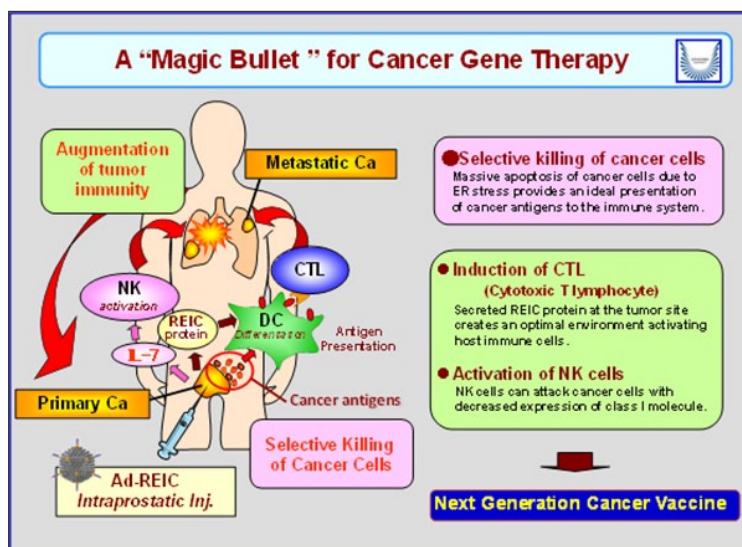
REIC/Dkk-3 Western Blot Analysis

The important aspect of cancer treatment using Ad-REIC is that it is highly selective, and normal cells are not affected, where the action of Ad-REIC occurs almost 100% in prostate cancer, ~90% in malignant mesothelioma, and also high rates in other cases including kidney cancer. “Our experiments show REIC will be applicable to a wide range of cancer treatment,” says Kumon. “The Ad-REIC is a cancer therapeutic gene that acts via the activation of JNK-c-jun pathway due to endoplasmic reticulum (ER) stress.” [1-3]

Kumon and colleagues are currently collaborating with international teams of researchers and clinicians on Phase I/II clinical studies for prostate cancer and malignant mesothelioma using Ad-REIC. These ‘proof of concept’ studies are being carried out in the USA and Japan to lay the foundations for innovative medicine for cancer, with the ultimate aim of collaborate with pharmaceutical companies to produce cancer vaccines.

In Japan, Momotaro-Gene Inc—an Okayama University venture company—and Okayama University own the intellectual property for this treatment.

Furthermore, in July 2014 Professor Kumon was selected by the Japan Science and Technology Agency (JST) as a recipient of the competitive and prestigious “NexTEP” program. This funding will be used to work with industrial partners to develop Ad-REIC cancer vaccine.



A "Magic Bullet" for Cancer Gene Therapy

Reference and further information

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- [2] Yuji Kashiwakura et al, "Down-regulation of Inhibition of Differentiation-1 via Activation of Activating Transcription Factor 3 and Smad Regulates REIC/Dickkopf-3-Induced Apoptosis", **Cancer Res** 68:8333-8341, [2008].
- [3] M. Sakaguchi et al, "Overexpression of REIC/Dkk-3 in normal fibroblasts suppresses tumor growth via induction of interleukin-7", **J Biol Chem** 284, 14236-14244, [2009].
- [4] 2008 Momotaro-Gene Inc. website: http://www.mt-gene.com/index_e.html
- [5] Japan Science and Technology Agency: <http://www.jst.go.jp/EN/index.html>