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NEWS ROUND-UP

First immune 'danger receptor' found

The first biological receptor that alerts the immune system to 'dangerous' or abnormal cell death has been discovered, according to research recently published in *Nature (doi:10.1038/nature07750)*.

The discovery of this 'danger receptor' is of major scientific significance as it could help improve the understanding of how immune cells work and consequently aid cancer drug discovery.

Cell death is a normal and essential process for keeping tissue healthy, but sometimes, in response to a trauma or injury, there is an abnormal type of cell death called necrosis.

It has been suspected for many years that sensing this type of cell death could kick-start an immune response because injury puts the body at risk of infection. However, until now, a receptor with this capability had not been found.

The receptor, called DNGR-1, is found on dendritic cells and, after coming across abnormal cell death, mobilises an immune response. Dendritic cells are messengers that instruct other immune cells to attack foreign invaders.

The researchers state that some tumours, in addition to infections, could trigger this type of immune reaction because they often contain clusters of cells undergoing abnormal cell death as they have a limited blood supply. This immune reaction helps the body fight cancer cells.

Dr Caetano Reis e Sousa (Cancer Research UK London Research Institute, London, UK), lead author of the study, said: "After a 15 year hunt, we've identified the first 'danger receptor' – one which senses abnormal cell death and then triggers an immune response."

"The detection of 'danger' could explain some situations when a tumour triggers an immune reaction against itself."

Dr Lesley Walker, director of cancer information at Cancer Research UK, said: "The concept of using the body's immune system to fight cancer has been around for decades, but advances in recent years have made this field of research a very exciting one."

"The results of this study are really important scientifically and a step towards understanding how to manipulate the immune system to treat cancer in the future."

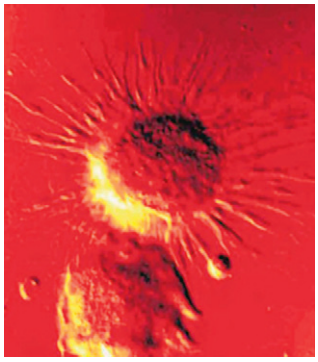

Image courtesy of Baylor Health Care System

Dendritic cells instruct other immune cells to attack invaders

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Multivitamins have no impact on cancer risk in postmenopausal women

The use of multivitamins has no impact on the risk of several common cancers, cardiovascular disease or death in postmenopausal women, according to a recent study published in the *Archives of Internal Medicine (2009* **169**:*3)*.

The largest study of its kind has found no convincing evidence of an overall association between multivitamin use and the risk of eight solid-tumour types, heart disease or mortality.

Multivitamin use is widespread due to strong consumer beliefs about the benefits that these supplements provide.

"Dietary supplements are used by more than half of all Americans, who spend more than $20 billion on these products each year. However, scientific data are lacking on the long-term health benefits of supplements," said Dr Marian L. Neuhouser (Fred Hutchinson Cancer Research Centre, Seattle, WA), lead author of the study.

The study investigated the associations between multivitamin use and several health outcomes among nearly 162,000 women enrolled in the Women's Health Initiative, one of the largest US prevention studies of its kind designed to address the most common causes of death, disability and impaired quality of life in postmenopausal women. The women were followed for about 8 years.

During the 8-year study period, nearly half of the enrolled women (41.5%) reported using multivitamins on a regular basis. However, no significant differences in risk of cancer, heart disease or death were found between multivitamin users and non-users.

"These findings are consistent with most previously published results regarding the lack of health benefits of multivitamins, but this study provides definitive evidence," said Dr Neuhouser. "The Women's Health Initiative is one of the largest studies ever done on diet and health. Thus, because we have such a large and diverse sample size, including women from 40 sites across the nation, our results can be generalised to a healthy population." However, since the study did not include men, Dr Neuhouser cautions that the results may not apply to them.

Dr Neuhouser added that women who want to ensure that they are getting optimal nutrition should concentrate on getting their nutrients from food rather than supplements.

"Whole foods are better than dietary supplements. Getting a wide variety of fruits, vegetables and whole grains is particularly important."

Potential prostate cancer marker discovered

A new biological marker, present in the urine of prostate cancer patients, has been identified which indicates whether the cancer is progressing and spreading, according to research recently published in *Nature (2009* **457**:*7231)*.

This finding, if confirmed, could lead to a simple test that would help doctors determine which prostate cancers are slow-growing and which require immediate, aggressive treatment.

The study reports that a molecule produced by the body's metabolism, known as sarcosine, could be used to differentiate between benign prostate tissue, localised and metastatic prostate cancer. The researchers also found that sarcosine may be associated with prostate cancer invasiveness and aggressiveness.

"One of the biggest challenges we face in prostate cancer is determining if the cancer is aggressive. We end up overtreating our patients because physicians don't know which tumours will be slow-growing. With this research, we have identified a potential marker for the aggressive tumours," said Dr Arul Chinnaiyan (Michigan Centre for Translational Pathology and University of Michigan Medical School, Ann Arbor, MI), senior author of the study.

The researchers looked at more than 1,100 metabolites in 262 samples of tissue, blood or urine associated with benign prostate tissue, early stage prostate cancer and advanced, or metastatic, prostate cancer. They identified about 10 metabolites that were present most often in the advanced cancer samples.

In particular, sarcosine appeared to be one of the strongest indicators of advanced disease. Sarcosine levels were elevated in 79 percent of the metastatic prostate cancer samples and in 42 percent of the early stage cancer samples. However, sarcosine was not found at all in the cancer-free samples.

In fact, sarcosine was a better indicator of advancing disease than the current, standard prostate-specific antigen (PSA) test. Given that sarcosine was also detected in the urine of men with prostate cancer, researchers are now hopeful that a simple urine test could be used in the future for screening and monitoring prostate cancer.

The researchers also found that sarcosine is involved in the same pathways that are linked to cancer invasiveness, suggesting that sarcosine could be a potential target for future drug development.

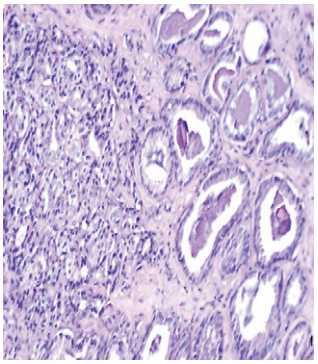

Image courtesy of National Cancer Institute/Otis Brawley

Histological slide showing prostate cancer

However, results are preliminary at this point and will need years of further testing and development before this technology would be available for patients.

"An important next step will be to do similar experiments on the other nine potential biomarkers identified in this study," added Dr Chinnaiyan. "For reliable diagnosis of aggressive disease, we need to have panels, not just rely on a single metabolite."