Ask the expert

What do proteins do? Why do scientists refer to them so much when they talk about cancer treatments?

Proteins are the products of genes. Different genes encode for distinct proteins that carry out biological processes such as cell growth and division.

As proteins are the workhorses of both cancerous and normal cells, they are the main targets of anti-cancer drugs, although some drugs target DNA.

For chemotherapy drugs that act on proteins, cells are killed because the actions of the proteins involved in basic cellular processes, such as cell division, are blocked.

As these proteins are crucial to normal and cancer cells alike, chemotherapy is often not selective, so side effects are common.

There is now an emerging concept of target-directed therapeutics.

It is based on the notion that cancer development is triggered by proteins whose levels of expression or activity have gone awry.

Taking advantage of the "addiction" of cancer cells to these proteins – which often belong to a class called tyrosine kinases – researchers have developed drugs that act specifically against these abnormal proteins.

Such drugs affect mainly cancer cells, while normal ones are spared.

A considerable number of target-directed therapeutic drugs have been approved by the United States Food and Drug Administration.

Several of them are in clinical use in Singapore.

They include the tyrosine kinase inhibitors Gefitinib and Gleevec, for the treatment of lung cancer and leukaemia respectively.

Major efforts are under way worldwide to find new protein molecules that are responsible for cancer formation, to increase the pipeline for target-directed therapeutics.

Answer provided by Dr Lim Yoon Pin, senior scientist and principal investigator, Oncology Research Institute, National University of Singapore.

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