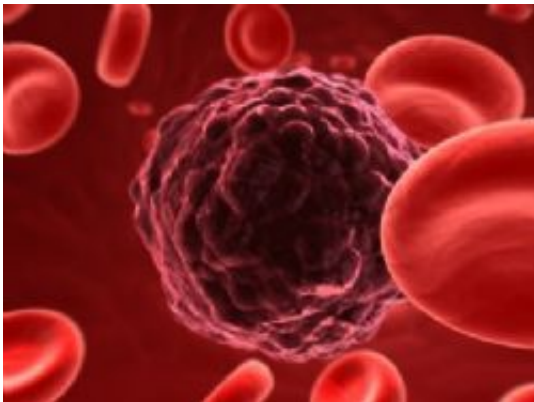


Tackling a large challenge for new modes of drug delivery

November 12 2013, by Marie Daniels



Cancer cell.

New treatments for prostate cancer, multiple sclerosis and cystic fibrosis could be developed following research being carried out into how medicinal 'biologics' can be delivered to diseased cells.

Currently only 15 per cent of protein targets in human [cancer cells](#) can be 'targeted therapeutically', rendering the remaining 85 per cent of proteins out of reach of traditional small drug treatments.

Dr Ishwar Singh, from the School of Pharmacy, University of Lincoln, UK, is now looking to develop a platform technology for tumour-specific delivery of biologics – large molecule drugs based on [nucleic acids](#), proteins and peptides with a potent and highly therapeutic effect.

He said: "Large molecule drugs are just that – too big to pass through to the [diseased cells](#). The challenge is to find a way to deliver these large molecules to the cells. Cell penetrating peptides (CPPs) are known to facilitate the delivery of therapeutic biologics into target cells.

Unfortunately current CPPs are highly toxic, which has prevented their widespread use. The aim of our project is to develop a non-toxic drug delivery method which enables CPPs to selectively pass through cell membranes of cancer cells, delivering the drug to the target site without causing toxicity.

"In the long-term we will be able to use this approach to treat conditions such as Multiple Sclerosis, [cystic fibrosis](#) and even some forms of cancer that are currently resistant to available drugs. We are developing a platform technology which could then be applied to a range of conditions."

Biologics differ from small drug molecules not only in terms of size, but also in how they are made, how they behave, their mode of action in the body and their suitability for certain drug forms.

Small, chemically manufactured molecules are the classic active substances and still make up more than 90 per cent of drugs on the market today. However, therapeutics based on large molecules, such as antibodies, are becoming increasingly important.

Small molecules can be processed into easily ingestible tablets or capsules. When the tablet dissolves in the gastrointestinal tract, the dissolved active substance is absorbed into the bloodstream via the intestinal wall. Small drugs can then reach the site of action in the body because of their tiny size. Their small structure and chemical composition also helps them to penetrate cell membranes.

Large [molecule drugs](#), which are created by biological or synthetic

processes, are made up of proteins, nucleic acids, sugars or a complex combination of these substances, or may be living entities such as cells. Delivery of these therapeutics to target sites is therefore a more complex process.

Dr Singh has been awarded a Royal Society Research Grant which will facilitate his research with colleague Dr Driton Vllasaliu for the next year.

Provided by University of Lincoln

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