Researched carried out at the University of Nottingham, in collaboration with Archimedes Development Ltd., has helped the company develop new ways of delivering drugs, such as pain-killers for cancer patients, through the mouth and nose.

Archimedes Development Ltd., a subsidiary of Archimedes Pharma Ltd., investigates ways of using two substances, chitosans and pectins, as drug delivery ‘vehicles’ to create drugs that can be administered orally or nasally. An Industrial Partnership Award (IPA) from BBSRC enabled researchers from the University of Nottingham to contribute their expertise in biochemistry to the development of these drug delivery vehicles.

Archimedes is now conducting clinical trials of a product based on a chitosan, developed during the collaboration. The research has also provided the company with more detailed information about the delivery vehicles they currently use in their drugs.

Taking medication by mouth or as a nasal spray is generally more pleasant for patients and easier for doctors than injecting it into the bloodstream. The problem with delivering drugs by mouth is that they pass quickly through the digestive system, so only a small proportion of the drug is absorbed into the body, making the process inefficient.

One solution is to find a substance that will attach the drug to the mucus inside the nose or gut, so it can be absorbed slowly through the nasal or gut lining and not be washed away before it is absorbed. Chitosans, which come from the shells of sea creatures like crabs and lobsters, and pectins, which come from fruit, have been identified as being suitable for this purpose.

The Nottingham scientists studied how chitosans and pectins interact with mucus, and found ways of using them to encapsulate drug molecules so they stick to the mucus of the nose and gut. They also characterised the properties of these drug delivery vehicles and assessed their stability over time. It is very important that the drugs are stable, because they must be able to sit on a shelf in a pharmacy for weeks or months without degrading.

“The work we did has helped Archimedes to better understand the materials they’re using to get the end...
Improving drug delivery

results their drugs produce,” says Professor Stephen Harding from the University of Nottingham, the lead researcher on the project, “and that’s crucially important.”

The collaboration provided benefits for the researchers as well as for the industrial partner. They published a large number of papers based on their work with Archimedes, and the postdoctoral researcher working on the project gained valuable industrial experience which helped him secure a permanent job as a lecturer.

The IPA also cemented the relationship that already existed between Harding’s research team and Archimedes. One of Harding’s PhD students is now working on chitosans in partnership with the company.

REFERENCES

1 Archimedes Pharma Ltd. Product Development


6 Professor Stephen Harding, University of Nottingham, http://www.nottingham.ac.uk/biosciences/people/steve.harding