

Cancer: Better treatment through better drug delivery

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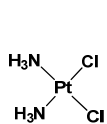
Why?

- Cancer is the 2nd biggest killer in Scotland.
- The drugs used to treat cancer attack healthy as well as cancerous cells.
- Better targeting of cancers is needed to make the drugs more effective.

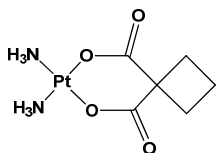
Who?

Dr Nial Wheate (Inorganic Chemist)
Dr Oliver Sutcliffe (Organic Chemist)
Professor David Flint (Cell Biologist)
Dr Sarah Brown (Postdoctoral Chemistry Researcher)
Gordon Kirkpatrick (PhD Chemistry Student)

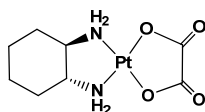
How?



cisplatin

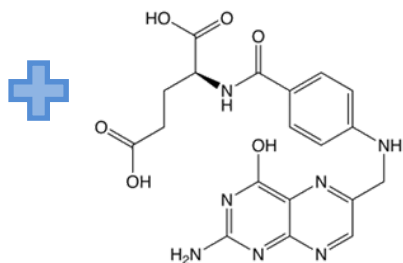


carboplatin

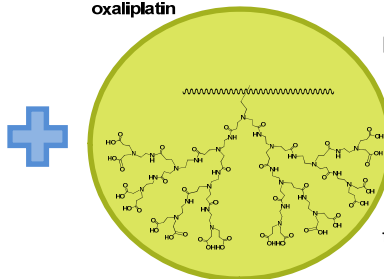


oxaliplatin

Platinum-based drugs are one of the most widely used and successful class of anticancer agent.



Folic acid is an essential substance used to make DNA. Cancer cells need lots of folic acid to grow. We can use folic acid to target the drugs to the cancer cells.



Dendrimers are nano-metre sized, spherical polymers. We can attach platinum drugs to the dendrimers using simple chemistry techniques.

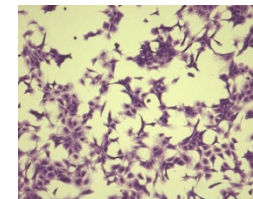
Drugs that are able to better recognise cancer cells. This means that the side-effects will be less severe (happier patients) and more drug will get to the Tumour (kill rate of drug higher)

Results!

- We can attach cisplatin to the surface of the dendrimers.
- The number of drug molecules we can attach increases with increasing dendrimer size.
- The cisplatin drug molecules can be released from the dendrimer and can go on to bind to DNA (their target inside cancer cells).
- Dendrimers release the drugs slowly, so we can use them as a controlled release mechanism.

But do they work?

- Ahhhhh! No! When tested in human ovarian cancer cell lines (petri dish like experiments), the dendrimer-drug complexes had no activity at all.



What does this mean?

- **Possible:** Dendrimer-drug complexes don't work.
- **More likely:** Our cancer test doesn't work for these types of drugs and we may need to use different tests to analyse them.

What next?

- Attach folic acid to the dendrimer-drug complexes.
- Use different tests (maybe in vivo animal tests) to examine whether they work.

Folic acid directed delivery of platinum(II)-based anticancer drugs using PAMAM dendrimers: Nial J. Wheate, Oliver B. Sutcliffe & David J. Flint, Strathclyde Institute of Pharmacy and Biomedical Science, University of Strathclyde.