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A chemist highlights promising organometallic drugs.

Traditionally, the compounds we use to fight cancer come in two flavours. Inorganic drugs, such as cisplatin — a small molecule with a platinum core — are the workhorses of chemotherapy. They are generally highly toxic to cells, not particularly selective, and are accompanied by side effects ranging from vomiting to kidney damage. Larger organic drugs offer a more targeted but weaker approach. They can selectively pick off key enzymes, but may work on only a narrow range of cancers.

In the search for more effective anticancer weaponry, hybrids of inorganic and organic components — organometallic drugs — are increasingly important. Once thought of as unstable, highly toxic species, these compounds are now being developed by chemists to treat a broad range of tumours and to overcome platinum-resistant cancer cells. Like organic drugs, they have a selective mode of action and so cause fewer side effects.

The dinuclear ruthenium-arene compounds trialled by Bernhard Keppler of the University of Vienna and his colleagues are promising examples (M. G. Mendoza-Ferri *et al. J. Med. Chem.* **52**, 916–925; 2009). These highly cytotoxic compounds contain two ruthenium centres, separated by an adjustable organic linker. By tweaking the length of this chain, the researchers produced compounds that are as active as established platinum-based drugs in human tumour-cell lines.

What's more, the ruthenium drugs could kill tumour cells that were resistant to oxoplatin, a drug related to cisplatin. They work by linking DNA duplexes together, and can also bind histone proteins to DNA.

The compounds have now progressed to experiments in animals. By reducing side effects, I hope the drugs can improve the quality of life for patients undergoing chemotherapy.

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