Where the titanium Woozle wasn't? - Speeding cancer cells to an early death…

Nearly 40 years ago in the excitement of cisplatin, the first general anti-cancer based on useful but toxic platinum, many other metals go tried and some positive effects were found for titanium. It was natural to assume that both the platinum and titanium drugs operated exactly the same way – targeting the DNA in the nucleus. It was not long before the key overviews of this early literature said as much even though no quantified measurement of titanium within the cell was made at that time.

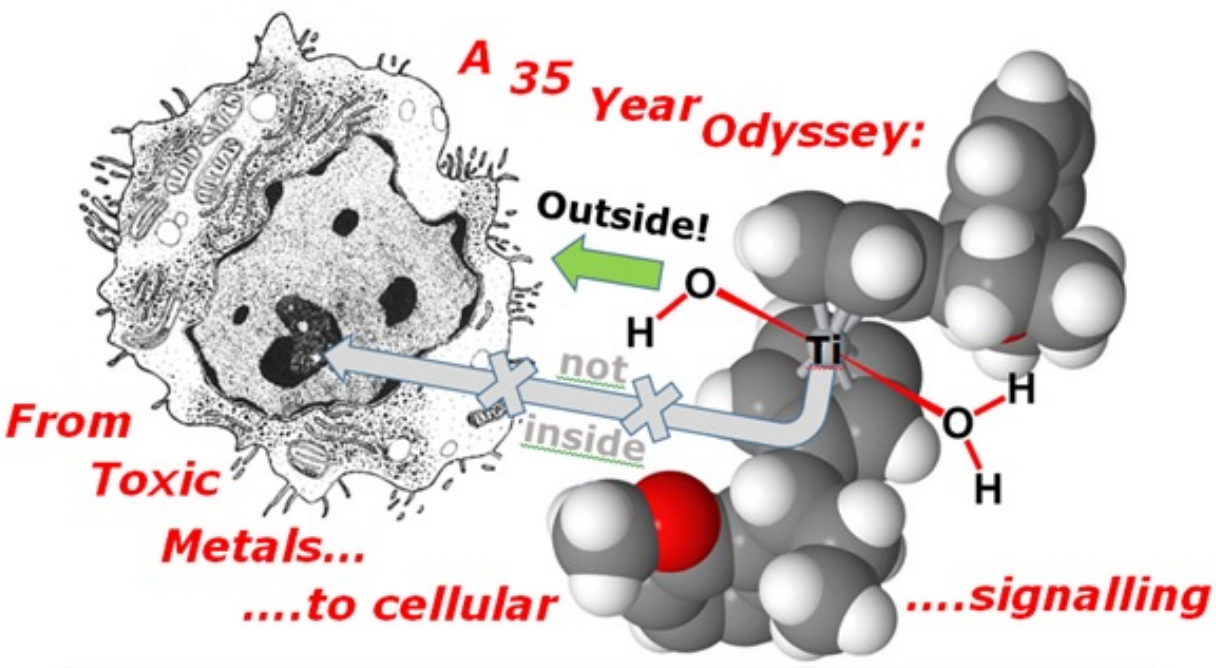

Fig. 1. Suggested in the 1980s to decompose to toxic titanium salts that are taken in the cell's nucleus recent work by Cini indicates that little decomposition of their titanium compounds takes place and instead signalling at the surface triggers cancer cells to blow-up and 'pop' like over inflated balloons.

All that were available were suggestions that 'some' titanium was there - via esoteric X-ray techniques and DNA synthesis suppression. Yet belief in titanium uptake to cellular nuclei has become widespread based on the citations of these early reviews. Sociologists sometimes refer to such events as 'Woozle effects' – as rather like Pooh and Piglet following their own (ever increasing) tracks in the snow as they walk round the spinney of trees additional citations

complicate the picture, rather than simplifying it. Recently, Cini (*Metallomics*, 2016) developed a nice concept to probe titanium cellular uptake. They designed a pair of titanium species (one shown in Figure 1) that are related a pair of gloves – they are mirror images, but they are not superimposable. If these titanium species just degenerate to provide free titanium then both the 'left' and 'right' based compounds should be equally toxic to cancer cells. However, if the compound stays intact then it is expected that one of the mirror images will be more active in killing the cancer cells. It turns out that the 'left' handed titanium species is more active and, in fact, it signals (via a presently unknown surface receptor) to the cell inducing an increase in the cell's 'metabolism' that leads to rupture of the cancer cell membrane and hence it's death (see the Cini movie). Fortunately, this signalling is somewhat selective for the cancer cells only opening the door for new pathways to treat stubborn carcinomas, such as pancreatic cancer.

Simon Woodward
School of Chemistry, University of Nottingham, University Park, Nottingham NG7 2RD, UK

Publication

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