



Contents lists available at ScienceDirect

## International Journal of Pharmaceutics

journal homepage: [www.elsevier.com/locate/ijpharm](http://www.elsevier.com/locate/ijpharm)

## Professor Ian G. Tucker: Man of many talents

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This special issue of the journal dedicated to Professor Tucker naturally will contain many allusions from colleagues around the world to Ian's varied research and academic activities and the great variety of topics investigated during his career. It is a pleasure for me to be able to write this note about our interactions, like many academics across continents, and to reflect on what Ian has achieved in extending the boundaries of pharmaceutics. It now seems eons ago since we first encountered each other. In 1981 I was invited to the University of Brisbane as a visiting professor from my home university in the west of Scotland, the University of Strathclyde. It was not only fascinating to be with a group of "overseas" pharmacy academics, but I also found that one of the incidental advantages of being on such an academic visit was that one was freed of one's daily work pressures. This enabled me to spend time in the University library and there I became acquainted with low density lipoproteins, Nature's carriers and targeting systems. On my return home it seemed to be an area worthy of exploration and to produce LDL-based drug delivery systems. Luck would have it that Ian chose to come to Scotland for a year in 1982 to join my group at the University of Strathclyde on a postdoctoral scholarship he had won. It was then that we explored together, *inter alia*, aspects of LDL behaviour not least their interactions with surfactants (Tucker, Florence and Stuart, 1982; Tucker and Florence, 1983; Florence, Tucker and Walters, 1984). Such was the specificity of the evolutionary design of LDL particles that any modification that we later attempted in the lab did not necessarily produce the targeted systems that we had hoped. As the Scots poet Robert Burns surmised: "*The best laid schemes of mice an' men gang aft a-gley.*"

Some years later I was invited to the University of Otago and I met up again with Ian whose new base it had been since 1991. We had similarities in that we had both been immersed in pharmaceutics, in its many forms and applications. We now have both been Deans of a School of Pharmacy. Such positions are regarded by some in academia as administrative posts, but Ian and I continued to pursue our research for that is the vital aspect of higher education and its leaders must be research active, not least to ensure that what is taught at undergraduate and postgraduate level is valid and current and so that future even speculative avenues can be explored. I am not sure if Ian ever had the sometimes fraught interactions with pharmacy professional bodies that I had in the UK, where there has been views expressed that basic science and research was far from the needs of the clinic or rather the "clinical"

pharmacist. Ian's papers with a variety of colleagues certainly prove otherwise, discussing *inter alia* ocular drug delivery, barriers and pathways of oral mucosal drug penetration, pulsatile drug release, drug transfer into human milk, dose dumping from matrix formulations and the delivery of growth factor in wound healing. The sheer variety of topics in the portfolio of his published papers is impressive and speaks loudly of the clinical importance of the science.

Ian's interests went beyond pharmacy and he has enjoyed inter-professional collaborations: his research output demonstrates this. Not least the paper on "what is the best way to deliver therapeutics and who decides?" which concludes that "perhaps it is reasonable to imagine delivery systems with time-varying dosing of selected drugs matched to meet patients' individual needs – even the non-adherent ones" (Tucker et al., 2013). Polypharmacy in a surgical unit and the consequences of the withdrawal of patient's medication was another topic for contemplation and discussion. The title of one paper (Tucker et al., 2015) drew my attention: "*A view on the less-than-rational development of drug delivery systems - the example of dry powder inhalers*". As he and his co-authors state therein it is about the "meandering course of science." We learn this from each of our own research interests, the nature of chance and intuition.

To many followers one of the admirable aspects of Ian's work has been his interactions with those outside conventional pharmaceutics. For example, working with psychologists on the effectiveness of aniracetam in model systems but its ineffectiveness on the working memory of pigeons (Phillips et al., 2019) and another a study of the GI tract of southern New Zealand's common brushtail possum (McDowell et al., 2005). One paper that intrigued me discussed the barrier function of the lower intestinal tract of salmon in the oral delivery of protein and peptide drugs, another the performance of subcutaneous injections in sheep. These have to be read to understand their wider significance. Most of us use animal models – mainly mice or rats – to understand processes such as drug absorption but have had little opportunity to explore other intrinsically unique species as Ian has with colleagues and to explore wider implications.

It was in 2015 that we met up again in Scotland when Ian and Judy paid us a visit to my home in Dundee. Apart from our common interest and devotion to the pharmaceutical sciences and their importance in the profession of pharmacy in all its aspects, Ian and I found we had other facets in common, namely our poetic efforts which we have been sharing since the Covid lockdowns affected us all. Students might appreciate

<https://doi.org/10.1016/j.ijpharm.2022.121870>

Received 19 May 2022; Accepted 24 May 2022

Available online 28 May 2022

0378-5173/© 2022 Published by Elsevier B.V.

through such writing that science can be expressed in other than turgid ways, that knowledge is not a collection of facts to be reproduced to pass exams, but to appreciate the fundamentals and applicability and to excite their interest and also to raise questions. One of my own short pieces during Covid begins:

*Where in the warm air are those myriads  
of tiny droplets, invisible yet there  
transporting Nature's subtly crafted spheres  
with no ploy other than to penetrate  
our lungs and spread in us and re-emerge  
to seek out other fertile places in  
our maskless fellows with their vacant eyes?*

Ian's "Nano-hero's odyssey" is an epic, the first verse of which starts

*Nanotechies have hopes of me to flood  
my drug payload at targets, via the blood,  
in spite of the encounters and challenges I have to surmount  
a thunder of dragons all jostling, beyond the count  
they dress me up in my peg coat for personal protection  
and decorate it with sweet ligands for attraction  
of a Siren receptor calling at my target site  
then engulfment, the lysosome, digestion, release, my plight....  
...but the nanotechnologists' searching will never cease  
to conquer, to find the elusive, the Golden Fleece.*

With retirement in sight, Ian shared with me a feeling that, by coincidence, I had as I moved the last files from my office in London in 2006 after 18 years residence in it. Ian wrote that his imagined

*"....diminishing circle of influence  
contracts with each letting go  
a shrinking sphere  
diminishing to*

*a full stop  
a dot...*

But in reality it will not. His love of life and family, his subject range and his scientific work in publications will live on. As he has written in one of his letters "In science there is no final word, no knockout, no authority beyond the reach of criticism and doubt...If traditional knowledge is taught.... teach it as science to be challenged, not dogma from magi." Such perspectives on his broad areas of research and how they have developed will certainly still be sought.

#### Declaration of Competing Interest

Author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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