

## Food For Thought - the development of drug loaded diets to improve both science and welfare

**MS A A RITCHIE, MRS P COLLIER, DR P CLARKE, DR A GRABOWSKA**

*Cancer Biology, Division of Cancer and Stem Cell Sciences, School of Medicine*

*Queen's Medical Centre, University of Nottingham NG7 2UH*

As an in vivo cancer unit, we grow human tumours in immunodeficient mice e.g. CD-1 nude, which may require the addition of hormones to promote growth e.g. prostate and breast tumours. Traditionally, the supplement was delivered by subcutaneous slow-release pellets. However, due to supply issues with the 5- $\alpha$ -DHT pellets, we had to develop another way to provide this hormone. We decided the best method for both staff and animals would be to supply it in a fortified diet, which would be less invasive and stressful to the animals while being simpler for the staff to deliver. We worked with a commercial diet company to formulate and produce the diet to ensure correct dosage delivery. Then we tested it using the LNCaP prostate tumour cell line and found it to be as effective in stimulating growth as the pellets. After this success, we decided to adopt this same method for 17- $\beta$ -Estradiol delivery, because these pellets can also cause additional side effects e.g. bladder calculi, urine scald, which we hoped would be alleviated by changing the delivery method. A test using the MCF-7 breast tumour cell line demonstrated that growth, while slower than in the pellet bearing mice, was sufficient for our studies, with no side effects apart from slight urinary retention, which was eliminated by removing the fortified diet for a few days. This led us to consider whether oral therapeutic drugs could also be delivered via diet, since ensuring the required dose is achieved via drinking water is difficult, due to spillage or reluctance to drink water containing unpleasant tasting compounds. Also, oral dosing can be stressful with welfare implications for the animal, requiring frequent restraint and invasive procedures. To this end, we have recently been involved in a therapy trial whereby a novel test compound for oral delivery was formulated as a diet. Administration via diet provides a simple solution for oral drug delivery, easily transferrable to a broad range of other animal model systems requiring regular oral dosing of substances e.g. stimulation of transgenic models. It is, therefore, a major refinement in welfare terms by reducing the need for invasive implants or injection regimes and by reducing side effects, while still generating consistent scientific outcomes.