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Role of ultrasound in the detection of apoptosis

Dear Sir,

It was delightful to see a thorough review of apoptosis-detecting radioligands, including the current state of the art and future perspectives (Lahorte et al., Eur J Nucl Med Mol Imaging 2004;31:887–910). It was also satisfying to read the reviewers' comment on alternative apoptosis detection techniques, including the complementary ultrasound-based approach developed by our research laboratories [1–3]. We have since gone beyond our initial publications and no doubt if the authors had looked into the ultrasound literature or contacted us we would have been able to gladly supply important additional information that would have made their review more balanced and exciting.

We have already published evidence that the technique can be used in tumour imaging in animals and patients [4] and most recently also established the detection sensitivity to be as little as 2.5% in an in vitro population of apoptotic or necrotic cells [5].

More importantly, the impetus behind development of a non-radiopharmaceutical-based method of apoptosis imaging includes the fact that radiolabelled agents cannot be given daily over many months of chemotherapy and radiation therapy, whereas modalities like ultrasound may be used on a daily basis with no deleterious effect. Additionally, there is emerging evidence that it will be possible to use lower-frequency ultrasound, with a greater penetration death and broader clinical application, for such a purpose [6–12]. In fact we have demonstrated this in our spectroscopic techniques down to 10 MHz [12]. Tissue characterisation methods using ultrasound should also permit the discrimination of apoptosis from necrosis or mitotic death, which annexin-V labelling alone cannot do [5]. Furthermore, nuclear medicine costs are prohibitive in modern health care whereas other imaging modalities such as ultrasound are comparatively inexpensive.

Finally, as oncologists we have concerns that the number of tumours in which apoptosis is very relevant is relatively limited when considering all tumours treated. This is true in particular amongst solid tumours and common tumours, which make up the majority of the patient tumour burden. Alternative methods beyond looking for apoptosis, be it by radiolabelling or other methods, must be identified.

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