



# **Microbubbles and ultrasound: An investigation of microbubble-cell interaction and development of an ultrasound delivery system**

*Raniska Tente*

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Microbubbles have been used for several decades as ultrasound contrast agents in diagnostic ultrasound imaging. However, their application in gene therapy as delivery vehicles has only recently been realised. The presence of microbubbles in close proximity to cells during ultrasound insonation can increase the efficacy of drug or gene delivery by inducing sonoporation. In this research project, experimental in-house microbubbles were used in order to establish the exact parameters that lead to sonoporation. Confocal imaging and 3-D reconstruction indicated the structure, morphology and size-distribution of these membrane-bound microbodies. Subsequently, cells were grown in an acoustically-transparent parallel membrane environment, where delivery of molecules of various sizes, in the presence of both in-house and Definity® microbubbles was investigated. The acoustic parameters were established for achieving sonoporation with the aid of a clinically relevant scanner in the presence of commercially available Definity® microbubbles.

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