There is now a substantial literature demonstrating the potential of surfactant stabilised microbubbles as drug delivery agents; particularly in combination with therapeutic ultrasound. Microbubbles provide a means of encapsulating drugs to avoid interaction with healthy tissue. They can be functionalized to enable them to be targeted to a specific tissue volume and drug release can be controlled temporally and spatially through exposure to a focused ultrasound beam. In addition, the biophysical and biochemical effects produced by an oscillating bubble can significantly enhance both the distribution of a drug within the tissue and its uptake at a cellular level. The underlying mechanisms however are still poorly understood. This talk will provide an overview of the relevant phenomena and their role in microbubble mediated delivery. The results of the authors' recent investigations into the role of microbubble composition and of inter and intracellular streaming will also be presented.