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Deformation of a soft interface by an oscillating microbubble¹ MARC TINGUELY, OMAR MATAR, VALERIA GARBIN, Imperial College London — Acoustically driven oscillating bubbles are used in biomedical applications, for instance to promote pore formation in cell membranes and enhance gene transfection, or to transiently open the blood-brain barrier, which is otherwise impermeable to drugs. However, control over the stresses generated by oscillating bubbles on cells and tissues is still lacking. We use high-speed video microscopy to observe the deformation of a soft interface (agarose gel, a hydrogel that is commonly used as tissue phantom) by the oscillations of a bubble. The mechanical properties of the hydrogel can be tuned to mimic different tissues. The deformation is measured by tracking the displacement of tracer particles embedded in the gel. The results show that the deformation is due to the "push and pull" motion of the bubble against the soft surface. The phase of the deformation varies with the distance to the bubble, which can be explained by the viscoelastic properties of the gel.

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Omar Matar Imperial College London

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