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Bubble-cell interactions with laser-activated polymeric microcapsules MICHEL VERSLUIS[1], GUILLAUME LAJOINIE, University of Twente, TOM VAN ROOIJ, ILYA SKACHKOV, KLAZINA KOOIMAN, NICO DE JONG, Erasmus MC Rotterdam, PHYSICS OF FLUIDS GROUP, UNIVERSITY OF TWENTE TEAM, BIOMEDICAL ENGINEERING, ERASMUS MC TEAM — Polymeric microcapsules that are made light-absorbing by the addition of a dye in their shell can generate cavitation microbubbles with spatiotemporal control when irradiated by a pulsed laser. These particles less than 3 μm in size can circulate through the body, bind to tissues and are expected to be readily detected, even if a single cavitation bubble is produced. In this paper, we study the impact of such cavitation bubbles on a cell monolayer and quantify it in terms of cell poration and cell viability. Two capsules formulations were used; the first one encapsulates a low boiling point oil and induced less cell damage than the second that was loaded with a high boiling point oil. We also report the generation of stable bubbles by the first capsule formulation that completely absorb the cells in their close vicinity.

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