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Acoustic cavitation of individual ultrasound contrast agent microbubbles confined in capillaries ALI ALMAQWASHI, DAVID MCINTYRE[1], Oregon State University- Physics Department, AZZDINE AMMI[2], Oregon Health & Science University- Cardiovascular Medicine Division — Ultrasound targeted therapies mainly rely on the inertial cavitation of ultrasound contrast agent (UCA) microbubbles. Our objective is to determine the cavitation acoustic pressure threshold for the destruction of UCA microbubbles inside cellulose capillaries. Acoustic emission from individual Optison^{TM} microbubbles confined inside a 200-μm diameter capillary was detected using a passive cavitation detection system. Excitation signals from a 2.25 MHz transmitter were applied to the microbubbles while their acoustic emission was detected by a broadband 15 MHz receiver. Time traces were recorded (100 MHz sampling, 12- bit), and frequency-domain analysis of the received signals was performed to characterize microbubble cavitation. The cavitation acoustic pressure threshold was found to be 1 MPa inside the capillary in comparison with $\sim$0.7 MPa previously reported for unconfined UCA microbubbles. This work provides a clearer understanding of the role of ultrasound contrast agent dynamics inside a capillary.

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