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Mechanical Trade-offs in Experimentally Evolved Multicellular Yeast SHANE JACOBEEN, JENNIFER PENTZ, WILLIAM RATCLIFF, PETER YUNKER, Georgia Tech — The evolution of multicellularity as much about physics as it is about biology, as selection acts on the physical properties of multicellular bodies. Nascent multicellular organisms are confronted by internal and external forces that act on large length scales and are capable of fracturing intercellular bonds. We study the evolution of the mechanical properties of multicellular 'snowflake' yeast that were selected for increased size over ˜1,500 generations[1,2]. While these snowflakes evolve to be larger by mitigating internal forces, they also become more susceptible to fracturing when faced with external compressive forces. Using confocal microscopy and direct mechanical measurements, we investigate the physical underpinnings and consequences of this strength-toughness trade-off. **References:** [1]W. Ratcliff *et al.* 2012. PNAS. 109:1959–1600. [2]W. Ratcliff *et al.* 2015. Nature Communications. 6:6102.

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