

Abstract Submitted
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On the need for a biomimetic breast device NICOLE DANOS, University of San Diego, REBECCA GERMAN, Northeast Ohio Medical University — The function of the mammary gland, a key anatomical innovation that led to the rise of mammals, is governed by solid-fluid mechanics. There is strong evidence that these mechanical interactions regulate the production of milk and the transport of milk through the lactiferous ducts and into the infants mouth. Solid-fluid mechanics determine the rate of milk flow and therefore may affect the safe coordination of sucking, swallowing and breathing in the infant. Additionally, links between breastfeeding, the material properties of the gland and breast cancer have been shown repeatedly. However, there is to date no direct way of characterizing breast mechanics during the physiological function for which it has evolved: infant feeding. We are developing an engineered biomimetic breast in which we can experimentally manipulate both structural and material properties of the gland. The device will be tested with an animal model of infant feeding, the pig, to measure the direct effect of gland mechanics on infant feeding. Data from these studies may lead to better designed feeding bottles for infants, milk pumps for both humans and agricultural mammals, and will provide the control mechanical environmental for studies of breast cancer mechanobiology.

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