Group #4

HUNEES: Developing a Breast Cancer Prevention Device

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Abstract

Breast cancer remains the most commonly diagnosed cancer among women worldwide, with approximately 80% of cases originating in the mammary ducts. While genetic mutations account for only 5–10% of cases, environmental contaminant entry through the ductal openings has been proposed as a significant contributing factor with no existing prevention strategy targeting this mechanism. HUNEES is a two-component, non-invasive nipple barrier device consisting of a reusable silicone cover and a single-use hypoallergenic adhesive patch, engineered to physically seal the lactiferous duct openings during daily wear and serve as an investigational platform for studying ductal contaminant entry. Across six prototype cycles and 54 wear trials conducted as an internal feasibility study, the device demonstrated zero adverse events, zero device displacement, progressive improvement in water seal performance from 60% penetration in Cycle 2 to 0% in Cycle 6, and sufficient adhesive retention throughout 12–20 hour daily wear. Short-term priorities include wear trials with an independent participant cohort under IRB-approved Protocol #813859, with long-term goals of assessing whether ductal occlusion reduces biomarkers of inflammation associated with environmental carcinogen exposure.