



Droplet-Scale Estrogen Assays in Breast Tissue, Blood, and Serum

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Abstract:

Estrogen is a key hormone in human reproductive physiology, controlling ovulation and secondary sexual characteristics. In addition, it plays an important role in the pathogenesis of breast cancer. Indeed, estrogen receptor antagonists and aromatase inhibitors (which block estrogen biosynthesis) are primary drugs used for treatment and prevention in at-risk populations. Despite its importance, tissue concentrations of estrogen are not routinely measured because conventional techniques require large samples of biopsies for analysis. In response to this need, we have developed a digital microfluidic method and applied it to the extraction and quantification of estrogen in 1 microliter samples of breast tissue homogenate (as would be collected with fine-needle aspiration), as well as in whole blood and serum. This method may be broadly applicable to conditions requiring frequent analysis of hormones in clinical samples (for example, infertility and cancer).

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