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## Description

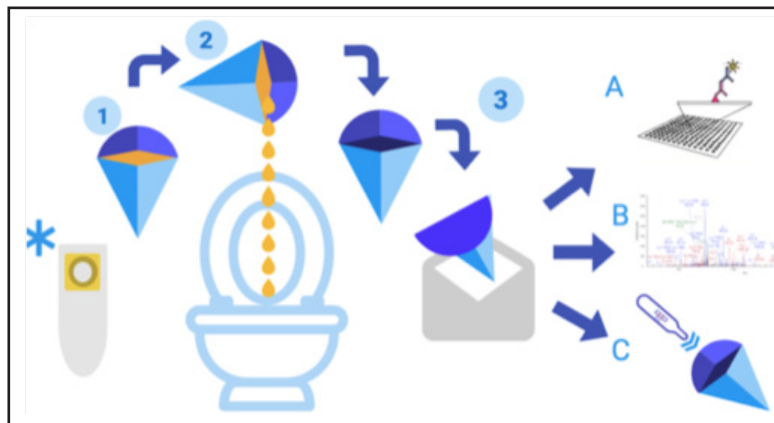
The collapsible collection vessel is a disposable, novel, "origami" device with integrated hydrogel nanoparticles. The nontoxic nanotechnology embedded within the vessel enhances the sensitivity of urinary biomarkers, like those from patients with active tuberculosis. Sampling does not require handling, transporting, or refrigerating liquid. The sample collection can be performed at home in one step and mailed in a dry, flat, confidential envelope. Sampling can also be paired with a point of care diagnostic for immediate results. The device can be used to screen a variety of individuals, including newborns and mothers.

## Problem Addressed

The collapsible collection vessel will lower the barriers to diagnostic testing for both individuals in underserved populations and community health centers that lack resources. The device also overcomes the need to collect invasive biosamples, such as sputum from newborns, by concentrating analytes distributed through the full volume of the urine. This test can be performed at home, encouraging early disease detection by expanding options for individuals who lack the ability to physically access health care providers. For hospitals, clinics, schools, churches, and other community health centers, the test preserves biomarkers without refrigeration and does not require trained personnel or lab equipment.

## Advantages

- Low cost
- Achieves a sensitivity 100 to 1000 times higher than existing technologies
- Urine sample can be collected at home
- No electricity or expensive equipment is required
- Can be manufactured and implemented directly within underserved regions



**Figure One:** User urinates into collection device, discards the urine, and sample is stored at room temperature for downstream analysis.

## Recent Publications

- L. Paris *et al.*, Urine lipoarabinomannan glycan in HIV-negative patients with pulmonary tuberculosis correlates with disease severity. *Sci Transl Med*, 9(420) (2017).
- N. Shafagati *et al.*, The use of nanotrap particles for biodefense and emerging infectious disease diagnostics. *Pathog Dis* 71, 69-76 (2013).