

CRISPR/CAS13A-RESPONSIVE AND RNA-BRIDGEED DNA HYDROGEL CAPILLARY SENSOR FOR POINT-OF-CARE DETECTION OF RNA. **Hui Wang**, Honghong Wang and X. Chris Le. University of Alberta, Division of Analytical and Environmental Toxicology, Department of Laboratory Medicine and Pathology, Faculty of Medicine and Dentistry, Edmonton, Alberta, T6G 2G3, Canada (hui19@ualberta.ca)

Point-of-care (POC) tests can complement centralized laboratory analysis and meet increasing needs for diagnostics and surveillance, especially in resource-limited settings and remote areas. The objective of this research was to develop a POC assay without the need for optical or electrical equipment. We developed a CRISPR/Cas13a-responsive and RNA-bridged DNA hydrogel capillary sensor for the direct and visual detection of specific RNA with high sensitivity. The capillary sensor was simply prepared by loading RNA-crosslinking DNA hydrogel film at the end of a capillary. When the CRISPR/Cas13a specifically recognized the target RNA, the RNA bridge in the hydrogel film was cleaved by the *trans*-cleavage activity of CRISPR/Cas13a, increasing the permeability of the hydrogel film. Different concentrations of target RNA activated different amounts of Cas13a, cleaving different amounts of the RNA bridge in the hydrogel and causing corresponding changes in the permeability of the hydrogel. Therefore, samples containing different amounts of the target RNA traveled to different distances in the capillary. Visual reading of the distance provided quantitative detection of the RNA target without the need for any nucleic acid amplification or auxiliary equipment.