Skysong Innovations
Advancing the Arizona State University Knowledge Enterprise

1475 N. Scottsdale Road, Suite 200
Scottsdale, AZ 85287-3538
Phone: 480 884 1996 Fax: 480 884 1984

Case ID:M14-153LC^
Published: 2/26/2020

Inventors

Junseok Chae
Jennie Appel
Joseph Liao

Contact

Jovan Heusser
jovan.heusser@skysonginnovations.com

Methods to Differentiate Healthy from Cancerous Cells

Obtaining a cancer diagnosis can be difficult, particularly for bladder cancer. Current bladder diagnostic strategies include either invasive cystoscopy or labor intensive urine cytology; neither of which is ideal.

Different types of cells, including cancer cells, have distinct biophysical properties. Cancer cells tend to spread out and have greater focal adhesions; subsequently they exert a stronger force on a surface than normal cells. While there have been many techniques explored in an effort to quantify the biophysical properties of cells, none have been utilized in diagnostic applications to differentiate between cancerous and non-cancerous cells.

Researchers at Arizona State University in collaboration with a researcher at Stanford University School of Medicine have developed a novel visualization platform to differentiate cancerous cells from healthy cells. Cells collected from urine, sputum, cervical swabs, peritoneal and pleural fluid, etc. are cultured on a thin silicone based membrane and allowed to grow. Because cancerous cells strongly adhere to and spread on the membrane, wrinkling or deformation occurs. This deformation is not seen with healthy cells. Quantitative measurement of membrane wrinkling represents a powerful, non-invasive diagnostic tool for early detection of common cancers, which may possibly enable less invasive therapies and enhanced human health.

This technology represents a foundation for the development of a small, powerful and non-invasive device to identify the presence of cancerous cells in clinical samples.

Potential Applications

- Non-invasive cancer diagnoses:
  - Bladder cancer (using urine)
  - Cervical cancer (using cervical swabs)
  - Lung cancer (using sputum)
  - Cancer in the abdominal and chest cavities (using peritoneal and pleural fluids)
- Fundamental studies of biophysical properties of cells
  - Monitoring cell traction force change upon various stimuli

Benefits and Advantages

- Qualitative - looks at number and length of wrinkles
- Non-invasive - can use a simple urine or other fluid sample
- Sensitive, rapid and accurate differentiation
- Minimal sample preparation

- Results interpretation does not require significant expertise
- Can be utilized with complex, heterogeneous bodily fluids without affecting wrinkle formation

For more information about the inventor(s) and their research, please see Dr. Chae's laboratory webpageDr. Liao's directory webpage