

The Smart Pregnancy Aptamer

A Breakthrough Innovation For Good

Story at a Glance

- ✓ Breakthrough innovation developed through unique partnership between UNICEF Office of Innovation and the Biotechnology Innovation Centre of Rhodes University.
- ✓ Aptamers are better biorecognition agents. These short chains of DNA molecules can bind with high affinity to a marker in urine or blood and are used to create diagnostic tests.
- ✓ Bio-engineered aptamer for pregnancy testing with the potential to save countless lives by making tests more affordable, transportable and accurate, enabling early antenatal care for at-risk women.
- ✓ Showcases UNICEF's vision and commitment to cause-related innovation through partnerships aimed at helping poor and under-served populations.
- ✓ Also partnered with cross-disciplinary team of Harvard students from Harvard Consulting on Business and the Environment to map routes to market and market potential.
- ✓ Market-driven approach to engage with organizations including private sector companies to develop tests using the aptamer to make these available at scale.
- ✓ Aptamers replace traditional antibodies derived from animals or cell and tissue culture.
- ✓ Chemically synthesized tests that use aptamers are less costly to manufacture, highly accurate and resistant to temperature and humidity, making them a breakthrough in serving poor and remote locations around the world.

A Cause-Directed Innovation

This Smart Pregnancy Aptamer can be used to create a smarter pregnancy test and is a prime example of the power of cause-directed innovation in addressing pressing humanitarian and development challenges globally. The UNICEF Office of Innovation is working with public and private sector organizations around the world to discover and harness innovation focused on addressing specific issues impacting poor and marginalized populations, especially children and women.

Pregnancy-related deaths have dropped some 34% globally since 2000, but still remain shockingly high. Some 2.8 million pregnant women and newborns die every year, mostly of preventable or treatable causes. Approximately 95% of these deaths occur in low and middle-income countries. Early pregnancy detection can save countless lives by enabling timely antenatal care. But most women in low-income countries cannot afford pregnancy tests, which can cost more than a day's income. Many pregnancy tests are also sensitive to changes in temperature and humidity and cannot be stored for long periods under basic conditions.

The Smart Pregnancy Aptamer addresses these challenges, while also being able to create a diagnostic that can identify potentially high-risk pregnancies. The aptamer was developed by the Biotechnology Innovation Centre of Rhodes University with visionary direction and funding from UNICEF. The UNICEF Office of Innovation is also working with RUBIC toward development of other biotech-based diagnostics for malaria and HIV/AIDS. Harvard Consulting on Business and the Environment provided research and analysis on the best routes to market to reach vulnerable women.

Bringing a Smarter Pregnancy Aptamer to Market Worldwide

UNICEF and Rhodes University share the vision of making pregnancy tests available to every woman in the world. They intend to work with a wide range of visionary partners in the private sector, non-profits, academia and beyond to achieve this vision to develop and bring tests to market at scale. Tests using aptamers (instead of antibodies) have the added benefit of being manufacturable in locations closer to in-need populations if this is an attractive model.

About UNICEF Office of Innovation

UNICEF, originally called the United Nations International Children’s Emergency Fund, now officially United Nations Children’s Fund, is an agency of the United Nations responsible for providing humanitarian and developmental aid to children worldwide. UNICEF’s Office of Innovation is an agile global architecture aligning with diverse partners to boldly explore, iterate and scale innovative approaches and technologies to deliver equitable impact and opportunity for every child today, and at an accelerated pace of change for generations to come. It incorporates an agile, creative and transdisciplinary team tasked with identifying and advancing technologies and practices that strengthen UNICEF’s work, improving how programs and services for the world’s children and families are designed, delivered and financed. UNICEF Innovation fosters collaboration across sectors and borders, building partnerships around “frontier technologies” to drive scalable solutions to global problems. These innovations range from new digital tools to improve learning opportunities for young people, to social innovations that improve health and safety, to advanced biotech solutions, such as the Smart Pregnancy Aptamer.

About the Rhodes University Biotechnology Innovation Centre (RUBIC)

Established in 2014, Rhodes University Biotechnology Innovation Centre is the new academic home of the discipline of Biotechnology at Rhodes, providing a transdisciplinary research and learning environment in biotechnology. Core discipline staff are supported by Research and Professional Associates representing academia, industry and the private sector. In addition to teaching and research, the Biotechnology Innovation Centre is engaged in biotechnology innovation and the public engagement and communication of the field. RUBIC plays host to the Department of Science and Innovation/ National Research Foundation South African Research Chair in Biotechnology Innovation & Engagement. RUBIC also heads up a national facility, the DSI Nano-Micro Manufacturing Facility in paper-based diagnostics. Rhodes University, established in 1904, is a public research university located Grahamstown (officially known as Makhanda) in the Eastern Cape province of South Africa.

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