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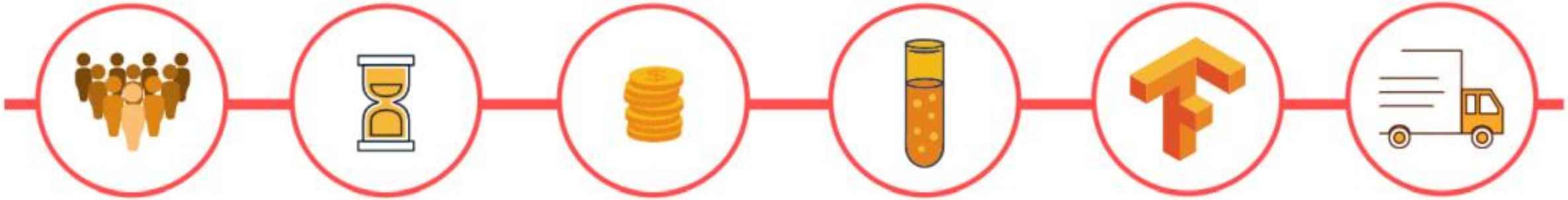
A public benefit company enhancing the welfare of adults and children in low- and middle-income economies by democratizing access to quality, timely and affordable clinical diagnostic technology solutions



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The Problem

In low-middle income countries, many diseases that can be easily cured or well controlled with affordable therapies, are either not diagnosed or mis-diagnosed



SCALE & LOCATION

Shortage of laboratory staff and expertise mean there is very limited diagnostic capacity across Sub-Saharan Africa

TIMINGS

Turnaround times due to having to transport to a handful of facilities across East Africa requiring out of country shipping for those in Tanzania

HIGH PRICE

Existing laboratories are few and expensive, often requiring samples to be sent overseas

INACCURACY

Non-DNA based diagnostics and conventional DNA based diagnostics lack the precision

ADAPTABILITY

Technology which can adapt to specific settings or specific diseases does not exist in Sub-Saharan Africa

SUPPLY CHAINS

A regular and fast supply of consumables, essential for diagnostic services, is not established in Tanzania

SerenOx uses its IP and know-how to address each of these diagnostic bottle necks

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Specifically: 47% of the world's population cannot access DNA-based diagnostics that are essential for diagnosing and treating diseases



www.grandviewreserach.com/industry-analysis/dna-testing-market

ACCESS: While the scope and scale of DNA-based diagnostics is rapidly growing in wealthy countries, low and middle income countries are being left behind.

- There is already a chronic lack of conventional diagnostic testing capacity in low income countries.
- Increasingly treatments for cancer rely on a genetic diagnosis.
- There is limited skills and know-how to offer DNA-based diagnostic testing in many low income countries.

COST: DNA-based diagnostic tests developed via the traditional route are prohibitively expensive (US-FDA approval costs >$100million). So even if laboratories in low income countries could perform such tests, they would be prohibitely expensive.

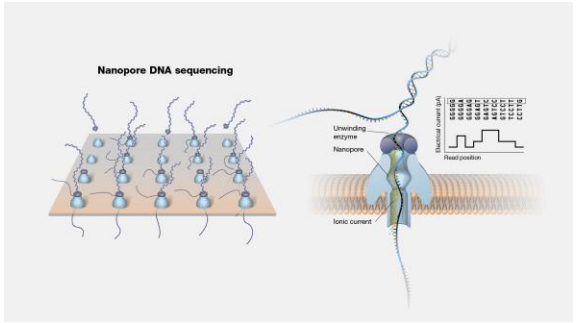
QUALITY: Unproven DNA-based diagnostic tests from China/India are starting to fill the void in unregulated low-income country markets.

IMPACT: Millions of lives are being shortened due to late- or inaccurate diagnoses.

Seren's solution: Local quality assurance and central analysis of DNA testing

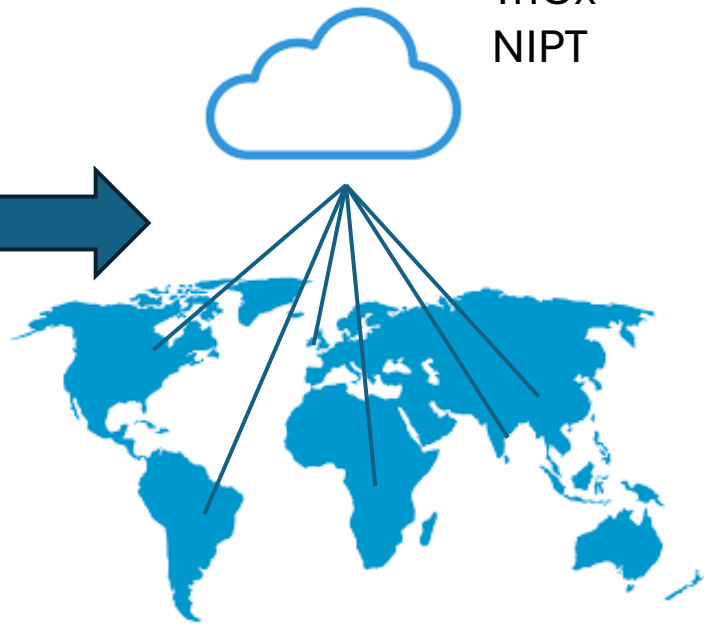
Pre-analytical steps to enrich cfDNA

DNA Sequencer agnostic

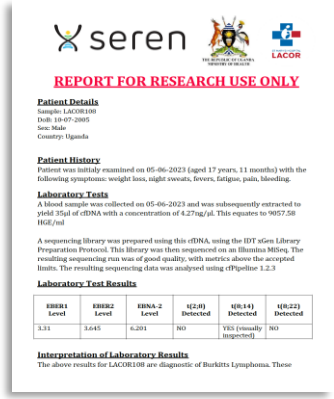




TriOx NIPT



Machine learning for Multi-modal analysis


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REPORT FOR RESEARCH USE ONLY

Patient Details
Sample: LACOR108
DoB: 10-07-2005
Sex: Male
Country: Uganda

Patient History
Patient was initialy examined on 05-06-2023 (aged 17 years, 11 months) with the following symptoms: weight loss, night sweats, fevers, fatigue, pain, bleeding.

Laboratory Tests
A blood sample was collected on 05-06-2023 and was subsequently extracted to yield 35µl of cfDNA with a concentration of 4.27ng/µl. This equates to 9057.58 HGE/ml

A sequencing library was prepared using this cfDNA, using the IDT xGen Library Preparation Protocol. This library was then sequenced on an Illumina MiSeq. The resulting sequencing run was of good quality, with metrics above the accepted limits. The resulting sequencing data was analysed using cfPipeline 1.2.3

Laboratory Test Results

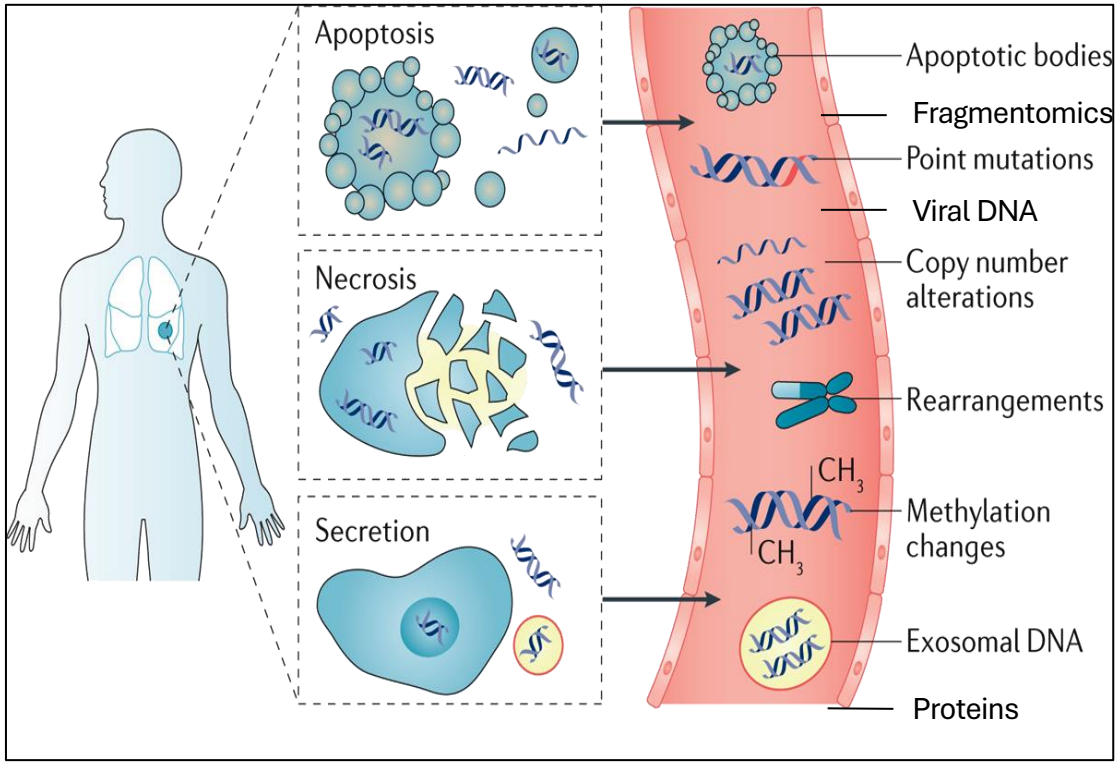
EBER1 Level	EBER2 Level	EBNA-2 Level	t(2;8) Detected	t(8;14) Detected	t(8;22) Detected
3.31	3.645	6.201	NO	YES (visually inspected)	NO

Interpretation of Laboratory Results
The above results for LACOR108 are diagnostic of Burkitts Lymphoma. These

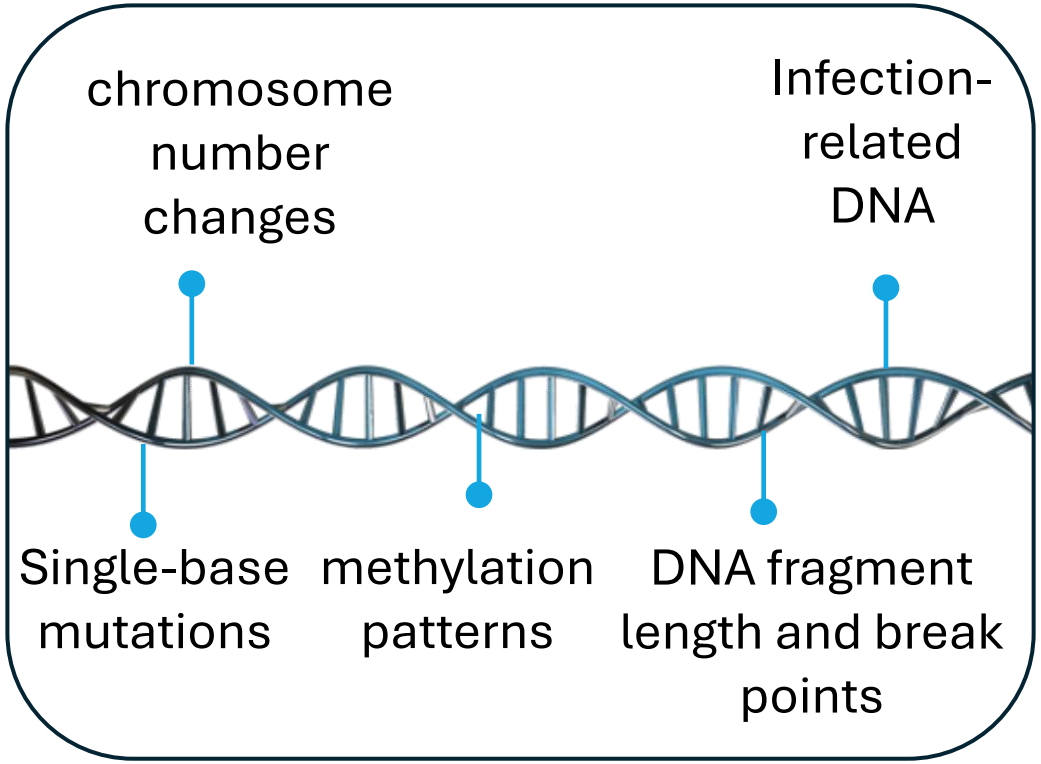
Clinical trials Routine Care

SerenOx's IP is based on methods to analyse liquid biopsies using multiple signals from circulating plasma DNA

Foetal circulating DNA in maternal plasma
Tumour DNA in patients with cancer

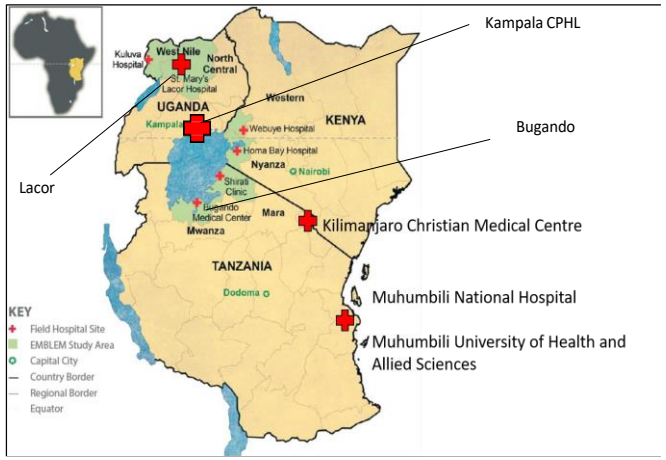


Artificial Intelligence to detect circulating DNA signals

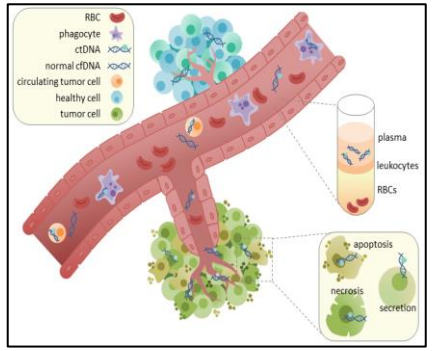


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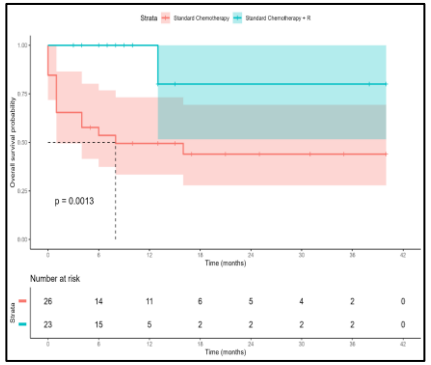
Example 1: Rapid and Accurate diagnosis of Epstein-Barr virus positive Burkitt Lymphoma



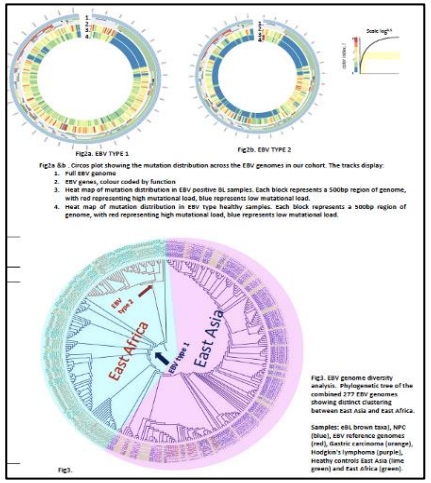
Liquid biopsy ctDNA test



Access to rituximab



EBV virus that causes Burkitt's lymphoma has specific mutations



Rapid and accurate diagnosis

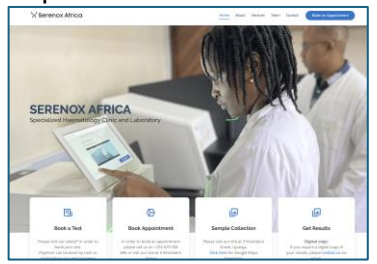
11 days vs 110
Diagnostic yield
88% vs 42%
(pathology)

Our test leads to Improved survival

Our test
Can be used as an early endpoint in vaccination studies

Impact

SerenOx Africa
https://serenoxafrica.co.tz



Adoption by MoH





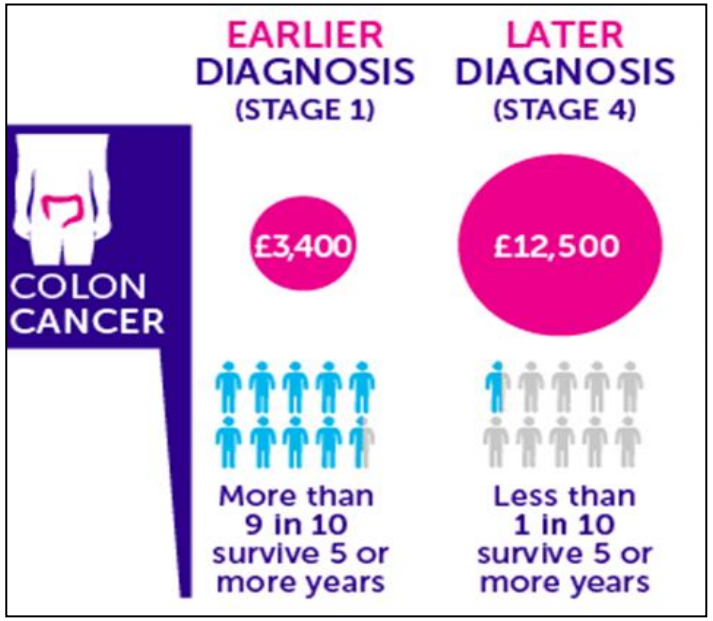


Example 2: Early Cancer Detection using TriOx

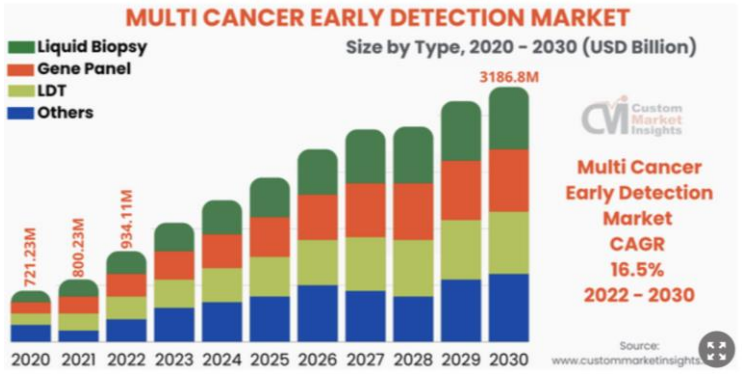
Cancer is the second most common cause of death in low and middle income countries. Early diagnosis is essential to reduce the cost of treatment and to save lives

SerenOx has developed an affordable, accurate, multi-cancer early detection blood test called TriOx, that use AI to identify patients with possible cancer.

Treating cancer early cures and is cheaper



CRUK Cancer Stats



Market size was valued $934M in 2022, estimated to reach $3B by 2030.

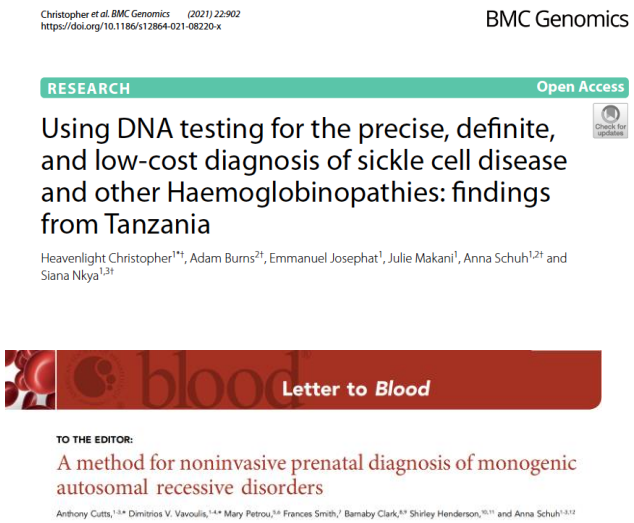
https://www.globenewswire.com/en/news-release/2022/08/25/2504443/0/en/Early-Cancer-Detection-Market-to-Reflect-Tremendous-Growth-Potential-with-A-CAGR-Of-13-8-by-2022-2028.html

Example 2: TriOx, a protected algorithm to detect cancer signals in plasma using multi-modal AI

- Tested in over 200 patients with non-specific symptoms of cancer so far
- Detects a range of different cancers
- Detects early and late stage disease
- Predicts Tissue of Origin
- Is agnostic to DNA sequencing input:
  - Pre-treated DNA for DNA methylation detection (Vavoulis D et al. Nature Communications 2024; in press
  - Short-read sequencing (copyright): Sensitivity 85%; specificity 100% (pre-set)
  - Long read sequencing (ongoing): Sensitivity 91%; specificity 100% (pre-set)
- Applicable to response monitoring after treatment
- Current stage of development
  - Needs user-friendly software interface
  - Needs bespoke methylation atlas
  - Overall cost per run is currently at $100
- We are looking to partner

Example 3: A suite of tests to diagnose Sickle Cell and Thalassemia Blood Disorders

Genetic disorders suffered predominantly by people of African and Indian-heritage. 400,000 infants are born with Sickle Cell world-wide every year and 95% die within the first 5 years of life. Currently tests can be unreliable, offer non-definite results, require testing of both parents or are invasive.


Christopher et al. BMC Genomics (2021) 22:902
https://doi.org/10.1186/s12864-021-08220-x

BMC Genomics

RESEARCH Open Access

Using DNA testing for the precise, definite, and low-cost diagnosis of sickle cell disease and other Haemoglobinopathies: findings from Tanzania

Heavenlight Christopher[1*†], Adam Burns[2†], Emmanuel Josephat[1], Julie Makani[1], Anna Schuh[1,2†] and Siana Nkya[1,3†]

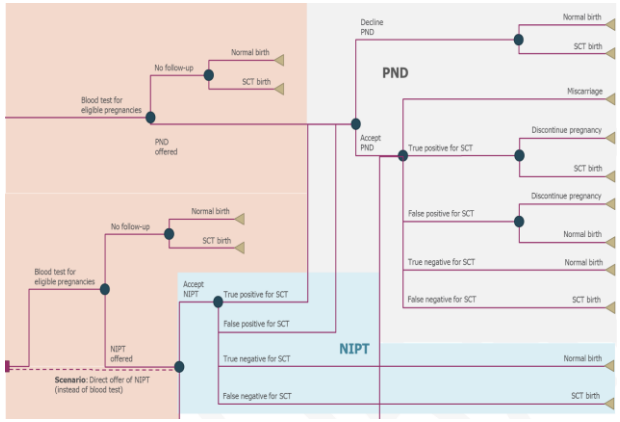
blood Letter to Blood

TO THE EDITOR:

A method for noninvasive prenatal diagnosis of monogenic autosomal recessive disorders

Anthony Cutts, Dimitrios V. Vavoulis, Mary Petrou, Frances Smith, Barnaby Clark, Shirley Henderson, and Anna Schuh

Results have been published
Patents granted



Adoption of the Sickle Cell test into NHS National Screening Program is underway

Unique application
Identifies mothers at risk genetically at low cost
Detects affected foetus from 10 weeks
No need for paternal genotype

High Accuracy
100% sensitivity and 100% NPV for foetal fractions >0.5% (i.e. over 95% of samples tested) and 91% specificity (PMID: 31444163)

Patented in US, UK and Europe

Next steps
We are looking to CE-marking our product and identifying a partner to licence this technology and bring it to market.

Commercial opportunities for Thalassemia Carrier Screening & Sickle Cell Non-invasive prenatal diagnosis tests:

- Pre-marital and pre-conception counselling
- Investigation of miscarriages
- Personalization of pregnancy follow-up

Social Mission: Supported the creation of SerenOx Africa





SerenOx Africa is a full service laboratory with clinic based in Dar es Salaam

- Opened in Q3 2023
- Offering quality-assured molecular diagnostic testing in Africa for the first time.
- Company limited by shares based in Dar es Salaam and legally separate from SerenOx.
- Public-Private Partnership supported by Tanzanian government, the Muhimbili University of Allied Science and the National Hospital
- Specializes in blood diseases, cancer screening and works as fully certified Interventional Clinical Trial Unit
- Recently selected for Global Pharma Registration Studies in non-communicable diseases: recruitment and sample analysis

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