

Rheumatic fever: A new diagnostic tool

A new streptococcal serological test to enable efficient and reliable diagnosis of rheumatic fever and post-streptococcal glomerulonephritis.

Background

- Globally there are an estimated one million new cases of rheumatic fever and post-streptococcal glomerulonephritis (PSGN) diagnosed per year.
- Rheumatic fever can lead to rheumatic heart disease (RHD), which is the world's leading cause of acquired heart disease. There are >30 million people living with RHD and the disease causes 320,000 deaths globally each year.
- In China over 70,000 deaths are attributed to rheumatic heart disease per annum.
- Post-streptococcal glomerulonephritis is linked to chronic kidney disease and end-stage renal failure.
- In New Zealand, Māori and Pacific children carry a significant disease burden and have some of the highest disease rates for both RF and PSGN in the world.

Problems with current diagnostic tool

Serological tests are essential for the diagnosis of rheumatic fever and post-streptococcal glomerulonephritis. The current gold standards measure the levels of anti-streptolysin O (ASO) and anti-DNase B (ADB) antibodies in blood.

Major disadvantages

- Incompatible assays so the two tests need to be run in parallel.
- Most commonly used assay platform for ADB is manual.
- DNase B is not carried by all strains of Streptococcus A, leading to false negatives.
- Antibodies have long half-lives, leading to false positives.
- Overall poor predictive value.
- Suspected cases prescribed antibiotics as a precaution.

Technology

The invention can be described in two steps:

1. Combine the two existing assays into a single test system based on platforms that are widely utilised in clinical diagnostic laboratories.
2. Add a third serological marker (SpnA), which has been discovered and characterized by our researchers.

Data has shown that SpnA improves the predictive value of streptococcal serology. A bead-based immunoassay method has been developed that enables SpnA to be measured simultaneously, in a multiplex format, with ASO and ADB.

Major advantages

- Enables all three antibodies to be measured simultaneously in a multiplex format.
- Triplex assay technology improves the accuracy and efficiency of streptococcal serology.
- The novel SpnA marker has sensitivity compared with ASO and ADB.
- Improved predictive value could decrease prescription of antibiotics.

Applications

- The main application of the technology will be in the clinical diagnosis of rheumatic fever and post-streptococcal glomerulonephritis. An additional application is in the clinical development of new Streptococcus A vaccines. Streptococcal serology will be required in all trial participants in all phases of development.

UniServices by the numbers

Total external research funding:

\$261.3M

(35% increase over 2020)

45

companies started in the past five years

\$1.25BN

Total market capitalisation of companies formed

\$73.5M

Net asset value of the University of Auckland Inventors' Fund

17,335 Covid-19 vaccinators trained by the Immunisation Advisory Centre in 2021

1,700

New Zealand teachers reskilled and upskilled through Tui Tuia | Learning Circle professional learning and development in 2021

3,000

clinical staff at 22 DHBs trained through teamwork-based acute care simulations designed by NetworkZ in the past five years

14,391 times that child and youth mental health workers attended Whāraurau e-modules, trainings and workshops in 2021

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