

Rapid Determination of Strongyloides Infection using dotLab® Technology

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• Serological analysis with isotype profile • <30-minute assay, 10 µL serum • No cross reaction

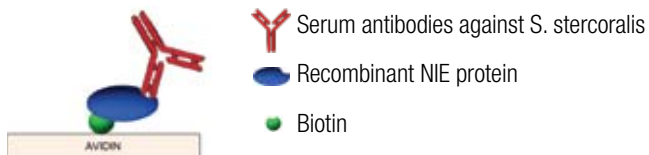


Figure 1. Schematic of NIE immunoassay.

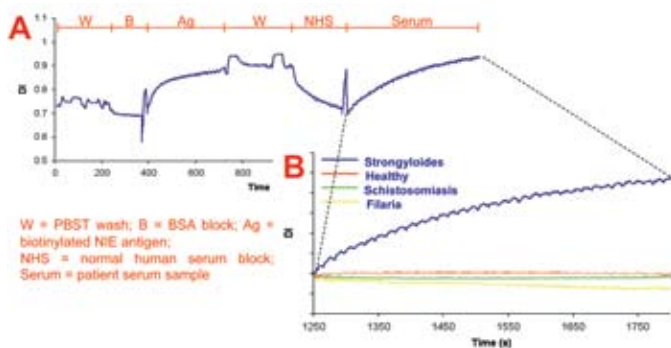


Figure 2: Representative dotLab trace of (A) a Strongyloides positive patient and (B) negative results from healthy individuals (red), Schistosomiasis positive (green) and filaria (yellow) patients.

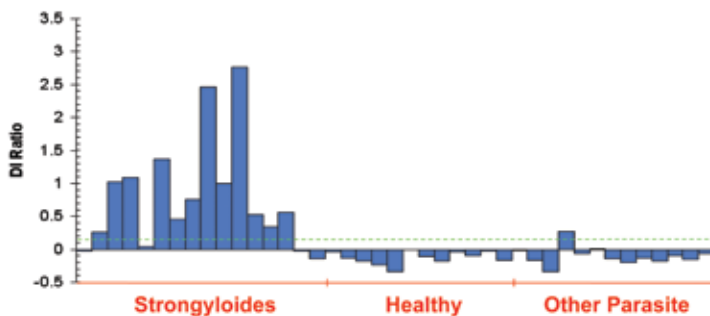


Figure 3: Normalized NIE antibody results for all samples analyzed. Green dotted line is the positive threshold above which samples are considered Strongyloides positive.

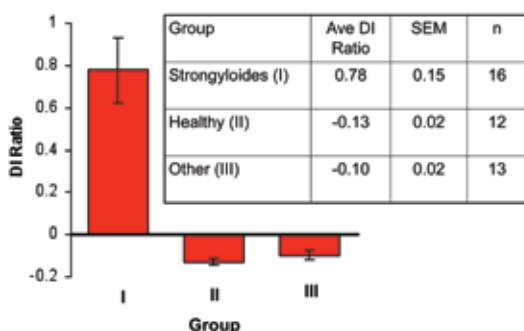


Figure 4: Average, normalized signal of serum *S. stercoralis* antibody binding to NIE. Data are from 42 patients comprising three different groups.

Introduction

Strongyloidiasis, caused by the intestinal nematode, *Strongyloides stercoralis*, is endemic in the tropics and subtropics with increasing prevalence in North America. Infection in immunocompromised individuals has high mortality. Current diagnostic tests are time consuming and prone to false positives because of cross reaction with antibodies from related parasitic infections. Here, we describe a rapid serological method of determining Strongyloides infection.

Method

The dotReady™ immunoassay used a biotinylated recombinant Strongyloides antigen, NIE, to capture antibodies on avidin dotLab® Sensors from only 10 µL of patient serum.

Results

- 42 patient samples consisting of (I) 17 Strongyloides positive, (II) 12 healthy individuals and (III) 13 with other parasitic infections were analyzed for serum antibodies against NIE.
- Figure 2A is a Strongyloides positive patient showing Strongyloides antibody binding. Figure 2B shows negative results from healthy individuals (red), Schistosomiasis positive (green) and filaria (yellow) patients.
- Figure 3 shows the individual normalized Strongyloides antibody binding signal obtained by the dotLab System for each sample in the study. Results showed an assay sensitivity of 75% and specificity of 96%.
- Sequential probing with anti-human IgG1, IgG2, IgG3, IgG4 and IgE antibodies generated an isotype profile for Strongyloides positive samples in a single assay.
- The ability to generate isotype profiles along with NIE antibody may improve serodiagnosis and may provide information on disease status such as chronicity or drug resistance.

Conclusion

The dotLab System serological test developed using NIE recombinant protein successfully detected serum Strongyloides antibodies in less than 30 minutes. Almost no cross reactivity to sera from healthy individuals or patients with other parasitic infections was detected. In addition to general Strongyloides testing, this assay may have possible future point-of-care applications where rapid results are required.

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