

VeraBind Biotin™

Solving Biotin Interference with a Novel Monoclonal Antibody

Developers of *in vitro* diagnostic tests, and those who create testing for clinical studies, are coming to grips with free biotin interference. In samples from patients who take OTC biotin supplements or biotin therapy, free biotin can cause false results with tests that use anti-biotin antibodies or streptavidin-based reagents.

The FDA issued a draft guidance advising diagnostics developers to test for biotin interference up to 3,500 ng/mL in their *in vitro* diagnostic devices (IVDs) that use biotin/streptavidin technology.¹

Veravas now has a solution. VeraBind Biotin is a novel anti-biotin monoclonal antibody (mAb), developed by Dr. J.-P. Jin at Wayne State University, that can replace streptavidin-based reagents and avoid the possibility of biotin interference up to 3,500 ng/mL.

VeraBind Biotin Binds to Conjugated Biotin in the Presence of Free Biotin

- High binding affinity to biotinylated proteins similar to streptavidin
- Nearly a million times lower affinity for free biotin than streptavidin
- Successfully captures biotinylated targets in the presence of up to 3,500 ng/mL biotin interference
- Without changing the test design format, developers can replace streptavidin-based reagents
- Cost-effective and accessible, with a quick protocol



Revising Clinical Laboratory Testing Kits with VeraBind Biotin

- VeraBind Biotin mitigates the risks and concerns of free biotin interference in:
 - Patients taking OTC biotin supplements (5-20 mg/d)
 - Patients taking high doses of biotin therapeutically (100-300 mg/d)
- Proven anti-biotin delayed capture assay format delivers:
 - Improved assay kinetics, precision and sensitivity
 - Faster turnaround times (TAT) for STAT assays
- Microparticles do not need to be present during the key antibody-antigen binding steps
- Microparticles do not sterically interfere or introduce assay non-specific binding

VeraBind Biotin's Binding Performance to Conjugated Biotin²

A ForteBio Octet HTX System and Bio-Layer Interferometry (BLI) was used to determine the binding constants (KD) of different biotin conjugates to Streptavidin and VeraBind Biotin:

- Streptavidin and VeraBind Biotin had similar binding affinities for each Biotin-IgG and Biotin-BSA conjugate tested.
- The K_D was $10^{-10}M$ to $< 10^{-12}M$ with the following conjugate chemistries:
 - NHS-Biotin
 - NHS-LC-LC-Biotin
 - NHS-PEG4-Biotin

VeraBind Biotin's Binding Performance in the Presence of Free Biotin³

In a free biotin competition study, streptavidin binding was inhibited 100% at 0.244 ng/mL. However, at 1,000 X greater biotin concentration (244 ng/mL) the monoclonal antibody was not inhibited. (Fig. 1)

In a second study, the presence of 3,500 ng/mL free biotin, a concentration 14,000 folds of that for 100% inhibition of Streptavidin binding, showed only 20-50% inhibition of VeraBind Biotin binding. (Fig. 2). These data agree with the predicted inhibition as shown in figure 1.

Results demonstrate preferential binding of biotin conjugates by VeraBind Biotin in the presence of high free biotin concentrations.

Raising the Standard for Clarity in Diagnostics

At Veravas, we strive to continually advance the quality of testing for new and existing methods. To reduce the effects of complex interferences in patient samples, we innovate breakthrough sample preparation and diagnostics technologies — so laboratory and research professionals can have powerful and precise options for eliminating interference.

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 or contact your Veravas representative at 1.888.466.4166.

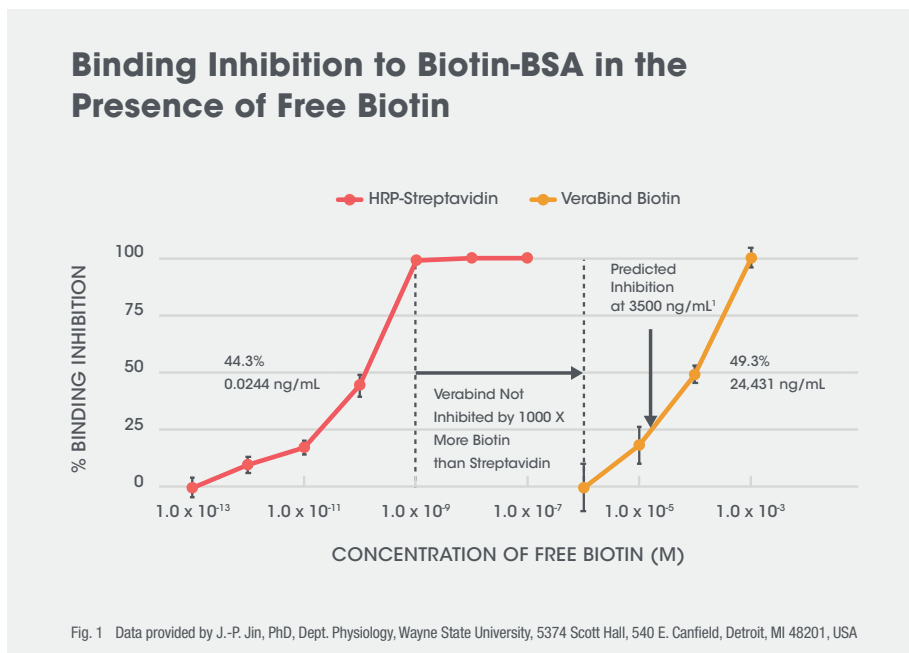


Fig. 1 Data provided by J.-P. Jin, PhD, Dept. Physiology, Wayne State University, 5374 Scott Hall, 540 E. Canfield, Detroit, MI 48201, USA

VeraBind Biotin or HRP-streptavidin, and serial dilutions of free biotin from 1.00 x 10⁻³M to 1.00 x 10⁻¹³M, were incubated with Biotin-BSA immobilized to microtiter plate wells. Using a standard ELISA procedure, the VeraBind Biotin wells were processed with HRP-anti-mouse IgG. The total amount of HRP-Streptavidin or HRP-anti-mouse IgG bound to each well was determined at A420nm after the addition of ABTS-H2O2 substrate solution.

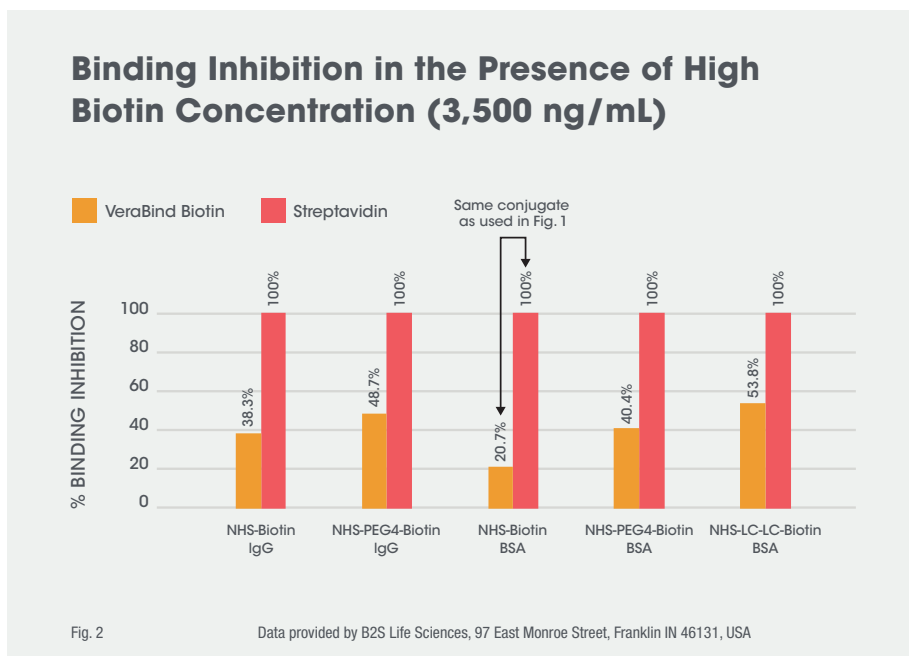


Fig. 2 Data provided by B2S Life Sciences, 97 East Monroe Street, Franklin IN 46131, USA

A Fortebio Octet HTX System was used to assess binding inhibition in the presence of a high biotin concentration per the FDA draft guidance document[2]. Streptavidin biosensor pins, and mouse anti-Fc bio-sensor pins immobilized with 100 nM VeraBind Biotin, were used to probe VeraBind Biotin and streptavidin binding interactions. Competition with 3,500 ng/mL free D-biotin was measured in the presence of a saturated concentration (300 nM) of biotin conjugate.

NOTE: For research use only.

REFERENCES:

1. FDA Draft Guidance: Testing For Biotin Interference in In Vitro Diagnostic Devices. June 2019. <https://www.federalregister.gov/documents/2019/06/14/2019-12564/testing-for-biotin-interference-in-in-vitro-diagnostic-devices-draft-guidance-for-industry>

2. Veravas, Inc. Data on file.
 3. Data provided by J.-P. Jin, PhD, Wayne State University.

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