

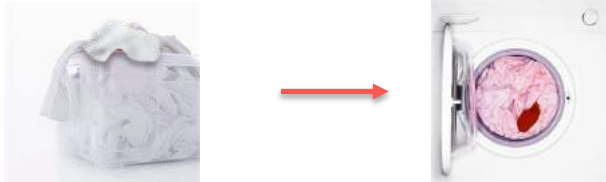
Product Solutions to Detect and Manage Biotin Risk and Increase Confidence in Reported Results

August 6, 2019

Joshua Soldo, CSO, Veravas Inc.

Dirty laundry analogy

The problem:



Didn't know the **RED** sock was there until it was too late

Immunoassay Interference

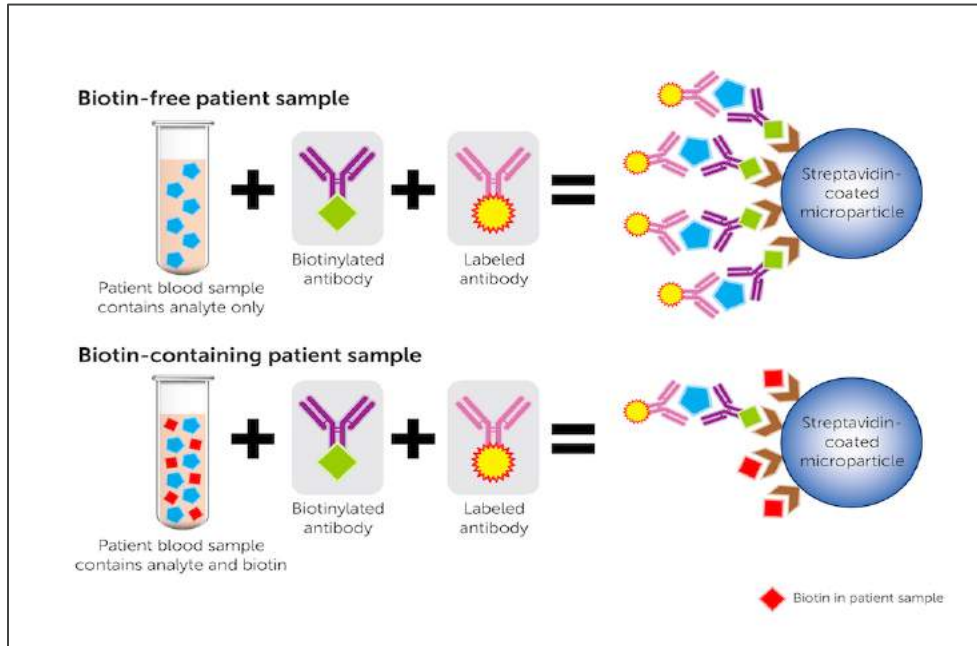
Today's solution:



Knew a **RED** sock could be there, tried to mitigate the possibility with a color catcher sheet – doesn't always work

Immunoassay Design and Blocking

A Contributor to Immunoassay Interference



Biotin in the patient sample competes for the binding of the biotinylated antibody to streptavidin-coated microparticle and falsely decreases assay signal

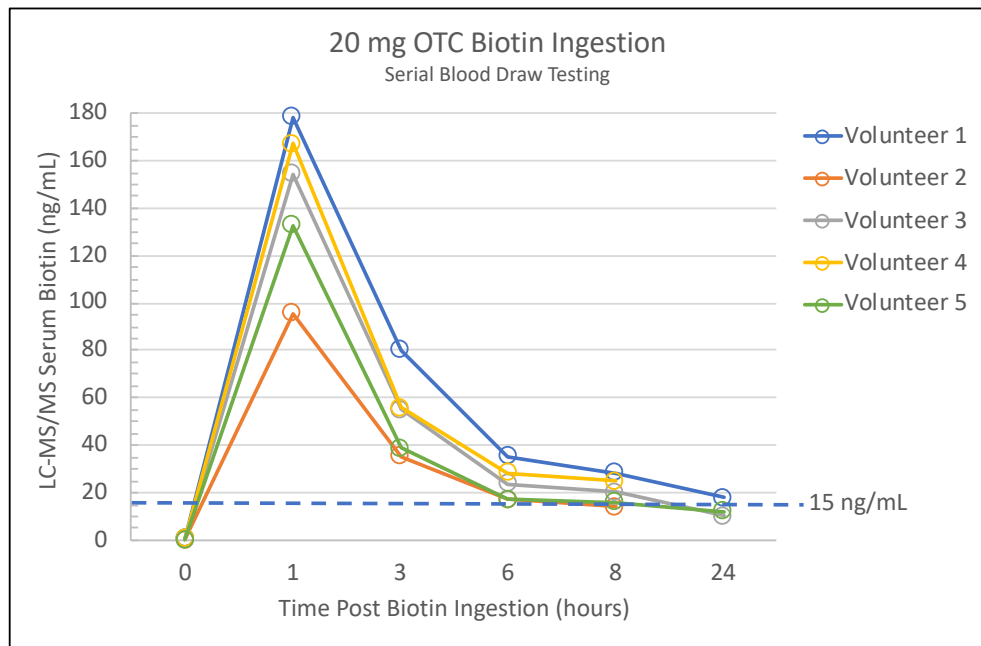
The clinical impact

- False Positives
 - Defined as results greater than the reference range, clinical cut-off, or medical decision point
- False Negatives
 - Defined as results below the reference range, clinical cut-off, medical decision point, limit of detection, or limit of quantitation
- False Normals
 - Defined as results within the reference range or reference interval

Biotin Metabolism

Biotin Clearance Study

VERAVAS



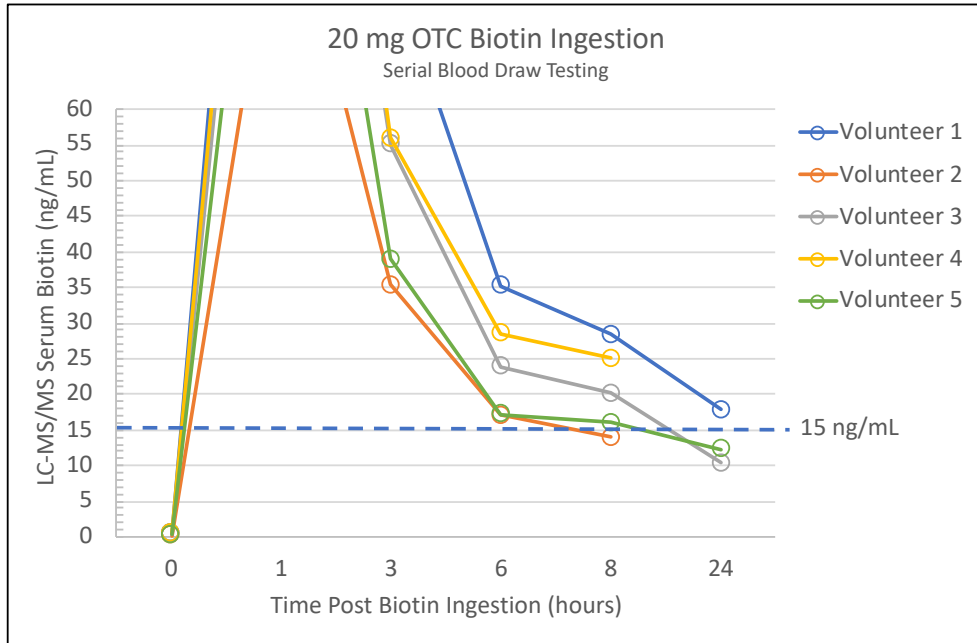
LC-MS/MS measurements performed at the University of Washington, Department of Laboratory Medicine, 1959 NE Pacific Street, Seattle, WA 98195

Study Description

- Volunteers had fasting serum samples collected at baseline
- They were subsequently dosed with 20 mg biotin
- Serum samples were serially collected
- All samples were sent out for LC-MS/MS biotin testing

Volunteer Demographics			
Volunteer	Age	Sex	Known Morbidity
1	65	Male	Diabetic Type 2
2	25	Male	Presumed healthy
3	43	Male	Presumed healthy
4	35	Female	Presumed healthy
5	46	Male	Presumed healthy

Biotin Clearance Study, cont'd



Key Findings

- Biotin levels were highest at 1 hour [96 - 179 ng/mL]
- At 6 hours, all volunteers still had serum biotin levels > 15 ng/mL [17 - 35]
- At 8 hours, 4 out of 5 volunteers had serum biotin levels > 15 ng/mL [16 - 28]
- At 24 hours Volunteer 1, a known diabetic, had a biotin level > 15 ng/mL [18]

Not all volunteers were drawn at 24 hours post biotin ingestion.

LC-MS/MS demonstrated an Inter-Assay precision of 1.60% at 376 ng/mL.

VeraTest Biotin™ and VeraPrep Biotin™

VERAVAS

Product Solutions To Detect and Manage Biotin Risk



VeraTest Biotin

- Fast and simple POCT to rapidly screen for biotin interference

VeraPrep Biotin

- Simple and fast method to remove free biotin and confirm biotin interference

VeraTest Biotin

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Product Solution To Detect and Manage Biotin Risk



VeraTest Biotin

- 5 minute protocol to detect biotin interference
- Serum or plasma
- 20 μ L sample size
- Portable and easy to use
- Determines if significant biotin, > 15 ng/mL, is present
 - In a setting of uncertainty
 - When delayed testing is not an option
 - Patients with renal disease
 - Patients on ≥ 100 mg/day biotin therapy
 - Patients taking ≥ 10 mg/day OTC biotin

Method Comparison Summary – 54 Patient samples
LC-MS/MS vs. VeraTest Biotin

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		LC-MS/MS Concentration		
		>15 ng/mL	<15 ng/mL	
Biotin Test Outcome	Test Outcome Positive	True Positive (TP)=23	False Positive (FP)=0	Positive Predictive Value =TP/(TP+FP) =23/(23+0) =100%
	Test Outcome Negative	False Negative (FN)=0	True Negative (TN)=31	Negative Predictive Value =TN/(TN+FN) =31/(31+0) =100%
		Sensitivity =TP/(TP+FN) =23/(23+0) =100%	Specificity =TN/(FP+TN) =31/(0+31) =100%	

VeraPrep Biotin

Product Solution To Detect and Manage Biotin Risk



VeraPrep Biotin

- 15 minute protocol to rule in or rule out biotin interference
- Serum or plasma
- No sample dilution
- 400 μ L sample size
- Determines if suspect biotin interference is clinically significant
 - If VeraTest biotin is positive, > 15 ng/mL
 - In a setting of uncertainty
 - When delayed testing is not an option
 - Patients with renal disease
 - Patients on ≥ 100 mg/day biotin therapy
 - Patients taking ≥ 10 mg/day OTC biotin



VWR
Biochemical

Benchmark

OFF

ON

Touch

DVRAC

0:00 10

T1

T2

T3

T4

HR

MIN

SEC

CLOCK

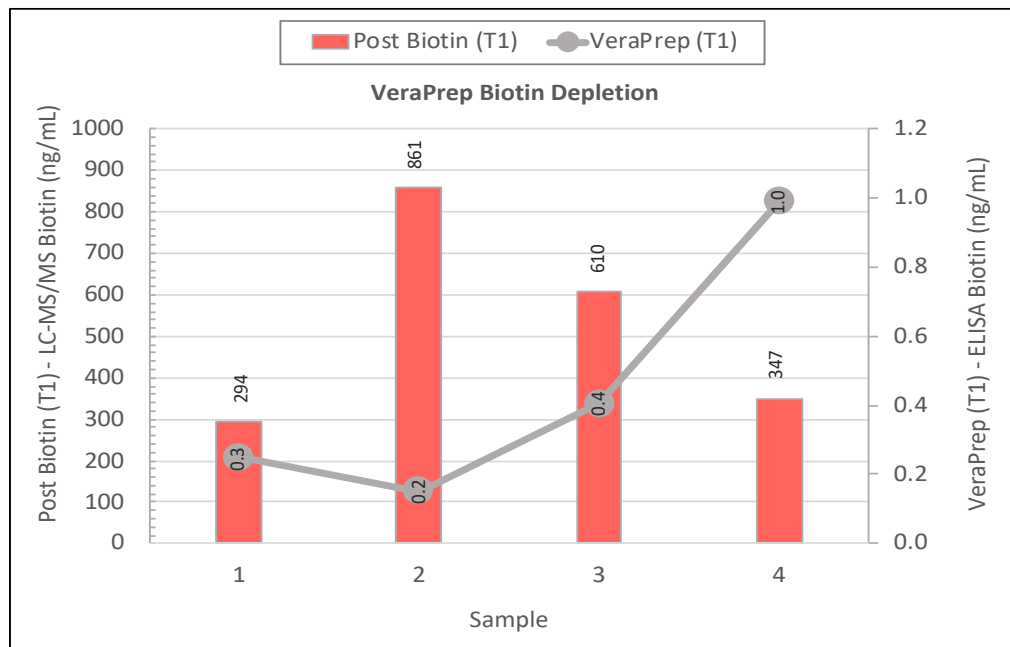
TIME/LOG

CLEAR

VWR ED. NO. 679-0101 NA 85292-842 S/N 18C88002

FALCON
5102
BUC

VeraPrep Biotin Biotin Depletion Study



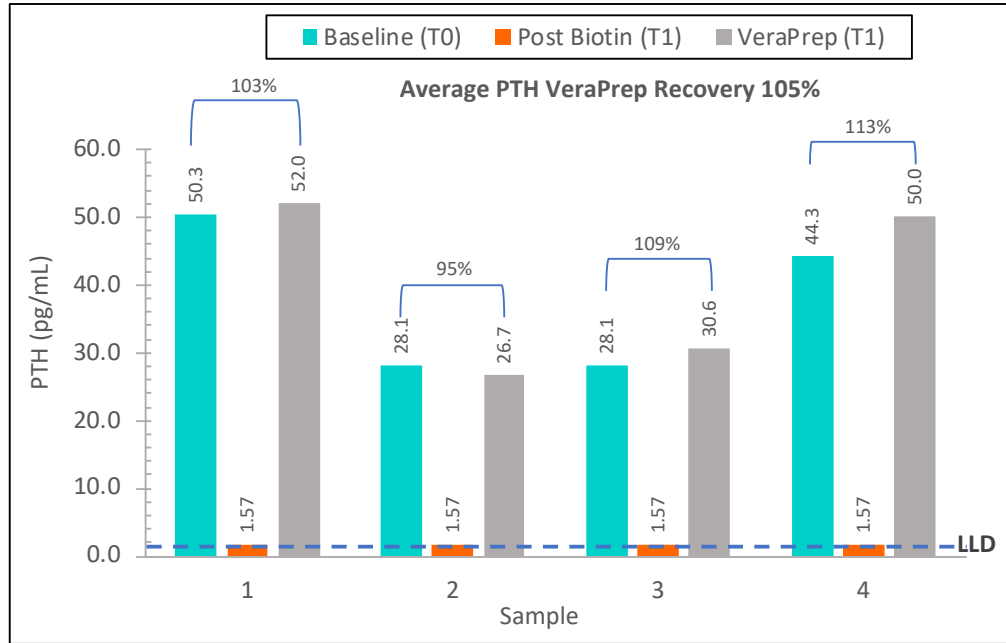
To verify biotin depletion, sample were tested in-house using the Immundiagnostik IDK® Biotin ELISA kit, Part No. K8141, measuring range of 48.1 – 1100 pg/mL).

VeraPrep Study Overview

- 4 samples were selected with high endogenous biotin levels [294 – 861 ng/mL] measured by LC-MS/MS
- Each sample was pre-treated with VeraPrep Biotin to deplete free biotin, and tested by ELISA to verify post-treated biotin levels [0.2 – 1.0 ng/mL]
- VeraPrep Biotin successfully depleted high biotin levels to less than 1.1 ng/mL or physiological biotin concentrations

VeraPrep Biotin

Biotin Depletion Study, cont'd



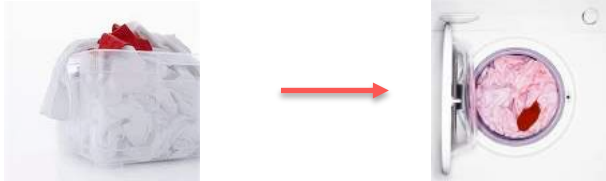
The Baseline Sample (T0) was drawn 1 hour prior to drawing the Post Biotin (T1) sample. PTH values can differ due to biological variability and PTH stability.

VeraPrep Biotin pretreatment to mitigate biotin interference

- PTH values were measured on baseline samples [28.1 - 50.3 pg/mL] using the DRG PTH Intact ELISA, Part No. EIA-3645
- PTH was also measured on matched high dose biotin samples [< 1.57 pg/mL]
- The samples were pre-treated with VeraPrep Biotin and PTH values measured again [26.7 - 52.0 pg/mL]
- VeraPrep successfully depleted biotin interference and PTH values recovered as compared to baseline [95 – 113% recovery]

Dirty laundry analogy

The problem:



The Veravas Solution:



Didn't know the **Biotin** was there until it was too late

Biotin Immunoassay Interference

If there is **Biotin**, you know it is there and can remove it before immunoassay testing

VeraTest Biotin and VeraPrep Biotin

VERAVAS

Thank You

Learn more at [veravas.com](https://www.veravas.com)

