Evaluation of Multiplexing Spinal Muscular Atrophy with a Laboratory Developed Severe Combined Immunodeficiency Assay in Minnesota

Carrie Wolf, MBS | Laboratory Supervisor
• Minnesota has been screening for SCID since January 2013

• A SMA assay was developed by the CDC’s Newborn Screening and Molecular Biology Branch and transferred to the Minnesota Newborn Screening Laboratory

• Minimal changes to the current SCID assay are needed to include SMA screening
• Comparison between current SCID assay (TREC & RNaseP) and a multiplexed SCID/SMA assay (TREC/RNaseP/SMN 1).

• Analysis of 4 SCID/SMA assays

• Comparison of 2 DNA extractions for each assay
Old Versus New

**SCID Assay**

**SCID/SMA Assay**

[Image of Amplification Plots for SCID and SCID/SMA assays showing RNaseP and TREC]
Unaffected Versus Affected SMA Patient

SMA Negative

SMA Positive

Amplification Plot

SMN1

RNaseP

TREC

Delta Rn

Cycle

0.01

100

1000

ΔRn

0.01

0.05

0.08

Cycle

0.01

0.05

0.08
## 4 SCID/SMA Assay Comparison

<table>
<thead>
<tr>
<th></th>
<th>Assay A</th>
<th>Assay B</th>
<th>Assay C</th>
<th>Assay D</th>
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<tr>
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<td>SMN Exon Forward</td>
<td>SMN Exon Forward</td>
<td>PE Forward</td>
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<tr>
<td>SMN Exon Reverse</td>
<td>SMN1 Exon-Intron LNA Reverse</td>
<td>SMN Exon Reverse</td>
<td>PE Reverse</td>
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<td>SMN 1 Exon RS Probe</td>
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<td>Assay A</td>
<td>Assay B</td>
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<tr>
<td>SMA Normal</td>
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</table>
DNA Extractions

QIAGEN Purification and Elution Solutions

Quanta Extracta DBS

Assay A
Assay B
Assay C
Assay D
• SMA can be added to the current SCID assay with minimal changes
• All assay conditions (A,B,C and D) give very comparable results
• The assay will NOT detect carriers
• No additional laboratory analysts will be needed to run the assay
• By multiplexing the assay, the cost will be increased by a little as $0.15 per reaction
Next Steps

- A validation of the SCID/SMA assay is in process
- SMA as a candidate condition is currently under review by the Minnesota Advisory Committee on Heritable and Congenital Disorders for recommendation of the addition of the disorder.
- Minnesota Department of Health will be activating a SMA workgroup comprised of specialists, pediatricians, and community advocates this Fall.
Acknowledgments

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Thank you!