MVC-COV1901 VACCINE UPDATES

Why do we need a pan-sarbecovirus vaccine?
WHO R&D Blueprint Meeting
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Background Photo Credit: Yuri Samoilov // CC BY 2.0
1. A booster dose of MVC-COV1901
2. A booster dose of MVC-COV1901 Beta-based vaccine in hamsters
3. MVC-COV1901 Beta-based vaccine timeline
4. Opportunity to demonstrate Efficacy in Previously Infected Population
COVID-19

OUTLINE OF PRESENTATION

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Durability of immune response to MVC-COV1901 six months after the booster

- Neutralizing antibodies declined by 84% within 6 months after 2 doses
- Neutralizing antibodies declined by 67% within 6 months after the booster
- *Half-life of NT was 12 days (11-14) after 2nd dose and 44 days (31-76) after booster dose.

*Exponential decay estimated with mixed linear models

Research available in part at medRxiv: [https://www.medrxiv.org/content/10.1101/2021.12.01.21267115v2](https://www.medrxiv.org/content/10.1101/2021.12.01.21267115v2)
3 doses of MVC-COV1901 in adults provide cross-reactivity against Omicron

- Adults immunized with 2 (Day 57) or 3 (Day 237) doses of mid-dose (15 μg) or high-dose (25 μg) MVC-COV1901
- Both dose groups demonstrated cross-reactivity to Omicron

<table>
<thead>
<tr>
<th></th>
<th>4 weeks after 2(^{nd}) dose</th>
<th>4 weeks after 3(^{rd}) dose</th>
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</thead>
<tbody>
<tr>
<td><strong>Fold difference</strong></td>
<td>55.1x</td>
<td>74.2x</td>
</tr>
<tr>
<td></td>
<td><strong>4 weeks after 2(^{nd}) dose</strong></td>
<td>4 weeks after 3(^{rd}) dose</td>
</tr>
<tr>
<td></td>
<td>8.7x</td>
<td>6.4x</td>
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A booster dose of beta-based vaccine offers broad coverage against variants of concern (VoC)

W+W+B induced the broadest breadth of coverage against the VoCs

Research available in part at bioRxiv: https://www.biorxiv.org/content/10.1101/2021.09.29.462344v3
A booster dose of beta-based vaccine in hamsters provides cross-reactivity against Omicron

- Hamsters immunized with
  - 3 doses of Wildtype S-2P (W+W+W)
  - or
  - 2 doses of Wildtype S-2P and 3rd dose of Beta S-2P (W+W+B)

Unpaired Mann-Whitney U test
* = p < 0.05, ** = p < 0.01, *** = p < 0.001, **** = p < 0.0001

Research available in part at bioRxiv: https://www.biorxiv.org/content/10.1101/2021.09.29.462344v3
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3. **MVC-COV1901 Beta-based variant vaccine timeline**
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<table>
<thead>
<tr>
<th>Master Cell Bank (MCB)</th>
<th>Development</th>
<th>Good Manufacturing Process (GMP) Production</th>
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<tbody>
<tr>
<td>MCB banking</td>
<td>UHB Test (I)</td>
<td>SOL GMP production-upstream</td>
</tr>
<tr>
<td>MCB testing - MVC</td>
<td>UBH Test (II) - TEM</td>
<td>SOL GMP production-downstream</td>
</tr>
<tr>
<td>MCB testing- mycoplasma</td>
<td>DS characterization (peptide mapping, N glycan, IEF)</td>
<td>DS release tests</td>
</tr>
<tr>
<td>*MCB characterization (I)</td>
<td>DS characterization (CD, disulfide bond)</td>
<td>DP Filling &amp; Inspection- 15 mcg</td>
</tr>
<tr>
<td>**MCB characterization (II)</td>
<td>Viral Clearance Study</td>
<td>DP Filling &amp; Inspection- 25 mcg</td>
</tr>
<tr>
<td>***MCB characterization (III) @CRL</td>
<td></td>
<td>DP release test (sterility &amp; Ag content)</td>
</tr>
</tbody>
</table>

- MCB has been established with some characterization remaining
- Development and GMP Production to be finished by Q1 of 2022

*MCB characterization (I): Sterility, mycoplasma (Indicator cell culture), Retroviral infectivity, TEM Thin Section, Specific Virus Detection, HAP test, BPyV

**MCB characterization (II): Identity, Mycoplasma (Direct culture), In vitro/in vivo adventitious virus test, PERT, Bovie virus detection

***MCB characterization (III) @CRL: Charles River Laboratories

*UHB Tests (I): Bioburden, Adventitious virus test, PERT, MMV- qPCR, Mycoplasma (qPCR)
Cryo-EM screening results:

- pH 7, 1 mg/ml
- pH 7, 0.5 mg/ml
- pH 5.5, 0.5 mg/ml

Collect overnight data
COVID-19

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Phase III trials recruitment during the global spread of Variants of Concern

- Pfizer, AstraZeneca, Moderna and J&J recruited before Jan-2021: the original strain was predominant.
- MVC recruits from Oct-2021: Delta and Omicron are predominant.
Key takeaways

• A booster dose of MVC-COV1901 increased cross-reactivity against Omicron, and increased the durability of neutralizing antibody.

• In hamster model, MVC-COV1901 beta vaccine as booster dose increased breadth of coverage against Wildtype, Alpha, Beta, Delta, and Gamma.

• Compared to three doses of prototype vaccine, using beta vaccine as booster, the NT titer increased by 1.5 folds against Wildtype virus, 3.8 folds against Omicron.

• Clinical trial using MVC-COV1901 beta vaccine as booster will start in Feb, 2022.

• WHO Solidarity Vaccine Trials allows MVC-COV1901 to demonstrate the vaccine efficacy against Omicron.