NevoLine™ Biomanufacturing System
Next Evolution of Viral Production
INTENSIFIED & AUTOMATED VIRAL PRODUCTION SYSTEM IN 10M²

**Containment & Safety**
- Low-footprint process enabling integration in biosafety cabinets or isolators
- Automated process reducing manual operations
- Closed system ensuring process and environment safety

**Upstream Module**
- Intensified cell culture & viral production, delivering concentrated harvest
  - High-density scale-X™ fixed-bed bioreactor for cell culture & viral production
  - Chained with in-line product concentration

**Downstream Module**
- Intensified streamlined purification
  - Harvest clarification
  - In-line chromatography

**Cost-effective Production**
- Reduced classified area footprint & simplified infrastructure
- Low capital investment
- Low operational expenditures

**Automated Operations**
- Virus containment
- Environment and operators safety

**Rapid Deployment**
- Fast implementation in new or existing facility
- Reduced time-to-market
- Adaptable to epidemic preparedness approaches

**Applications**
- Viral vaccines
- Oncolytic viruses
- Viral vectors
- Pilot to commercial-scale production

**Dimensions (L x W x H)**
- NevoLine: 6650 x 1610 x 2367 mm
- Upstream & Downstream: 2158 x 1610 x 2367 mm
- Additional: 1533 x 1610 x 2367 mm

**Integration into:**
- Greenfield facility construction
- Existing facility revamping
- Container-size POD for rapid deployment

**Features**
- Additional Modules for Inactivation, Aliquoting, etc
- Automated operations in a controlled environment
  - Based on process needs
Case study: trivalent sIPV production in a NevoLine–based facility

4 NevoLine systems delivering over 50M doses of trivalent inactivated polio vaccine annually

**Estimated CAPEX:** $20M

POD-based facility with 4 NevoLine systems

**Estimated CoGs:** < $0.30/dose

Including upstream, downstream and viral inactivation

**Estimated Capacity:** 50M doses/y

Each NevoLine system delivers
577,000 doses/batch of trivalent sIPV, 22 batches/year

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**NevoLine reduces facility footprint & investment requirements**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>NevoLine</th>
<th>Single-Use (SU)</th>
<th>Stainless Steel (SS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4x NevoLine</strong></td>
<td>(600 m² bioreactors)</td>
<td>50M doses/y</td>
<td>5x750 L bioreactors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CAPEX</strong> (USD M)</th>
<th>NevoLine</th>
<th>Single-Use (SU)</th>
<th>Stainless Steel (SS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>~ 20</strong></td>
<td></td>
<td>~ 50</td>
<td>~ 200</td>
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<table>
<thead>
<tr>
<th><strong>Footprint (m²)</strong></th>
<th>NevoLine</th>
<th>Single-Use (SU)</th>
<th>Stainless Steel (SS)</th>
</tr>
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<tbody>
<tr>
<td><strong>1,500 m²</strong></td>
<td></td>
<td>4,000 m²</td>
<td>~ 10,000 m²</td>
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<tr>
<th><strong>Utilities</strong> (USD/run)</th>
<th>NevoLine</th>
<th>Single-Use (SU)</th>
<th>Stainless Steel (SS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5,400</strong></td>
<td></td>
<td>35,500</td>
<td>75,000</td>
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<tr>
<th><strong>CoGs (/dose)</strong></th>
<th>NevoLine</th>
<th>Single-Use (SU)</th>
<th>Stainless Steel (SS)</th>
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<tr>
<td><strong>&lt; $ 0.30</strong></td>
<td></td>
<td>$ 0.6</td>
<td>$ 1.2–1.5</td>
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</tbody>
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**Assumptions**

Calculations: BioSolve. Facilities built from scratch, utilized at capacity.
Purifications yield: NevoLine 57%, SU & SS 45%.