Nanoviricides: Novel Antiviral Nanomedicines
Innovation, Regulation, and Investments

Panel Chair: Mostafa Analoui, PhD, The Livingston Group

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NanoViricides, Inc. is a publicly traded company (stock symbol: NNVC, OTC).

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NanoViricides, Inc. (www.nanoviricides.com) is a development stage company that is creating special purpose nanomaterials for viral therapy. The Company's novel nanoviricide™ class of drug candidates are designed to specifically attack enveloped virus particles and to dismantle them. The Company is developing drugs against a number of viral diseases including H1N1 “swine flu”, H5N1 bird flu, seasonal Influenza, HIV, EKC, Herpes “cold sores” and genital Herpes, Hepatitis C, Rabies, Dengue fever, and Ebola virus, among others.

This document contains forward-looking statements that reflect the current expectation of NanoViricides, Inc. (the "Company") regarding future events. Actual events could differ materially and substantially from those projected herein and depend on a number of factors. Certain statements are “forward-looking statements” within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. You should not place undue reliance on forward-looking statements since they involve known and unknown risks, uncertainties and other factors which are, in some cases, beyond the Company's control and which could, and likely will, materially affect actual results, levels of activity, performance or achievements. The Company assumes no obligation to publicly update or revise these forward-looking statements for any reason, or to update the reasons actual results could differ materially from those anticipated in these forward-looking statements, even if new information becomes available in the future. Important factors that could cause actual results to differ materially from the company's expectations include, but are not limited to, those factors that are disclosed under the heading "Risk Factors" and elsewhere in documents filed by the company from time to time with the United States Securities and Exchange Commission and other regulatory authorities. Although it is not possible to predict or identify all such factors, they may include the following: demonstration and proof of principle in pre-clinical trials that a nanoviricide is safe and effective; successful development of our product candidates; our ability to seek and obtain regulatory approvals, including with respect to the indications we are seeking; the successful commercialization of our product candidates; and market acceptance of our products.
**Innovation... What is a NanoViricide®?**

**FIND the enemy...**

- **Ligands**
  - Target Virus Particle
  - "Guided Missile"

**ENCAPSULATE enemy...**

- "Nanomicelle"
  - A folded-up glob that can unfold and spread onto the virus particle after ligands bind to the virus
  - "Attack from all around"

**DESTROY the enemy...**

- "Nanoviricide"
  - The virus thinks it bound to a host cell, starts its own unfolding machinery, destroying itself in the process
  - Tricking the Virus

**API’s**

- Active Pharmaceuticals can be Encapsulated in the "Belly" of the nanoviricide

- Future Drugs - Creating Cures?
A single nanoviricide micelle may be capable of completely engulfing a Virus Particle. Nanoviricide micelles self-assemble from multiple chains. A single chain micelle shown for convenience. Illustration not to scale.

- **Bound nanoviricide** binds to a virus particle (1)
- **Bound nanoviricide** wrapping onto virus particle (2)
- A nanoviricide has ligands to bind to the virus, just like antibodies. A nanoviricide can engulf and dismantle the virus particle, which antibodies cannot do. (3)
- A virus particle destroyed by a nanoviricide (4)
Our Current Drug Programs

**Clinical Lead**

### Influenzas
- H5N1 Bird Flu
- H7N, H9N, High Path Avian Influenzas
- Epidemic H1N1 - “Swine Flu”
- Seasonal Influenzas

### Pre-clinical Leads
- * FluCide™ one Drug for All
- * Eye Drops for All Viral Conjunctivitis/Keratitis
- * Skin Cream & Gel for Oral, Genital Cold Sores
- * HIVCide™ Potentially “Functional Cure”
- * Dengue nanoviricide - avoid ADE Effect

### Post-Discovery
- Rabies
- Ebola, Marburg, Rift Valley Fever, Hemorrhagic Viruses
- Hepatitis C
- EBV, RSV, Chikungunya, Rotavirus...
>1,000-fold Lung Viral Load Reduction in NanoViricide Treated Animals

Only <2-fold reduction with Oseltamivir in this study

Lung Viral Load, pfu/ml homogenate, log-scale

4.5 Days (108h) Post-Infection
Sustained Reduction in HIV-1 Viral Load Even After Treatment Stopped in the SCID-hu Thy/Liv Mouse Model Study #2

NV-5B Treatment stopped at 20 days, yet antiviral effects (viral load, CD4+-CD8+ DP cells, Total T cells) lasted at least through 48 days.
NanoViricides: Beyond Immunotherapeutics!

✴ Immunoglobulins, Antibodies : Standard Antiviral Treatments
✴ NanoViricides are Designed to Neutralize the Virus Particle Completely and Dismantle it
✴ Nanoviricides Do Not Depend Upon the Immune System to encapsulate and dismantle the virus, as antibodies do
✴ Nanoviricides Strategy: Seek, Attach, Encircle and Destroy
  ◦ Classic War Strategy!
FDA Regulatory Environment

- **Efficacy** - YES
- **Safety** - YES
- **Consistency:** CMC - Chemistry, Manufacture, Controls
  - Chemistry - Translate from bench Chemistry to Production
  - Polymeric Nature Poses Limitations
    - Many Polymers Already in Medicinal Practice
  - Controls
    - Similar to Usual Small Chemicals
    - Additional Characterization and Controls
  - Batch to Batch Reproducibility
FDA Regulatory Environment: cGMP

- Capabilities Issues with CMOs
- Transfer/Translation Load Issues at NanoViricides
- Overall Costs - Initial, Milestone, Recurring
- Timeline Goals
- Uncertain Regulatory Needs Dictate that We Need to Have Control

Regulation... relative to NanoViricides

Chose to Do it On Our Own

Building Purchased (3rd Party)

Renovation being Planned and Designed

Aggressive 9 month Goal
FDA Regulatory Environment: Clinical Path

- Guidelines for Nanomedicines: No New Guidelines Needed; Case-by-Case
- Clear Clinical Path for Influenza
- High Efficacy should translate into Lower Clinical Trials Costs and Shorter Timelines
- Experienced Consultants
- Uncertain Regulatory Environment
Financing & Investments...

Public Company - Equity Market Financing

✶ Took NanoViricides Public -
  › Reverse Shell Merger - June 2005

✶ To date, Raised about $31M
  › about $11M cash in hand
  › current expense rate ~ 6M/yr

✶ Stock Market Uncertainties

✶ Global Economic Uncertainties

✶ Changes in Investment Models

✶ Changes in Investor Models

✶ Late Revenue in Pharma Business

✶ Licensing Deals in First-In-Class Nanomedicines
## Large Market Sizes: Strong ROI Opportunity

<table>
<thead>
<tr>
<th>Disease/Virus</th>
<th>$ Billions, 2013 estimates (1)</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td><strong>HIV/AIDS</strong></td>
<td>$ 21 B</td>
<td>HIV-Cide™ Potentially a “Functional Cure”</td>
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<tr>
<td><strong>Influenzas</strong></td>
<td>$ 7 B</td>
<td>Resistance to Current Drugs widespread. FluCide™ as a Pan-Influenza Drug</td>
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<td><strong>Eye Drops Antiviral</strong></td>
<td>$ 1~5 B (2)</td>
<td>No current non-toxic drugs</td>
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<td><strong>Herpes “Cold Sores” Skin Cream &amp; Gel</strong></td>
<td>$ 2 B</td>
<td>Current therapies have limited effectiveness</td>
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<td><strong>Hepatitis C</strong></td>
<td>$ 6 B</td>
<td>Current therapies not very effective</td>
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<td><strong>Dengue, Rabies, other NTD’s</strong></td>
<td>$ 1 B (2) . combined</td>
<td>Rapidly increasing developing world markets not properly accounted for</td>
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<td><strong>Ebola/Marburg/VHF</strong></td>
<td>$ 1 B . combined</td>
<td>Biodefense; Single customer issues Government Grants &amp; Contracts</td>
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(2) Estimates based on the Jain Report, and a report commissioned by the Company for more detailed analyses of these special markets. March 2009.
## NanoViricides: Strong Product Pipeline

<table>
<thead>
<tr>
<th>Disease</th>
<th>Drug Candidates</th>
<th>Efficacy - Cell Cultures</th>
<th>Safety - Animals</th>
<th>Efficacy - Animals</th>
<th>IND-Enabling Studies</th>
<th>Phase I, II, III, NDA</th>
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<tbody>
<tr>
<td><strong>Primary (Commercially Important) Programs</strong></td>
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<tr>
<td>Influenza, Bird Flu*</td>
<td>FluCide™-I</td>
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<td>External Eye Viral Diseases</td>
<td>EKC-Cide™-I</td>
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<td>HIV/AIDS</td>
<td>HivCide™-I</td>
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<td>Herpes Oral and Genital</td>
<td>Identified</td>
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<td>Dengue</td>
<td>Identified</td>
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<td><strong>Neglected Tropical Diseases Programs - Social Responsibility</strong></td>
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<td>Rabies</td>
<td>RabiCide™-I</td>
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<td><strong>Bio-Defense Programs</strong></td>
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<td>Ebola/Marburg</td>
<td>TBD</td>
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<td>ADIF™ Technology**</td>
<td>ADIF-Base™-I</td>
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* Includes all highly pathogenic avian influenza (HPAI) viruses capable of causing severe human epidemics, such as H5N1, H7N, H8N.

** ADIF: “Accurate-Drug-In-Field” is NanoViricides, Inc. unique technology. The ADIF-Base nanomicelles can be stockpiled. When a novel infection (natural or bioterrorism) occurs, a nanoviricide against that virus can be quickly created in the field and used to stop an epidemic from spreading.

We plan on obtaining non-equity funding for our NTD and Bio-defense programs. The Company believes that these programs benefit our commercially important drug development programs, and vice versa.

The Regulatory Process is complex. A Tox Package needs to be developed for each drug candidate. Then an IND is submitted to the FDA. Human Clinical Trials, Phase I, II, and III, are conducted upon IND approval. An NDA is submitted after that. A drug can be marketed only after FDA approval. The Company cannot reliably predict timelines for these events, nor can it assure that it will be successful in developing any drugs.
The End