The PRINT platform offers a high degree of flexibility and can be utilized to:

- De
- Geometric Mean of Ratios
- Joelle
- +
- J
- Benchmark
- Precise control over particle shape and size
- Geometric Mean of Ratios
- Flexibility to combine particles with soluble antigen or
- MAGE
- 0      42     72
- 2
- MVA
-(see article by
- J
- 3
- T cell response, demonstrating
- 0      42     72
- +
- adjuvant
- +
- N/A
+ is
- Observed a 15x improvement in IgG titers when soluble MAGE
- QS21
- Co
- Elouahabi C, et al: Structure, chromosomal localization, and
- received [823.5
- 2
- WH
- 2
- 0      42   72
- Formulation
- Ghafouri
- 0      42   72
- N/A
+ is
- T Cell Responses
- T cell
- 6,7
- T cell responses in swine
- Vaccine
- Langlet
-and the MAGE
- 50 µg
- 5
- J
- NP
- of metastatic cancer patients with
- TLR7/8L + 240
- 0      42     72
- E, Arden K,

### Reference


- encapsulate multiple target molecules (antigens and adjuvants) to
- encapsulate multiple compounds with very different solubility profiles within each particle possible to improve cellular uptake and immune responses.
- Precise control over particle shape and size at nano-
- Sterile filtration capabilities.
- Particulate delivery shown to enhance cellular uptake and antigen processing.
- Flexibility to combine particles with soluble antigen or adjunt for final formulation with no observed interference.

### The PRINT Process

The core process involves four basic steps:

1. Create a film of the desired composition on a suitable carrier.
2. Laminate the film with a mold where the material fills the mold cavities.
3. Remove particles from the mold.
4. Collect particles to create a particle suspension or dry powder.

There are several variables that can be leveraged to create particles of a wide range of shapes, sizes, and chemical composition.

### Introduction

The MAGE-A3 gene is expressed in a wide variety of tumors. It is present in specific T cells by HLA molecules at the cell surface as a tumor-specific antigen. MAGE-A3 is not expressed on most adult tissues and the few that do express it do not bear HLA molecules; therefore, it is a suitable selective target for a tumor-specific active immunotherapy.

Historical studies have shown that recombinant MAGE-A3 protein used as an immunotherapeutic had antitumor activity in patients with metastatic melanoma and non-small-cell lung cancer. However, long-term clinical responses with good tolerability were documented. Recent studies targeted to non-small-cell lung cancer and melanoma using MAGE-A3 with various adjuvant systems, however, did not demonstrate improved patient outcomes. Therefore it is valuable to explore additional novel formulations that would enable a more robust CD8+ T cell response.

### Particle Characterization

**M3/TLR7/8L-NP**

Purified MAGE-A3 and TLR8L were co-encapsulated within 80 nm x 80 mm x 320 nm rod-shaped PLGA particles.

**TLR4/Saponin-NP**

TLR4L and saponin were co-encapsulated within 80 mm x 80 mm x 180 mm rod-shaped PLGA + Cholesterol particles.

**Study Design**

N=12 Lendrace pigs dosed D0, D28, DS6. Blood drawn for T cell response D0, D28, D68, 84.

**Treatment Groups:**

<table>
<thead>
<tr>
<th>Group</th>
<th>Formulation</th>
<th>M3 Dose</th>
<th>TLR4/TLR7 Dose</th>
<th>TLR4L Dose</th>
<th>Saponin Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Benchmark</td>
<td>300 µg</td>
<td>N/A</td>
<td>50 µg</td>
<td>50 µg</td>
</tr>
<tr>
<td>2</td>
<td>PRINT</td>
<td>300 µg</td>
<td>915 µg</td>
<td>50 µg</td>
<td>N/A</td>
</tr>
<tr>
<td>3</td>
<td>PRINT</td>
<td>300 µg</td>
<td>N/A</td>
<td>52 µg</td>
<td>50 µg</td>
</tr>
<tr>
<td>4</td>
<td>PRINT</td>
<td>300 µg</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>5</td>
<td>Control</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* Some animals received similar doses.

**References**


### Improved Cellular & Humoral Immunity

**T cell responses:**

- CD8+ T cell (TLR4L+/CD8+) cell (TLR4L+) T cell responses were measured in the PRINT
- M3/TLR4L/NP groups compared with the benchmark regardless of the form of the adjuvant
- TLR4L+/TLR4L/- NP groups with 3 doses of the benchmark
- IgG was observed
- MVA
- MVA
- MVA
- MVA
- TLR4L/
- TLR4L/
- TLR4L/
- TLR4L/
- TLR4L/