## KRAS vaccine (mRNA-5671)

Last program update: August 5, 2020

<table>
<thead>
<tr>
<th>Modality</th>
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<th>Preclinical development</th>
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<td>Cancer vaccines</td>
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<td>50-50 global profit sharing with Merck</td>
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<td>Cancer vaccines</td>
<td>mRNA-5671/ Merck V941</td>
<td>KRAS vaccine, CRC, NSCLC, pancreatic cancer</td>
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Phase 1 study ongoing; study run by Merck
Moderna’s mRNA vaccines elicit T cells required for curative cancer therapy
KRAS opportunity

*Mutation is present in >20% of human cancers*

- KRAS is a key regulator of cell proliferation and survival; mutations cause dysregulated cell proliferation
- One of the most frequently mutated oncogenes in human cancers
- Mutations found principally in pancreatic cancer, lung cancer, and colorectal cancer
- The four most prevalent KRAS mutations associated with these malignancies are G12D, G12V, G13D, and G12C (80% to 90% of KRAS mutations)

*Patients whose tumors harbor KRAS mutations have worse outcomes*
Anti-KRAS Tcell transfer shows human efficacy (Rosenberg, NIH)
**KRAS vaccine (mRNA-5671)**

**Preclinical data – Tcell responses after KRAS mRNA vaccination**

**Species:**

**Mouse**

**T cell response to restimulation with KRAS mutation 1 peptide in mouse model study**

- **% Freq CD8+/IFN+**
- **Species:** Mouse
- **X-axis:** Same HLA control, mRNA for KRAS mutation 1 peptide, 4 mutant KRAS concatemer
- **Y-axis:** 0 to 3

**T cell response to restimulation with KRAS mutation 2 peptide in mouse model study**

- **% Freq CD8+/IFN+**
- **Species:** Mouse
- **X-axis:** Same HLA control, mRNA for KRAS mutation 2 peptide, 4 mutant KRAS concatemer
- **Y-axis:** 0.0 to 0.5

**CD8 T cell responses to KRAS antigens were greatly enhanced following vaccination with mRNA encoding KRAS mutations in pre-clinical studies**
KRAS vaccine (mRNA-5671)

Preclinical data – Tcell responses after KRAS mRNA vaccination

Study Overview

- A Phase 1, Open-Label, Multicenter Study to Assess the Safety and Tolerability of mRNA-5671/Merck V941 as a Monotherapy and in Combination With Pembrolizumab in Participants With KRAS Mutant Advanced or Metastatic Non-Small Cell Lung Cancer, Colorectal Cancer or Pancreatic Adenocarcinoma

- Selecting for HLA subtypes (HLA-A*1101 and/or HLA-C*0802) most likely to respond
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