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Personalized cancer vaccine (PCV) (mRNA-4157, NCI-4650)

Last updated: December 6, 2018

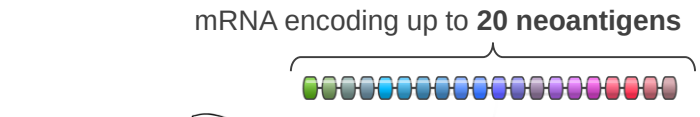
Modality	Program #	Program *Indication*	Preclinical development	Phase 1	Phase 2	Phase 3 and commercial	Moderna rights
Cancer vaccines	**mRNA-4157 NCI-4650**	PCV *Solid tumors*					50-50 global profit sharing with Merck
	mRNA-5671	KRAS vaccine *CRC, NSCLC, pancreatic cancer*					50-50 global profit sharing with Merck

mRNA-4157 Phase 1 ongoing, enrolling 1 mg cohort of part A monotherapy and part B combination with Keytruda.
NCI-4650 Phase 1 ongoing (investigator-initiated, single-arm trial sponsored by the NCI).
Planning of randomized Phase 2 has begun.

Note: NCI-4650 only differs from mRNA-4157 in its neoantigen selection process

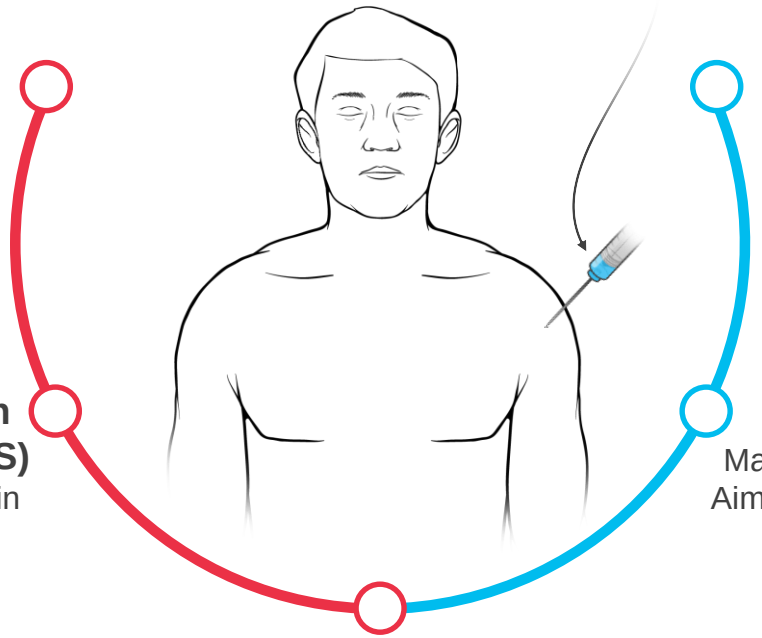
Personalized cancer vaccine (mRNA-4157)

Designed to target an individual patient's unique tumor mutations



Tissue Samples
Tumor (biopsy) and
Normal (blood)

Next Generation Sequencing (NGS)
Mutations identified in protein neoantigen



Vaccine Design
Up to 20 neoantigens
Automated algorithm integrated with workflow

Manufacturing
Manufacturing of mRNA
Aim for one lot per patient

Administration

- **First patient was dosed with a PCV** in November 2017
- Partnered with **Merck** (Keytruda combo)
- Clinical plan includes multiple solid tumor patient populations

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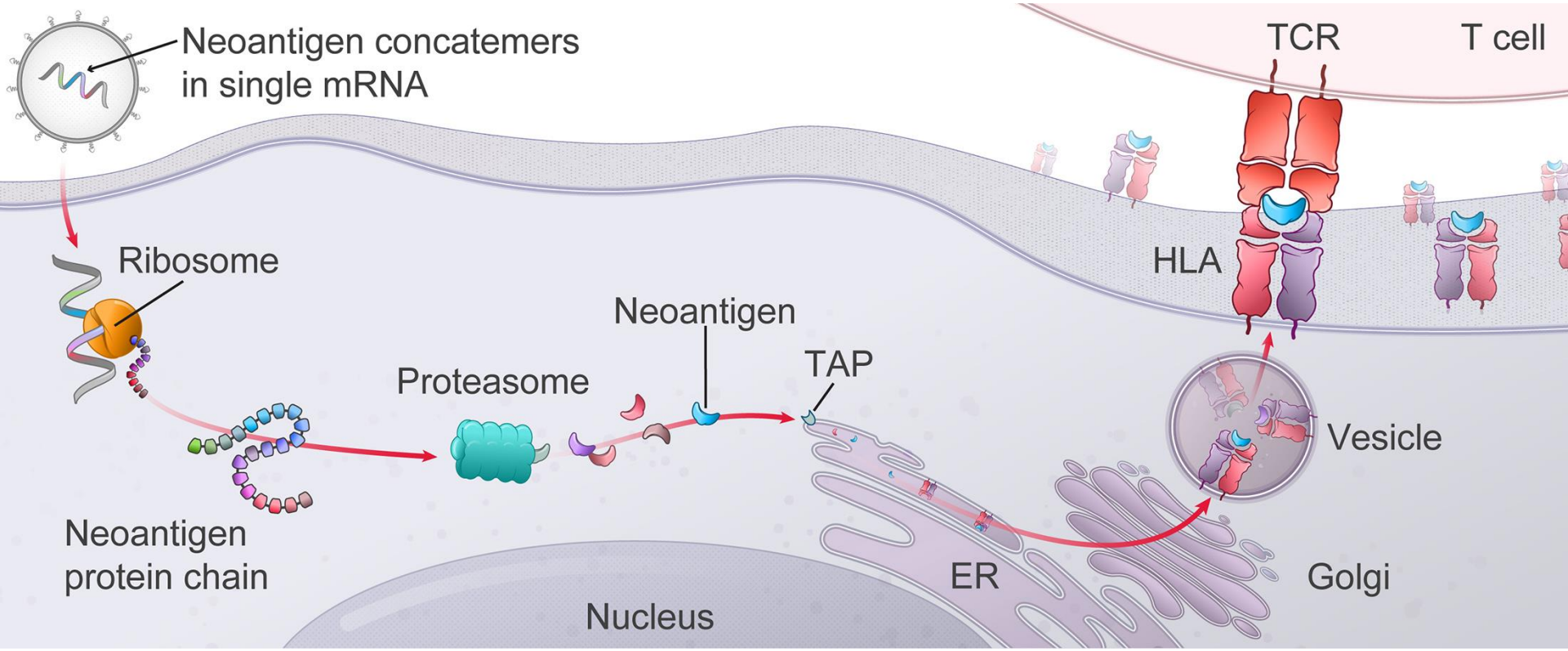
Moderna's mRNA vaccines elicit T cells required for curative cancer therapy



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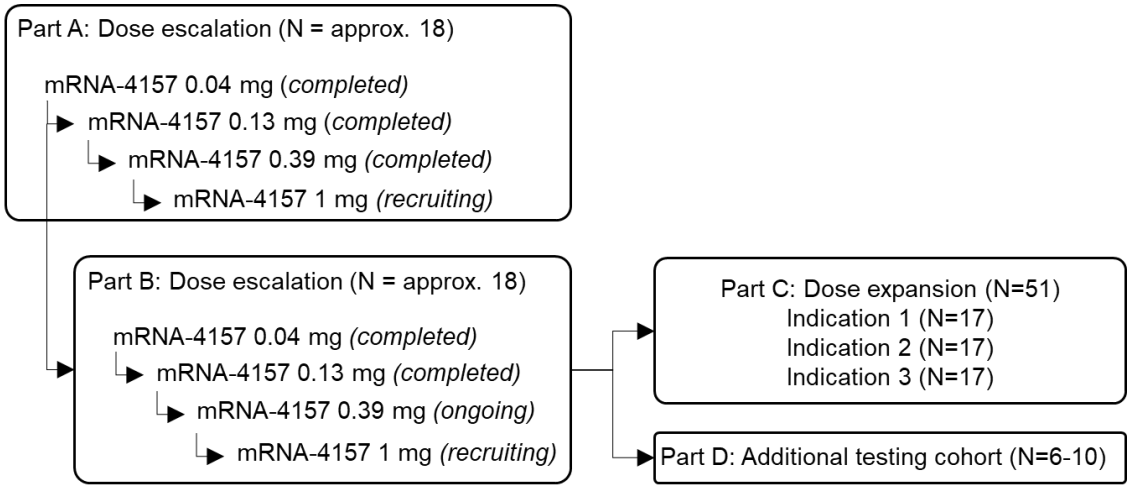
Personalized cancer vaccine (mRNA-4157)

Phase 1 design

Key Objectives

- Part A — To assess the safety and tolerability of mRNA-4157 monotherapy in subjects with resected solid tumors, including an apheresis cohort
- Parts B, C and D — To assess the safety, tolerability, and recommended Phase 2 dose of mRNA-4157 in a dose escalation cohort administered in combination with pembrolizumab
- Part D — To assess the immunogenicity of mRNA-4157 with pembrolizumab from apheresis samples in certain subjects



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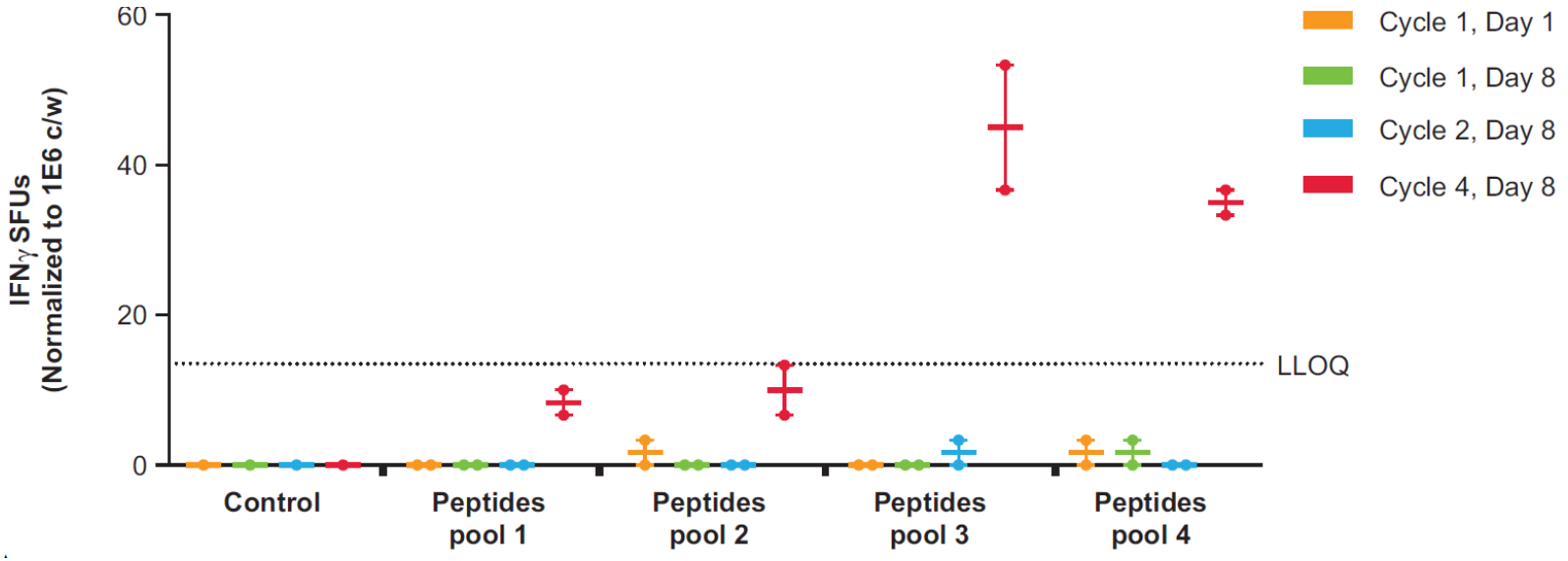
Early Phase 1 data shows antigen-specific T cell responses

Melanoma
Part A (mRNA-4157 monotherapy)
0.13 mg dose

First patient with melanoma treated at the 0.13 mg dose level has shown an induction of mutation-specific T cells after the 4th cycle (week 12), as measured by ELISPOT assay



Planning underway for Phase 2 study to evaluate mRNA-4157 plus pembrolizumab against pembrolizumab alone

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Special note regarding forward-looking statements

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