



U.S. Food & Drug Administration
10903 New Hampshire Avenue
Silver Spring, MD 20993
www.fda.gov

To: Administrative file, IND 19745

From:

Through:

CC:

(b) (6)

Sponsor: ModernaTX, Inc

Facilities: 1. ModernaTX, Inc. (Moderna); One Moderna Way, Norwood, MA, USA, 02062
FE#3016741856
2. Lonza Biologics, Inc (Lonza); 101 International Drive, Portsmouth, NH 03801;
FE# 3001451441; DUNS# 093149750

Product: Human Coronavirus (2019-nCoV; Pre-Fusion Spike protein; Lipid Nanoparticles, messenger RNA-1273) Vaccine; suspension for intramuscular injection

Indication: Active immunization to induce protective immunity against acute respiratory disease associated with the SARS-CoV-2 virus.

Subject: **Drug Substance Review Memo** – Review of the facility and equipment information submitted to Moderna IND 19745 and (b) (4) in support of Drug Substance (DS) manufacture for the Emergency Use Authorization (EUA 27073) of Human Coronavirus Vaccine developed by ModernaTX, Inc.

RECOMMENDATION:

We have reviewed the information submitted to the Moderna IND 19745 for the Moderna, Norwood, MA facility and the Lonza, Portsmouth, NH facility as well as (b) (4) used in the manufacture of Moderna's mRNA-1273 drug substance SARS-COVID-19 vaccine, and find that the facility, equipment, and controls appear suitable to support use under an Emergency Use Authorization.

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1. SUMMARY

In response to the ongoing Coronavirus Disease 2019 (COVID-19) public health emergency, Moderna developed a vaccine indicated for the prevention of disease caused by the Coronavirus SARS-CoV-2, consisting of mRNA encoding the SARS-CoV-2 pre-fusion spike protein encapsulated in lipid nanoparticles.

The original IND was received by CBER on April 27, 2020, and the Emergency Use Authorization (EUA) request was received by CBER on November 30, 2020.

(b) (4) conducted a site visit of the Moderna facility from October 13-16, 2020. Additional details of facility, equipment and manufacturing information pertaining to the mRNA-1273 DS is contained in the site visit report which is covered in a separate memo.

The purpose of this review performed in support of the EUA is to evaluate the bioburden-controlled drug substance (DS) manufacture of mRNA-1273 vaccine (hereafter referred to as mRNA-1273) at Moderna's manufacturing site located in Norwood, Massachusetts and at Moderna's contract manufacturing organization, Lonza Biologics Inc (Lonza) in Portsmouth, NH. The scope of this review memo is limited within (b) (4) purview which includes the following: facility information, cross-contamination prevention measures, maintenance of controlled environments, equipment for use in drug substance manufacturing including qualification, cleaning and sterilization, and types of equipment used (i.e. dedicated or shared, multi-use or single-use), and container closure systems. Process validation for the manufacture of mRNA-1273 DS at Moderna was also assessed in this review.

Assessment of the information related to Drug Product (DP) manufacture at the Catalent facility is documented in a separate review memo.

Most of the product-specific facility and equipment information for both facilities reviewed in this memo was submitted to Moderna's IND 19745. Additionally, (b) (4)

(b) (4) containing 3.2.A.1 Facilities and Equipment information for (b) (4)
(b) (4) The facility and equipment information in the (b) (4)
(b) (4)

Submissions/amendments reviewed in this memo, in the order they were received include:

Receipt Date	STN(s)	Summary
08/26/2020	(b) (4)	
09/03/2020		
09/04/2020		
09/11/2020		

Receipt Date	STN(s)	Summary
09/11/2020	(b) (4)	
09/28/2020		
09/30/2020		
10/13/2020		
10/16/2020		
11/09/2020		
11/12/2020	IND 19745/0.67	Lonza Portsmouth facility and equipment
11/16/2020	IND 19745/0.70	Manufacturing process
11/09/2020	IND 19745/0.66	Control of materials
11/30/2020	EUA 27073/0.0	LoA for IND 19745 (all relevant information)
11/30/2020	IND 19745/0.84	Manufacturing process Moderna Norwood facilities and equipment Lonza Portsmouth PPQ protocol for full Scale B, batch analyses for one GMP batch of each DS component and bulk DS manufactured at Scale B
12/14/2020	IND 19745/0.92	Lonza Portsmouth facility and equipment (response to IR of 12/08/2020)

2. BACKGROUND

mRNA-1273 is a lipid nanoparticle (LNP) dispersion containing an mRNA (CX-024414) and four lipids: SM-102 (a custom-manufactured, ionizable lipid); PEG2000-DMG; cholesterol, and 1,2-distearoyl-sn-glycero-3-phosphocholine (DSPC).^{(b) (4)}

^{(b) (4)} which Moderna considers the DS. mRNA-1273 is a vaccine indicated for the prevention of the disease caused by SARS-CoV-2.

MANUFACTURE of mRNA-1273

^{(b) (4)}

(b) (4)



(b) (4)



