EXTRACT FROM THE RECORDS OF UNIVERSITY OF MASSACHUSETTS

Granting Authority to Execute Contracts and All Other Instruments

I, Zunilka Barrett, Secretary of the Board of Trustees of the University of Massachusetts, do hereby certify that the following is a true and complete copy of a vote duly adopted by the Board of Trustees of the University of Massachusetts at a meeting duly called and held on the fifth day of February, nineteen hundred and ninety-seven at the University of Massachusetts, Chancellor's Conference Room, Boston, Massachusetts:

"Further, to affirm that, except as to matters governed by the University of Massachusetts Intellectual Property Policy (Doc. T96-040), the Treasurer of the University of Massachusetts or his designee shall be the sole contracting officer of the University with the Authority to execute all contract, grants, restricted gifts (excluding endowments), and amendments thereto for sponsored programs in instruction, research, or public service, unless and until otherwise voted by the Board of Trustees."

I further certify that the Senior Vice President for Administration & Finance and Treasurer of the University, Lisa A. Calise, has retained the right to remain the sole contracting officer of the University of Massachusetts, but in her absence, she has designated Andrew W. Russell, Senior Assistant Vice President of Operations and Associate Treasurer.

I further certify that effective March 31, 2021, the following is a list of designated individuals authorized in accordance with the afore referenced votes to review and execute all grants and contracts for sponsored programs in instruction, research and public service that are applicable to and received on behalf of the University of Massachusetts for their respective campuses.

Amherst Campus

Kumble R. Subbaswamy, Chancellor, Amherst Campus, Amherst, Massachusetts,

Michael F. Malone, Vice Chancellor, Research and Engagement Amherst Campus, Amherst, Massachusetts,

Carol P. Sprague, Director, Office of Post Award Management, Amherst Campus, Amherst, Massachusetts,

Jennifer A. Donais, Assistant Vice Chancellor, Research and Engagement and Director of Research Compliance, Amherst Campus, Amherst, Massachusetts,

Marcia Day, Director, Office of Pre-Award Services, Amherst Campus, Amherst, Massachusetts Laura J. Howard, Associate Director, Division of Continuing Education, Amherst Campus, Amherst, Massachusetts

Steven D. Goodwin, Deputy Chancellor, Amherst Campus, Amherst, Massachusetts

Boston Campus

Marcelo Suárez-Orozco, Chancellor, Boston Campus, Boston, Massachusetts, Kathleen Kirleis, Vice Chancellor for Administration and Finance, Boston Campus, Boston, Massachusetts,

Joseph Berger, Provost & Vice Chancellor for Academic Affairs, Boston Campus, Boston, Massachusetts,

Bala Sundaram, Vice Provost for Research and Strategic Initiatives and Dean of Graduate Studies, Boston Campus, Boston, Massachusetts,

Matthew L. Meyer, Associate Vice Provost for Research and Director of the Office of Research & Sponsored Programs, Boston Campus, Boston, Massachusetts,

Shala A. Bonyun, Assistant Director for the Office of Research and Sponsored Programs, Boston Campus, Boston, Massachusetts,

Dartmouth Campus

Mark Fuller Interim Chancellor, Dartmouth Campus, Dartmouth, Massachusetts, Michael Goodman, Acting Provost & Vice Chancellor for Academic Affairs, Dartmouth Campus, Dartmouth, Massachusetts,

Michelle M. Plaud, Manager of Pre and Post Award Administration, Dartmouth Campus, Dartmouth, Massachusetts,

Deborah Dolan, Pre-Award and Subrecipient Manager, Dartmouth Campus, Dartmouth Massachusetts,

Megan Hennessey-Greene, Director, Office of Research Administration, Dartmouth Campus, Dartmouth Massachusetts,

Ramprasad Balasubramanian, Vice Provost for Research and Academic Affairs, Dartmouth Campus, Dartmouth, Massachusetts,

Lowell Campus

Jacqueline F. Moloney, Chancellor, Lowell Campus, Lowell, Massachusetts,

Joseph Hartman, Provost, Lowell Campus, Lowell, Massachusetts,

Steven O'Riordan, Vice Chancellor for Finance and Operations, Lowell Campus, Lowell, Massachusetts,

Susan Puryear, Director, Office of Research Administration, Lowell Campus, Lowell, Massachusetts,

Julie Chen, Vice Chancellor for Research & Innovation, Lowell Campus, Lowell, Massachusetts,

Anne Maglia, Associate Vice Chancellor, Research Administration, Lowell Campus, Lowell, Massachusetts,

President's Office

Eric Heller, Executive Director of the University of Massachusetts Donahue Institute

Worcester

Michael F. Collins, M.D., Chancellor, University of Massachusetts Medical School, Worcester, Massachusetts,

James Glasheen, Executive Vice Chancellor Innovation & Business Development, University of Massachusetts Medical School, Worcester, Massachusetts,

John C. Lindstedt, Executive Vice Chancellor for Administration & Finance, University of Massachusetts Medical School, Worcester, Massachusetts,

Katherine Luzuriaga, M.D., Vice Provost for Clinical and Translational Research, University of Massachusetts Medical School, Worcester, Massachusetts,

Janice Lagace, Associate Director Research Funding Services, University of Massachusetts Medical School, Worcester, Massachusetts,

Patti Onorato, Managing Director, Clinical Delivery Solutions, Commonwealth Medicine, University of Massachusetts Medical School, Worcester, Massachusetts,

Terence R. Flotte, M.D., Dean, School of Medicine, Provost and Executive Deputy Chancellor, University of Massachusetts Medical School, Worcester, Massachusetts,

James McNamara, Executive Director, Office of Technology Management, University of

Massachusetts Medical School, Worcester, Massachusetts,

Marcy Culverwell, Associate Vice Chancellor for Administration & Finance, University of Massachusetts Medical School, Worcester, Massachusetts,

Amy Miarecki, Assistant Vice Chancellor, Grants and Contracts Administration, University of Massachusetts Medical School, Worcester, Massachusetts,

Danielle Howard, Director Clinical Research Operations, University of Massachusetts Medical School, Worcester Massachusetts,

Matty Spragens, Director of Sponsored Programs, University of Massachusetts Medical School, Worcester Massachusetts,

Lisa M. Colombo, Executive Vice Chancellor for Commonwealth Medicine, University of Massachusetts Medical School, Worcester Massachusetts

Elizabeth Giehl, Director of Grant Accounting and Compliance, University of Massachusetts Medical School, Worcester Massachusetts

Mark S. Klempner, MD, Executive Vice Chancellor for MassBiologics of UMMS, , University of Massachusetts Medical School, Worcester Massachusetts

I further certify that Lisa A. Calise, Andrew W. Russell, Kumble R. Subbaswamy, Michael F. Malone, Carol P. Sprague, Jennifer A. Donais, Marcia Day, Laura J. Howard, Steven D. Goodwin, Marcelo Suárez-Orozco, Kathleen Kirleis, Joseph Berger, Bala Sundaram, Matthew L. Meyer, Shala A. Bonyun, Mark Fuller, Michael Goodman, Megan Hennessey- Greene, Ramprasad Balasubramanian, Michelle M. Plaud, Deborah Dolan, Jacqueline F. Moloney, Steven O'Riordan, Julie Chen, Joseph Hartman, Anne Maglia, Susan Puryear, Eric Heller, Michael F. Collins, MD, James Glasheen, John C. Lindstedt, Katherine Luzuriaga, MD, Janice Lagace, Patti Onorato, Terence R. Flotte, MD, James McNamara, Marcy Culverwell, Amy Miarecki, Danielle Howard, Matty Spragens, Lisa M Colombo, Elizabeth Giehl, and Mark S. Klempner are members of the University Administration with its principal office located at 333 South Street, Shrewsbury, County of Worcester, in the Commonwealth of Massachusetts.

Date: April 2, 2021

zunilka Barsett Zunilka Barrett, Secretary to the Board of Trustees