June 30, 2016

Mirna Therapeutics Appoints Perry Nisen, M.D., Ph.D., to Its Board of Directors

AUSTIN, Texas--(BUSINESS WIRE)-- Mirna Therapeutics, Inc. (Nasdaq:MIRN), a clinical stage biopharmaceutical company developing a broad pipeline of microRNA-based oncology therapeutics, today announced the appointment of Perry Nisen, M.D., Ph.D., to the Company's Board of Directors. Dr. Nisen currently serves as the Chief Executive Officer and Donald Bren Chief Executive Chair of the Sanford Burnham Prebys Medical Discovery Institute, an independent biomedical research institute. Dr. Nisen oversees the organization's strategic vision of becoming a leader in the growing field of translational medicine.

"We are delighted to welcome to our board an executive with Perry's extensive pharmaceutical drug development and leadership experience," said President and CEO Paul Lammers, M.D., M.Sc. "His proven ability to foster innovation and advance new products through the pipeline will be invaluable to our efforts to realize the full potential of our microRNA-based cancer therapies."

"I look forward to working with fellow directors and the management team to advance Mirna's pioneering approach to treating cancer," said Dr. Nisen.

Before joining Sanford Burnham Prebys, Dr. Nisen served as Senior Vice President of Science and Innovation at GlaxoSmithKline (GSK), where he facilitated innovation and integration of R&D across GSK's global organization and was integral to the discovery, development, and commercialization of a vast portfolio of drugs. Earlier in his career at GSK, he held various key positions, including interim Chief Medical Officer, Senior Vice President and Oncology Therapy Area Head, Senior Vice President of Cancer Research, and Senior Vice President of Clinical Pharmacology and Discovery Medicine. Previously, Dr. Nisen was the Divisional Vice President of Cancer Research and Oncology Development at Abbott Laboratories.

Formerly, Dr. Nisen was the Lowe Foundation Professor of Neuro-Oncology at the University of Texas Southwestern Medical Center. He holds a B.S. from Stanford University and M.D. and Ph.D. from the Albert Einstein College of Medicine.

About Mirna Therapeutics, Inc.

Mirna is a clinical stage biopharmaceutical company developing a broad pipeline of microRNA-based oncology therapeutics and is the first to establish clinical proof-of-concept for a microRNA replacement therapy for cancer. Mirna's lead product candidate, MRX34, a mimic of naturally occurring microRNA-34 (miR-34), is currently being studied in a Phase 1 clinical trial in patients with primary liver cancer, advanced solid tumors and hematological malignancies. miR-34 is one of the most widely published microRNAs and is considered a key regulator of multiple oncogenes across key oncogenic pathways, with the capacity to regulate more than 30 different oncogenes and repress the immune checkpoint signaling molecule PD-L1. The potential capacity to simultaneously affect multiple pathways and processes that are critical to cancer cell viability may make mimics of tumor suppressor microRNAs potent anti-cancer agents and less susceptible to drug resistance. Mirna plans to develop MRX34 as a monotherapy and in combination with other therapeutic modalities, such as targeted therapies and immuno-oncology agents. The Company was founded in 2007 and is located in Austin, Texas.

For more information, visit www.mirnarx.com.

Forward-Looking Statements

To the extent that statements contained in this press release are not descriptions of historical facts regarding Mirna, they are forward-looking statements reflecting the current beliefs and expectations of management made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995, including statements regarding our plans for MRX34 development; our preclinical and clinical activity and results of our clinical development program; and the potential efficacy of MRX34, including as a combination therapy. Such forward-looking statements involve substantial risks and uncertainties that could cause our clinical development program, future results, performance or achievements to differ significantly from those expressed or implied by the forward-looking statements. Such risks and uncertainties include, among others, the uncertainties inherent in the clinical drug development process, including the outcomes of clinical trials, the regulatory approval process, our substantial dependence on MRX34, our commercialization plans and efforts and other matters that could affect the availability or commercial potential of our product candidates. Mirna undertakes no obligation to update or revise any forward-looking statements. For a further description of the risks and uncertainties that could cause

actual results to differ from those expressed in these forward-looking statements, as well as risks relating to our business in general, our most recent Quarterly Report for the quarter ended March 31, 2016, filed with the SEC on May 12, 2016, and our most recent Annual Report for the year ended December 31, 2015, filed with the SEC on March 30, 2016.

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