November 23, 2015

Mirna Therapeutics Announces the Publication of New Data Supporting Potential Immune-Related Mechanism for Anti-Cancer Activity of MRX34

AUSTIN, Texas--(BUSINESS WIRE)-- Mirna Therapeutics, Inc. (Nasdaq:MIRN), a clinical-stage biopharmaceutical company developing a broad pipeline of microRNA-based oncology therapies, today announced that the *Journal of the National Cancer Institute (JNCI)* published new preclinical data demonstrating a novel mechanism by which MRX34, the Company's lead product candidate, can stimulate the immune system to potentially induce an anti-tumor immune response. The study, conducted in collaboration with researchers from the University of Texas MD Anderson Cancer Center, was published online on November 17, 2015 and is scheduled to appear in Volume 108, Issue 1 of the *JNCI* print edition.

MRX34 is a double-stranded synthetic mimic of the naturally occurring tumor suppressor microRNA (miRNA) miR-34, encapsulated in the SMARTICLES® liposomal delivery formulation. miR-34 has been widely studied as a critical tumor suppressor microRNA and has been shown to be a key regulator of multiple oncogenes across multiple oncogenic pathways. The new data indicate that miR-34 can also regulate anti-tumor immune functions by repressing PD-L1 (programmed death receptor ligand 1), an immune checkpoint signaling molecule that is upregulated by many tumor cells to escape the surveillance of the body's immune system.

"This study adds important new information to our understanding of miR-34-induced tumor suppression and its potential in treating many different cancers," commented Miguel Barbosa, Ph.D., Chief Scientific Officer of Mirna Therapeutics. "The researchers' conclusions suggest that the therapeutic potential of MRX34 derives from its ability not only to repress multiple oncogenes but also to block tumor evasion pathways. We look forward to further exploring this mechanism of activity and to seeing additional results in patients with multiple tumor types from our ongoing MRX34 clinical trial."

Although the PD-L1 gene is frequently upregulated in various cancers, the molecular mechanisms that lead to PD-L1 overexpression have not been fully explained. The newly published study demonstrates that PD-L1 is negatively regulated by the tumor suppressor p53 via miR-34. In non-small cell lung cancer (NSCLC) cells, mutated p53 was associated with lower expression levels of miR-34, consistent with previous data indicating that p53 directly induces the expression of the miR-34 gene. Notably, mutated p53 was also correlated with high expression of PD-L1. While p53 has been linked to other aspects of immune response and miR-34 is known to regulate multiple oncogenes, the *JNCI* paper is the first to connect both p53 and miR-34 to immune evasion by tumors and regulation of PD-L1.

To understand the relevance of PD-L1 regulation for new cancer drug candidate MRX34, the authors tested the potential immune-related function of MRX34 *in vivo* in tumor-bearing mice with intact immune systems. Consistent with the *in vitro* data discussed above, therapeutic delivery of MRX34 led to a decrease of PD-L1 expression in tumor tissue. The authors also observed a concurrent increase of CD8+ tumor-infiltrating lymphocytes (TILs), and decrease of CD8+PD1- TILs, suggesting that MRX34 can alter immune cell profiles in the tumor and potentially reverse tumor immune evasion.

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 the therapeutic potential of

MRX34 and our expectations regarding future clinical activity and results for MRX34, including in connection with our Phase 1 clinical trial of MRX34. 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, see our Quarterly Report on Form 10-Q filed with the U.S. Securities and Exchange Commission on November 13, 2015.

View source version on businesswire.com: http://www.businesswire.com/news/home/20151123005365/en/

Investors
The Trout Group
Josh Barer, 646-378-2948
jbarer@troutgroup.com
or
Media
BMC Communications
Amy Bonanno, 646-513-3117
abonanno@bmccommunications.com

Source: Mirna Therapeutics, Inc.