July 16, 2019

Anixa Biosciences Highlights Recent Publication in The Journal of Experimental Medicine on Myeloid Derived Suppressor Cells

SAN JOSE, Calif., July 16, 2019 /PRNewswire/ --Anixa Biosciences, Inc. (NASDAQ: ANIX), a biotechnology company focused on harnessing the body's immune system to fight cancer, today announced it will make available reprints of a recent study in the Journal of Experimental Medicine (JEM) entitled, "Identification of monocyte-like precursors of granulocytes in cancer as a mechanism for accumulation of PMN-MDSCs" jointly published with collaborators at The Wistar Institute.

The Journal of Experimental Medicine (JEM) is a peer-reviewed journal published by Rockefeller University Press dedicated to publishing outstanding and enduring studies in medical biology. The study identified monocytic precursors that are capable of differentiating into polymorphonuclear myeloid-derived suppressor cells (PMN-MDSCs). MDSCs are a heterogeneous myeloid population that become pathologically activated in cancer patients and suppress antitumor immune response in the body. They are associated with poor prognosis and resistance to certain therapies and they are the primary subject of Anixa's Cchek™ early cancer detection platform.

"Our collaboration with Anixa has been quite helpful in our continued work and commitment to understand the behavior of MDSCs, which play a major role in enabling tumors to evade and escape the immune system," said senior author Dmitry I. Gabrilovich, M.D., Ph.D., Christopher M. David Professor and program leader of the Immunology, Microenvironment and Metastasis Program at Wistar.

For this study, Anixa helped support the identification of a type of monocytic precursors, called monocyte-like precursors for granulocytes (MLPGs), within the population of $CXCR1^{+}CD15^{-}CD14^{+}HLA\text{-}DR^{-/lo}$ monocytic MDSCs (M-MDSCs) found circulating in the blood of cancer patients. Gene expression analysis was performed on sorted M-MDSCs ($CD15^{-}CD14^{+}HLA\text{-}DR^{-/lo}$) and monocytes ($CD15^{-}CD14^{+}HLA\text{-}DR^{high}$) from patients with advanced non-small cell lung cancer, and the gene *Cxcr1* was found to be up-regulated on M-MDSCs. The *Cxcr1* gene encodes for the chemokine receptor CXCR1 which is typically

expressed on neutrophil populations and not monocytes. Upon evaluation of CXCR1 expression on M-MDSCs and monocytes from healthy individuals and prostate cancer patients, it was found that almost 20% of M-MDSCs express this receptor. Upon testing for suppressive activity, $CXCR1^-$ M-MDSCs were found to be more suppressive than their $CXCR1^+$ M-MDSC counterparts suggesting that $CXCR1^-$ M-MDSCs are bona fide M-MDSCs based upon previously established criteria for MDSC identification. Furthermore, approximately 20% of the CXCR1+ M-MDSCs were found to differentiate into neutrophils suggesting that this population is enriched for MLPGs. In mice, these cells were found to contribute to a significant portion of the PMN-MDSC pool in several cancer models.

"We are pleased to have helped provide some insight into a potential mechanism for MDSC expansion in cancer patients, considering this process is still not well defined," stated George A. Dominguez, Ph.D., Senior Clinical Research Scientist at Anixa and third author on the study. "Furthermore, by showing that $CXCR1^-$ M-MDSCs are potently suppressive, we may have identified a new MDSC biomarker that could be used to help identify these cells in patients and improve their clinical utility."

The study's lead author was Dr. Dmitry Gabrilovich of the Wistar Institute. Co-authors included researchers from Anixa Diagnostics, University of Pennsylvania School of Medicine, The Helen F. Graham Cancer Center, Zongshan School of Medicine, and Roswell Park Comprehensive Cancer Center.

Publication information: Identification of monocyte-like precursors of granulocytes in cancer as a mechanism for accumulation of PMN-MDSCs, Journal of Experimental Medicine (2019); http://doi.org/10.1084/jem.20181952.

For those who would like a reprint of the article, please email presentations@anixa.com.

About Anixa Biosciences, Inc.
Anixa is a publicly-traded biotechnology company focused on harnessing the body's immune system in the fight against cancer. Anixa is developing a cancer immunotherapy program, which uses chimeric endocrine receptor t-cell (CER-T) technology, a novel type of CAR-T. Its Cchek™ liquid biopsy technology is a series of inexpensive non-invasive blood tests for early detection of solid tumors based on the body's immune response to the presence of a malignancy. This technology enables cancer detection in its earliest stages in efforts to treat patients when the disease is most curable. Anixa continually examines emerging technologies in complementary fields for further development and commercialization. Additional information is available at www.anixa.com.

Forward-Looking Statements: Statements that are not historical fact may be considered forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Forward-looking statements are not statements of historical facts, but rather reflect Anixa's current expectations concerning future events and results. We generally use the words "believes," "expects," "intends," "plans," "anticipates," "likely," "will" and similar expressions to identify forward-looking statements. Such forward-looking statements, including those concerning our expectations, involve risks, uncertainties and other factors, some of which are beyond our control, which may cause our actual results, performance or achievements, or industry results, to be materially different from any future results, performance, or achievements expressed or implied by such forward-looking statements.

These risks, uncertainties and factors include, but are not limited to, those factors set forth in "Item 1A - Risk Factors" and other sections of our most recent Annual Report on Form 10-K as well as in our Quarterly Reports on Form 10-Q and Current Reports on Form 8-K. We undertake no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law. You are cautioned not to unduly rely on such forward-looking statements when evaluating the information presented in this press release.

Anixa contact:
Mike Catelani
mcatelani@anixa.com
408-708-9808

Tiberend Strategic Advisors, Inc.

Sharen Tilman (Investors)
stilman@tiberend.com
646-604-5149

Johanna Bennett (Media)
jbennett@tiberend.com
212-375-2686

View original content to download multimedia: http://www.prnewswire.com/news-releases/anixa-biosciences-highlights-recent-publication-in-the-journal-of-experimental-medicine-on-myeloid-derived-suppressor-cells-300885296.html

SOURCE Anixa Biosciences, Inc.