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Amarantus Announces Positive Pre-Clinical Data for MANF in Wolfram Syndrome Presented at the 79th Annual Scientific Sessions of the American Diabetes Association

NEW YORK, NY, June 18, 2019 (GLOBE NEWSWIRE) -- via NEWMEDIAWIRE – Amaranthus Bioscience Holdings, Inc. (OTC Pink: AMBS) (the “Company,” or AMBS), a US-based JLABS-alumnus biotechnology holding company developing first-in-class orphan neurologic, regenerative medicine and ophthalmic therapies and diagnostics through its subsidiaries, today announced that positive results from in vitro and animal studies on MANF in the treatment of Wolfram Syndrome were presented at the 79th Annual Scientific Sessions of the American Diabetes Association.

[The abstract entitled ‘Mesencephalic Astrocyte-Derived Neurotrophic Factor \(MANF\): A New Therapeutic Target for Wolfram Syndrome.’](#) describes positive results that show MANF:

1. Activates proliferation of beta cell in WFS1 genetic animal models of Wolfram Syndrome
2. Suppresses key apoptosis and proteins misfolding
3. Activates the pro-survival and pro-protein folding mTOR/S6K signaling pathway

“MANF appears to have significant potential as a therapeutic agent for Wolfram Syndrome,” said Stephanie Gebel, Co-Founder and Chairman of the Board at the Snow Foundation, a co-sponsor of the research. “Going forward, we will be working with Amaranthus to help bring this exciting research into clinical development to help the pediatric patients who are affected by Wolfram Syndrome.”

About Wolfram Syndrome

Wolfram Syndrome is considered a rare disease and afflicts about 1 in 500,000 people. There are approximately 30,000 patients in the world who have this disease. There are currently no drug therapies or cures that exist for Wolfram Syndrome. As a result, more than 60% of Wolfram patients die before age 30. It is expected that a treatment for Wolfram's Syndrome would fall under the rare pediatric disease designation (RPDD) regulatory pathway with the US FDA.

Wolfram Syndrome is a condition that affects many of the body's systems. It is a rare, monogenic disease caused by a mutation in the WFS1 gene. Typically, it first presents with juvenile onset type1 diabetes, often followed by optic nerve atrophy, hearing loss and cortical

neurodegeneration. Wolfram syndrome is often fatal by mid-adulthood due to complications from the many features of the condition, such as health problems related to diabetes mellitus or neurological problems. MANF is an endoplasmic reticulum (ER) stress response protein localized in the membrane of the ER/Golgi complex where it corrects protein misfolding. MANF appears to be especially effective in diseases associated with stress of the endoplasmic reticulum, like diabetes mellitus. rMANF increased the proliferation of pancreatic beta-cells in a mouse model of Wolfram syndrome. The downstream molecular events of MANF tend to suppress cell death and promote cell health. Researchers are beginning to regard Wolfram Syndrome as a monogenic disease that could provide a molecular road map into more complex neurodegenerative diseases like Parkinson's and Alzheimer's diseases.

About MANF Therapeutics, Inc.

MANF (mesencephalic-astrocyte-derived neurotrophic factor) is believed to have broad potential because it is a naturally occurring protein produced by the body to reduce/prevent apoptosis (cell death) in response to injury or disease, via the unfolded protein response. By administering exogenously produced MANF to the body, Amaranthus is seeking to use a regenerative medicine approach to assist the body with higher quantities of MANF when needed. Amaranthus is the front-runner and primary holder of intellectual property around MANF and is initially focusing on the development of MANF-based protein therapeutics.

MANF is currently in pre-clinical development. MANF therapeutic indications include is Wolfram Syndrome, Glaucoma and Parkinson's disease. Additional indications include, diabetes and Retinitis Pigmentosa, Alzheimer's disease, traumatic brain injury, myocardial infarction, antibiotic-induced ototoxicity and certain other orphan diseases.

In April 2017, Amaranthus incorporated the wholly-owned subsidiary MANF Therapeutics, Inc. to focus on progressing pre-clinical and clinical development of MANF.

About Amaranthus Bioscience Holdings, Inc.

Amaranthus Bioscience Holdings (AMBS) is a JLABS alumnus biotechnology company developing treatments and diagnostics for diseases in the areas of neurology, regenerative medicine and orphan diseases through its subsidiaries. The Company's 80.01%-owned subsidiary **Breakthrough Diagnostics, Inc.**, currently a joint venture with Todos Medical, Ltd. has licensed intellectual property rights to the Alzheimer's blood diagnostic LymPro Test® from Leipzig University that was originally developed by Dr. Thomas Arendt, as well as certain rights to multiple sclerosis diagnostic MSPrecise™ and Parkinson's diagnostic NuroPro. Amaranthus entered into a joint venture agreement with **Todos Medical, Ltd. (OTCQB: TOMDF)** to advance the diagnostic assets, and Todos recently exercised its exclusive option to acquire Amaranthus' remaining ownership in Breakthrough in exchange for approximately 50% ownership of Todos. The transaction is expected to close in the summer of 2019. AMBS' 50%-owned subsidiary **Elto Pharma, Inc.** has development rights to eltoprazine, a Phase 2b-ready small molecule indicated for Parkinson's disease levodopa-induced dyskinesia, Alzheimer's aggression and adult attention deficit hyperactivity disorder, commonly known as ADHD. Elto Pharma entered into an agreement to be acquired by specialty pharmaceutical company Coeptis Pharmaceutical, Inc. that is commercializing the FDA-approved Consensi in late 2019. Under the terms of the agreement, AMBS would own approximately 25% of the combined company post-acquisition. The AMBS acquired

Cutanogen Corporation from Lonza Group in 2015. Cutanogen is preparing for pivotal studies with Engineered Skin Substitute (ESS) for the treatment of pediatric life-threatening severe burns. ESS is a regenerative medicine-based, autologous full-thickness skin graft technology originally developed by the Shriners' Hospital that can be used to treat severe burns, as well as several other catastrophic and cosmetic dermatological indications. AMBS' wholly-owned subsidiary, **MANF Therapeutics Inc.** owns key intellectual property rights and licenses from a number of prominent universities related to the development of the therapeutic protein known as mesencephalic astrocyte-derived neurotrophic factor ("MANF"). MANF Therapeutics is developing MANF-based products as treatments for ophthalmological disorders such as Wolfram Syndrome, Retinitis Pigmentosa and Glaucoma, as well as neurodegenerative diseases such as Parkinson's disease. MANF was discovered by the Company's Chief Scientific Officer John Commissiong, PhD. Dr. Commissiong discovered MANF from AMBS' proprietary discovery engine PhenoGuard, and believes several other neurotrophic factors remain to be discovered.

The Company announced in May 2019 that it retained Evolution Venture Partners to evaluate strategic options for expansion into the legal hemp space.

For further information please visit www.Amarantus.com, or connect with the Amarantus on Facebook, LinkedIn, Twitter and Google+.

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