



Emerald Health Pharmaceuticals' Cannabinoid-Derived Drug Candidate, EHP-101, Shows a Unique Mechanism of Action in Systemic Sclerosis Model, Indicating Key Differences Compared to Ajulemic Acid

***Biochemical Pharmacology* publication describes the unique multi-target mechanism of action of EHP-101 with the potential to be beneficial in systemic sclerosis, a complex disease with no current treatment**

SAN DIEGO, CA, March 19, 2019 – Emerald Health Pharmaceuticals Inc. (EHP), a clinical-stage company developing medicines based on cannabinoid science, announced today that newly published scientific data supports the potential of EHP's lead orally-administered drug candidate, EHP-101, to treat systemic sclerosis (SSc), a severe form of scleroderma.

VCE-004.8, the active pharmaceutical ingredient (API) in EHP-101, is a patented synthetic derivative of cannabidiol (CBD), modified to enhance the activation of peroxisome proliferator-activated receptor gamma (PPAR γ) and cannabinoid receptor 2 (CB $_2$). These receptors are well documented in multiple peer-reviewed publications to relate to inflammatory and fibrotic processes associated with SSc and other fibrotic, autoimmune and neurodegenerative diseases. The publication describes the beneficial effects of EHP-101 on inflammatory and fibrotic parameters in a murine model of SSc.

Moreover, a unique additional and complementary mode of action of VCE-004.8 on the hypoxia inducible factor (HIF) pathway is reported, showing enhanced expression of factors related to vasculogenesis (the formation of new blood vessels), as well as prevention of vascular damage induced in this model. These vascular effects were not observed with another synthetic cannabinoid, ajulemic acid (Lenabasum), currently being evaluated in the clinic for the treatment of SSc. This additional vascular mechanism of action shown for EHP-101, therefore, may provide additional benefits compared to other compounds, by not only reducing inflammation and fibrosis, but also by preventing the vascular damage associated with SSc and through the formation of new blood vessels.

These results were reported in *Biochemical Pharmacology* in a publication titled, "Cannabinoid derivatives acting as dual PPAR γ /CB $_2$ agonists as therapeutic agents for systemic sclerosis." Co-authors included senior scientists from EHP as well as Jim DeMesa, MD, MBA (Chief Executive Officer), Alain Rolland, PharmD, PhD (Chief Development Officer), Giovanni Appendino, PhD (Scientific Advisor), and Eduardo Muñoz, MD, PhD (Chief Scientific Officer).

"There are currently no approved drugs for the treatment of scleroderma," said Jim DeMesa, MD, CEO of Emerald Health Pharmaceuticals. "This work by our scientific team provides hope for patients suffering from this complex, life-threatening disease."

"Our cannabinoid derivatives have shown the potential to be disease-modifying based on their multi-modal mechanism of action," said Eduardo Muñoz, MD, PhD, EHP's Chief Scientific Officer

and Professor of Immunology at the University of Córdoba. “EHP-101 has demonstrated the ability not only to reduce inflammation and prevent fibrosis in the skin and lungs, but also to prevent vascular damage and induce vascular regeneration, which we have not seen with any other compounds to date.”

Data from this study shows EHP-101, an oral lipidic formulation of VCE-004.8, prevents skin and lung fibrosis in a bleomycin (BLM) murine model of SSc, while also demonstrating significant effects on vasculogenesis. The pharmacotranscriptomic signature of EHP-101 in the skin of BLM-treated mice (SSc model) demonstrated an upregulation of many genes related to vasculogenesis. The endothelial CD31⁺/CD34⁺ cells and telocytes, reduced in BLM mice, were restored by EHP-101 treatment. In addition, the expression of some plasmatic biomarkers related to the induction of new blood vessels was enhanced with EHP-101 treatment. In contrast, none of these vascular effects were observed for another synthetic cannabinoid, ajulemic acid (Lenabasum), currently being evaluated in the clinic for the treatment of SSc. The unique mode of action of EHP-101 on the vasculature via activation of the HIF pathway complements its activation of PPAR γ and CB₂, which may be beneficial in the treatment of SSc, a complex disease without current treatment options.

About Systemic Sclerosis and EHP-101

Systemic sclerosis (SSc), a form of scleroderma, is a rare and chronic autoimmune disease, causing fibrosis of the skin and internal organs, including small blood vessel damage in the skin and multiple other organs in the body. The tissues of involved organs become hard and fibrous, causing them to function less efficiently. While the symptoms of SSc vary for each person, it can be life-threatening, depending on which parts of the body are affected and the extent of disease. The disease is more common in adults, with an estimated 80,000 – 100,000 people affected in the US. Currently, there are no approved treatments specific to SSc. Current therapies for scleroderma, which are mainly drugs that suppress the immune system, are limited in efficacy and may present toxicities. New treatments and early diagnosis will be critical to help reduce the symptoms of systemic scleroderma and prevent further damage to the body.

EHP is currently developing two drug candidates from its portfolio of cannabinoid derivatives, one derived from CBD for multiple sclerosis and scleroderma (EHP-101) and one derived from cannabigerol (CBG), EHP-102, for Huntington’s disease and Parkinson’s disease.

EHP-101 is an oral formulation of an aminoquinone derivative of cannabidiol endowed with dual peroxisome proliferator-activated receptor gamma (PPAR γ) and cannabinoid receptor type 2 (CB₂) agonist activity. Both receptors are therapeutic targets for SSc. EHP-101 also targets the HIF pathway, expanding the rationale for its development as a novel SSc drug. EHP has received Orphan Drug Designation for EHP-101 in systemic scleroderma/sclerosis from both the FDA and EMA.

EHP is currently conducting a Phase I human study with EHP-101 to support its development for multiple sclerosis and scleroderma and expects the initiation of Phase II studies by the end of 2019.

About Emerald Health Pharmaceuticals Inc.

Emerald Health Pharmaceuticals is developing product candidates derived from cannabinoids for the treatment of CNS, autoimmune, and other diseases. The Company has two families of new chemical entities, derived from synthetic cannabidiol (CBD) and cannabigerol (CBG), that it has

modified through rational drug design to affect validated receptors and pathways pertinent to targeted diseases. Its first drug candidate, EHP-101, is in Phase I clinical development and is focused on treating multiple sclerosis and systemic scleroderma. Its second, EHP-102, is in preclinical development and is focused on treating Huntington's disease and Parkinson's disease. For more information, visit <http://www.emeraldpharma.life> or contact: info@emeraldpharma.life.

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To the extent statements contained in this news release are not descriptions of historical facts regarding Emerald Health Pharmaceuticals Inc. they should be considered "forward-looking statements," as described in the private securities litigation reform act of 1995, that reflect management's current beliefs and expectations. You can identify forward-looking statements by words such as "anticipate," "believe," "could," "estimate," "expect," "forecast," "goal," "hope," "hypothesis," "intend," "may," "plan," "potential," "predict," "project," "should," "strategy," "will," "would," or the negative of those terms, and similar expressions that convey uncertainty of future events or outcomes. Forward-looking statements contained in this news release include, but are not limited to, statements regarding: (i) the success and timing of our product development activities and clinical trials; (ii) our ability to develop our product candidates; (iii) our plans to research, discover, evaluate and develop additional potential product, technology and business candidates and opportunities; (iv) the anticipated timing of clinical data availability; (v) our ability to meet our milestones; and (vi) our expectations regarding our ability to obtain and maintain intellectual property protection. Forward-looking statements are subject to known and unknown factors, risks and uncertainties that may cause actual results to differ materially from those expressed or implied by such forward-looking statements. Undue reliance should not be placed on forward-looking statements. We undertake no obligation to update any forward-looking statements. Emerald Health Pharmaceuticals' investigational drug products have not been approved or cleared by the FDA.