



Emerald Health Pharmaceuticals Announces Publications on Patented Cannabinoid Derivatives to Treat Scleroderma and Amyotrophic Lateral Sclerosis

Preclinical data published in *Biochemical Pharmacology* and *British Journal of Pharmacology* highlight neuroprotective, anti-fibrotic, and anti-inflammatory effects

SAN DIEGO, CA, September 24, 2018 – Emerald Health Pharmaceuticals Inc. (EHP), which is developing medicines based on cannabinoid science, today announced the peer-reviewed publication of preclinical results demonstrating the potential of its two drug candidates, EHP-101 and EHP-102, to treat scleroderma and amyotrophic lateral sclerosis (ALS), respectively. A third molecule in the EHP series of patented cannabinoid derivatives, VCE-004.3, also improved skin fibrosis through validated scleroderma receptor targeting. Co-authors from EHP included Eduardo Muñoz, MD, PhD, Chief Scientific Officer; Giovanni Appendino, PhD, Scientific Advisor; and Mari-Luz Bellido, PhD, Vice President of European Operations. The publications are as follows:

- “EHP-101, an oral formulation of the cannabidiol aminoquinone VCE-004.8, alleviates bleomycin-induced skin and lung fibrosis,” *Biochemical Pharmacology* (DOI: [10.1016/j.bcp.2018.07.047](https://doi.org/10.1016/j.bcp.2018.07.047))
- “VCE-004.3, a cannabidiol aminoquinone derivative, prevents bleomycin-induced skin fibrosis and inflammation through PPAR γ and CB $_2$ receptor-dependent pathways” published in *British Journal of Pharmacology* (DOI: [10.1111/bph.14450](https://doi.org/10.1111/bph.14450))
- “Neuroprotective effects of the cannabigerol quinone derivative VCE-003.2 in SOD1^{G93A} transgenic mice, an experimental model of amyotrophic lateral sclerosis” published in *Biochemical Pharmacology* (DOI: [10.1016/j.bcp.2018.07.049](https://doi.org/10.1016/j.bcp.2018.07.049))

EHP-101 and VCE-004.3 Scleroderma Findings

Preclinical data showed that EHP-101, a patented drug candidate derived from cannabidiol (CBD), could be developed as an oral treatment to manage or treat scleroderma and other fibrotic diseases. EHP-101 (an oral formulation of the molecule known as VCE-004.8) behaves as a dual PPAR γ /CB $_2$ agonist. These studies showed that EHP-101 generated anti-inflammatory effects and prevented skin and lung fibrosis and collagen accumulation in bleomycin-challenged mice. Additionally, analyses demonstrated that EHP-101 downregulated expression of several genes associated with fibrosis and inflammation.

Similarly, another patented molecule that is equivalent to EHP-101 in EHP’s series of CBD derivatives, VCE-004.3, also showed dual PPAR γ and CB $_2$ agonist activity, as well as CB $_1$ receptor antagonism, with the ability to prevent skin fibrosis as well.

“Scleroderma is a rare life-threatening disease that causes fibrosis of skin and internal organs. There are currently no scleroderma-specific approved drugs, and existing therapies are not effective and/or have significant toxicities,” said Dr. Muñoz. “These findings add to the preclinical



evidence that shows the potential of cannabinoid-derived medicines to serve as disease-modifying treatments for scleroderma and help us advance our lead candidate, EHP-101, into clinical trials.”

EHP-102 and ALS Findings

Researchers found that EHP-102, a patented drug candidate derived from cannabigerol (CBG), could potentially be used as a neuroprotective agent against ALS. ALS, referred to as Lou Gehrig's disease, is a nervous system disease that weakens muscles and impacts physical function. In a mouse model, EHP-102 (also known as VCE-003.2) helped improve neuropathological signs, including reduced weight loss, preserved spinal cholinergic motor neurons, and reduced astroglial reactivity. Results also showed EHP-102 attenuated the LPS-induced generation of TNF- α and IL-1 β , indicating a probable PPAR γ activation responsible for its neuroprotective effects.

“We applaud members of our scientific team for the publishing of their research in prominent scientific journals,” said Jim DeMesa, MD, CEO of Emerald Health Pharmaceuticals. “They continue to discover potential therapeutic benefits and new indications to treat debilitating diseases, such as ALS, scleroderma, and multiple sclerosis, and we are proud to be working closely with them as we advance our initial two novel cannabinoid drug candidates into clinical-stage development.”

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, based on cannabidiol (CBD) and cannabigerol (CBG), that it has modified through rational drug design to affect validated receptors pertinent to targeted diseases. EHP-101 is focused on treating multiple sclerosis and scleroderma. EHP-102 is focused on treating Huntington's disease and Parkinson's disease. For more information, visit www.emeraldpharma.life or contact: info@emeraldpharma.life.

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 these presentations 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.