



**emerald™**  
HEALTH PHARMACEUTICALS

## EMERALD HEALTH PHARMACEUTICALS

Developing medicines based on cannabinoid science

Emerald Health Pharmaceuticals' research is founded on the known benefits of cannabinoid interaction with the human endocannabinoid system (ECS) and combines non-ECS receptors to potentially achieve additional therapeutic benefits against many diseases with unmet medical need.

### RECENT ADVANCES

**18/09/27** Initiates Phase 1 Clinical Study of lead product candidate, EHP-101 for the treatment of multiple sclerosis and scleroderma

**18/09/24** Announces publications on patented cannabinoid derivatives to treat scleroderma and amyotrophic lateral sclerosis

**18/08/21** Recipient of the International Cannabis Research Society Scientific Innovation Award

**18/07/12** Forms scleroderma scientific advisory board

**18/07/03** Presents preclinical data for its lead product candidate, EHP-101, in both multiple sclerosis and scleroderma

**18/05/31** Appoints Dr. Alain Rolland as Executive VP & Chief Development Officer

### COMPANY HIGHLIGHTS

- Developing new drugs that leverage the known benefits of cannabinoid interaction with the human endocannabinoid system (ECS) to positively impact central nervous system (CNS), autoimmune, inflammatory, metabolic and fibrotic diseases.
- Composition of matter patents for two series' of molecules containing over 20 new chemical entities (NCEs) derived from the non-psychoactive cannabinoids, cannabidiol (CBD) and cannabigerol (CBG). Two lead product candidates are called EHP-101 (derived from CBD) and EHP-102 (derived from CBG).
- Phase I clinical study initiated in September 2018, with data expected in Q3 2019. Study designed to support Phase II for EHP-101 in multiple sclerosis and scleroderma.
- EHP-101 granted orphan drug status by the U.S. FDA and EU EMA for scleroderma indication.
- EHP-102 granted orphan drug status by the U.S. FDA for Huntington's disease.
- Extensive life sciences industry expertise including collaboration with VivaCell Biotechnology, a global leader in cannabinoid research.
- Multi-billion dollar market potential in four initial indications: multiple sclerosis, scleroderma, Parkinson's disease and Huntington's disease.
- Management & board have raised ~\$1B for development-stage companies and run clinical trials with budgets exceeding \$1B. Executive Chairman is former CEO of Inovio; CEO has 29+ years in life sciences; Chief Development Officer has 30 years in biotech product development.
- The company's two families of patented NCEs, based on CBD and CBG, have been modified through rational drug design to affect pertinent disease-related targets, including peroxisome proliferator-activated receptor-gamma (PPAR $\gamma$ ), cannabinoid receptor type 2 (CB2) and the hypoxia inducible factor (HIF) pathway - all of which have been validated through decades of published research.
- Over 15 years of research and development published in leading journals such as *Nature Scientific Reports*, *Biochemical Pharmacology* and *Journal of Neuroinflammation*.



## MANAGEMENT

**Jim DeMesa, MD, MBA** - Experienced public company CEO with over 29 years in biotech leadership and product development.

**Alain Rolland, PharmD, PhD** - Executive VP and CDO with 30 years in pharma product development and management, including preclinical and clinical trial management.

**Eduardo Muñoz, PhD** - CSO with 30+ years of biomedical research. Expert in the development of cannabinoid based NCEs.

**Lisa Stanford, CPA** - CFO with 30+ years of diversified experience in finance and accounting in the life sciences.

**Giovanni Appendino, PhD** - Scientific Advisor with 15+ years in cannabinoid research. Advisor with 15+ years in cannabinoid research.

## BOARD OF DIRECTORS

**Avtar Dhillon, MD** - Chairman and former CEO of Inovio Pharmaceuticals, Inc. (NASDAQ:INO). Board member of several life sciences companies.

**Gaetano Morello, ND** - Specialist in natural medicine. Practicing at the Complex Chronic Disease Program at Woman's Hospital in Vancouver, Canada.

**Jim Heppell, LLP** - Former President and Director of BC Advantage Funds. Founding CEO and Director of Sophiris Bio Inc. (NASDAQ:SPHS).

**Punit Dhillon, BA Hons.** - Former President & CEO of Oncosec Medical Inc. (NASDAQ: ONCS).

## LEAD PRODUCT CANDIDATES INDICATIONS

### Multiple Sclerosis (MS)

MS is a chronic inflammatory, degenerative, demyelinating disorder of the central nervous system (myelin is an essential insulating sheath around many nerve fibers, increasing the speed at which impulses are conducted). There are over 900,000 patients in 7 major markets, no effective disease-modifying drugs for progressive forms or therapies that re-myelinate damaged neurons.

### Scleroderma (Systemic Scleroderma or SSc)

SSc is a chronic systemic autoimmune disease causing fibrosis of skin and internal organs. It is classified as an orphan disease in the US and EU. There are no SSc-specific approved drugs on the market and current therapies prove non-effective or have significant toxicities.

### Parkinson's Disease (PD)

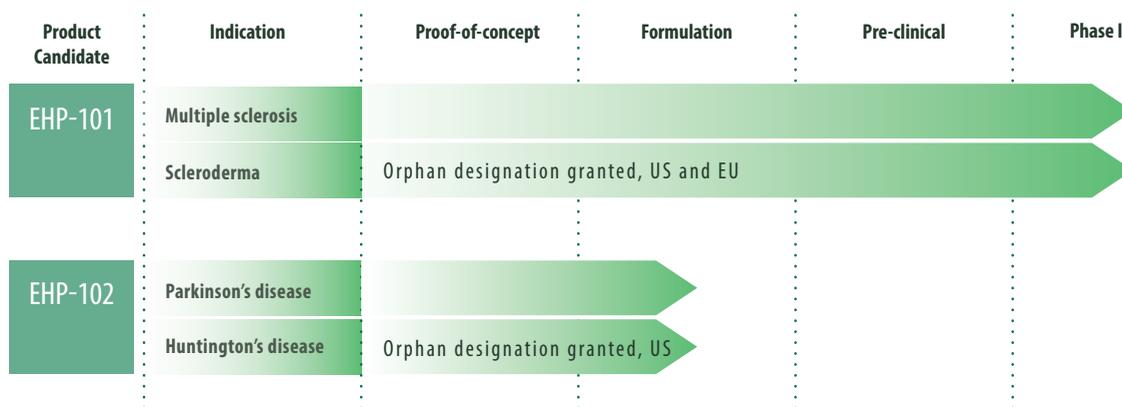
PD is a chronic, progressive neurodegenerative disorder affecting nearly 10 million people worldwide. There is no current cure for PD. Initial treatments become less effective as the disease progresses.

### Huntington's Disease (HD)

A disorder that causes progressive breakdown of nerve cells which affects nearly 30,000 patients in the USA. There are no specific disease modifying therapies for HD.

	EHP - 101	EHP - 102
<b>Cannabinoid template</b>	CBD (cannabidiol)	CBG (cannabigerol)
<b>Development stage</b>	Phase 1 clinical trial initiated	Manufacturing & formulation development
<b>Mechanism of action</b>	CB2, PPAR $\gamma$ receptor activation HIF-1 stabilization	PPAR $\gamma$ agonist and ERK1+2 activator
<b>Activity</b>	Anti-inflammatory, neuroprotection, re-myelination (MS)	Reduces inflammatory marker expression (iNOS, TNFa AND iL01-B)
<b>Initial indications</b>	Multiple sclerosis & scleroderma	Parkinson's and Huntington's disease

## PRODUCT PIPELINE



## LOOKING FORWARD

### EHP-101

Phase I human study initiated in Australia. This clinical study is intended to support Phase II in MS and scleroderma. Phase II in MS and scleroderma. Phase II development expected to

### EHP-102

Preclinical proof-of-concept established for two indications. Formulation, manufacturing development and additional preclinical evaluations currently in process.

To find out more about Emerald Health Pharmaceuticals please contact:

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