



ProPhaseLabs.com

INVESTOR PRESENTATION

Equivir, Equivir G (Rx) Line Backer LB1, LB2

NASDAQ: PRPH

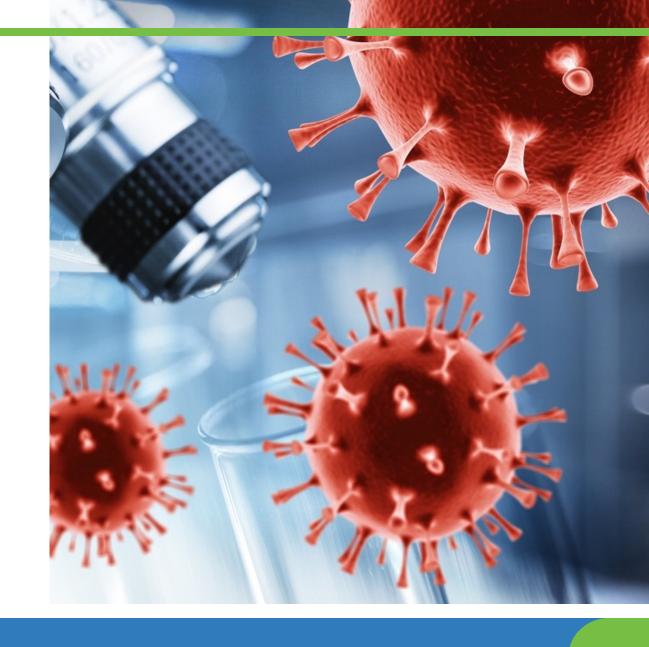
FORWARD LOOKING STATEMENTS

This presentation contains forward-looking statements relating to our strategy and business objectives. All statements other than statements of historical facts included in this presentation may be deemed to be forward-looking statements including statements regarding our strategy, plans, objectives and initiatives, including those related to our plans to expand our in-house clinical testing capabilities and genomics testing offerings. You can identify forward-looking statements by words such as "anticipate," "believe," "could," "estimate," "expect," "intend," "may," "plan," "potential," "predict," "project," "should," "will," "would" or the negative of those terms, and similar expressions that convey uncertainty or future events or outcomes. These forward-looking statements involve known and unknown risks, uncertainties, and other factors that may cause our actual results, performance, or achievements to be materially different from those contemplated, projected, forecasted, estimated or budgeted, whether expressed or implied, by these forward-looking statements including risks related to consumer demand for our diagnostic and genomic services, the competitive environment, challenges relating to entering into new business lines, the failure to obtain and maintain certain regulatory approvals, our ability to collect payment for the diagnostic tests we deliver, including our ability to collect payment from uninsured individuals if emergency funding is not allocated to the HRSA uninsured program in the future, and our ability to continue to execute on our business plan. Additional risks and uncertainties relating to our business can be found under the heading "Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2021 and our subsequent Quarterly Reports on Form 10-Q, as well as our other filings with the Securities and Exchange Commission. These forward-looking statements are based on current expectations, estimates, forecasts and projections and are not guarantees of future performance or development. The forward-looking statements contained in this presentation are made as of the date hereof, and we do not assume any obligation to update any forward-looking statements except as required by applicable law. Readers are cautioned not to place undue reliance on any forward-looking statements contained in this presentation.



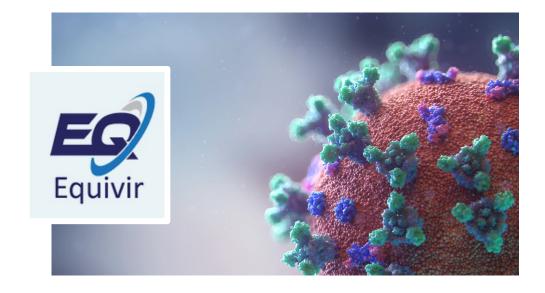
PROPHASE BIOPHARMA

- Announced in June 2022 the formation of wholly-owned subsidiary ProPhase BioPharma, Inc. (PBIO) for the licensing and development of novel drugs, compounds and biotechnology.
- PBIO will focus on creating and formulating new compounds that can change the outcomes of healthcare.
- The initial proprietary compounds licensed by PBIO were developed by Global Research and Discovery Group (GRDG).
- GRDG is a leading Scientific think tank and research organization. It has strong ties to BARDA (Biological Advance Research Development Authority), DARPA (Studies and Defense Advanced Research Projects Agency) and to the Potomac Institute for Policy. Its goal is to provide novel, multi-target therapeutics for challenging pharmacological needs.

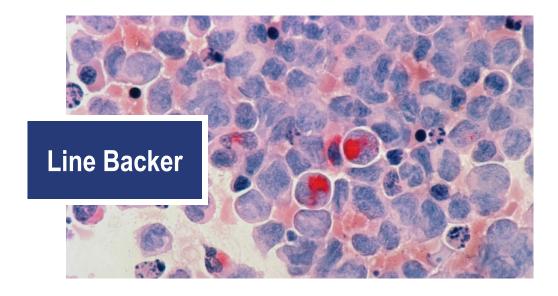




PROPHASE BIOPHARMA IP

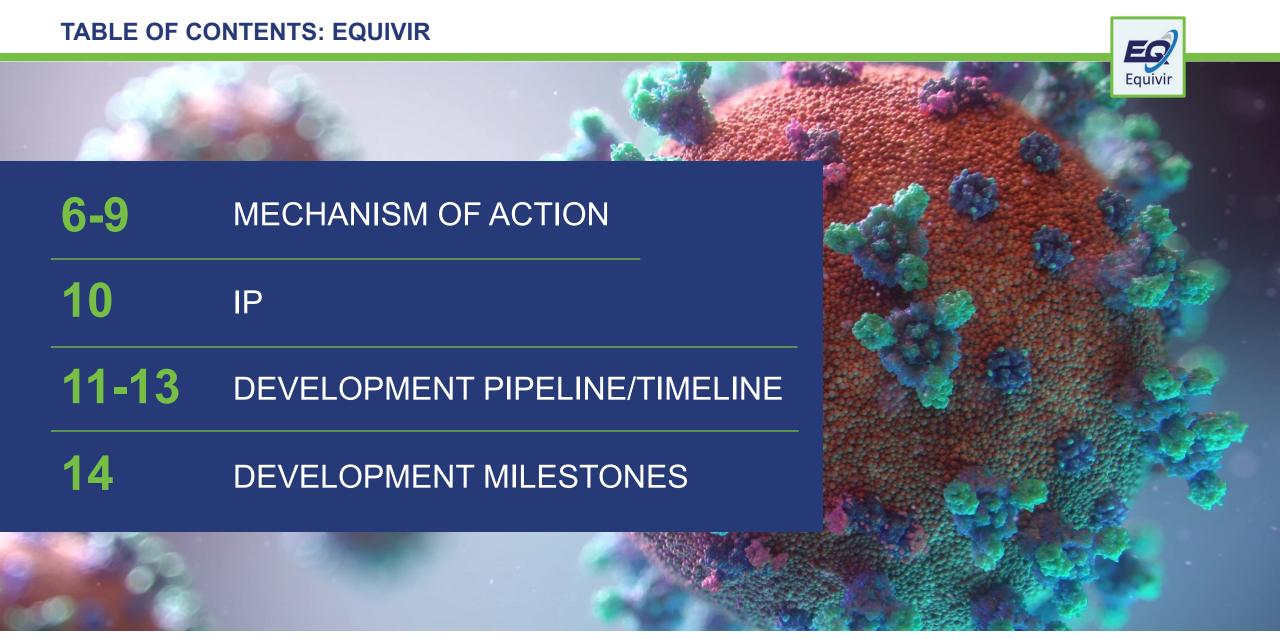


ProPhase has obtained exclusive rights worldwide to develop and commercialize patented **Equivir** and **Equivir G (Rx)**, proprietary compounds which have shown to be potential treatments to limit the occurrence and/or reduce the risk and severity of viral outbreaks, subject to the necessary regulatory approvals.



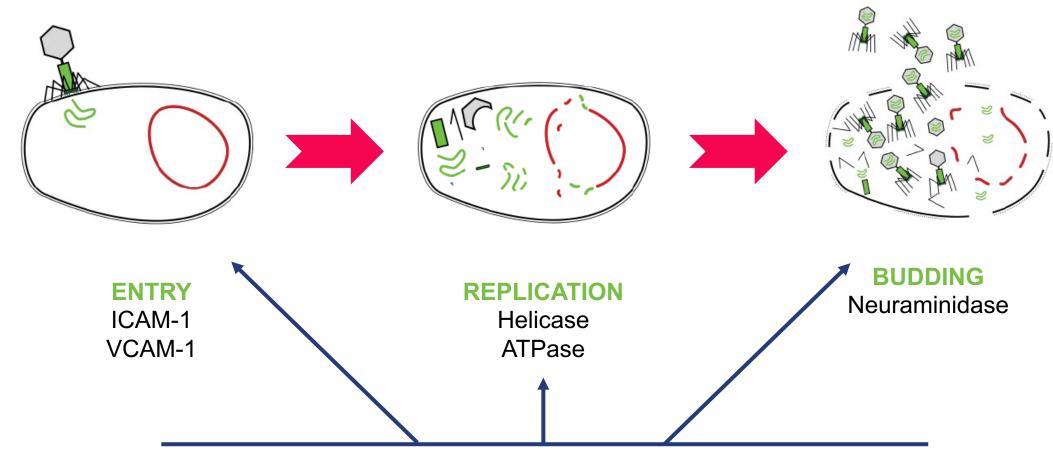
ProPhase has obtained exclusive rights worldwide to develop and commercialize patented Line Backer LB1 and LB2 in the following fields: cancer, inflammatory diseases or symptoms, memory-related syndromes, diseases or symptoms, including dementia and Alzheimer's Disease. LB1 and LB2 are proprietary compounds which have shown to be potential treatments for Cancer as a co-therapy, Bacterial and viral infections, Neurological, Diabetes and Pain modulation.











The synergistic action of Equivir blocks multiple viral mechanisms





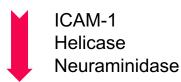
MYRICETIN

Polyphenol found in vegetables, fruits, nuts, berries, tea, and red wine

Point-source intracellular inhibition

Inhibits TNF- α , which drives ICAM-1 expression

Down regulates





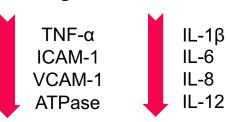
HESPERIDIN

Polyphenol found in citrus fruits

Extracellular inhibition

Partially migrates to skin, lung, and nasal tissue

Down regulates

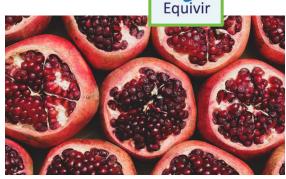




PIPERINE

Alkaloid found in black pepper

Increases trans-membrane permeability/bioavailability

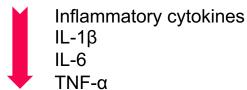


GALLIC ACID (Rx)

Classified as a Phenolic acid found in pomegranate extract, sumac, witch hazel and grape seed extract.

Adhesion molecule and cell infiltration, has bacteriostatic and antioxidant activities, MAPK and NF-κB signaling pathway

Down regulates

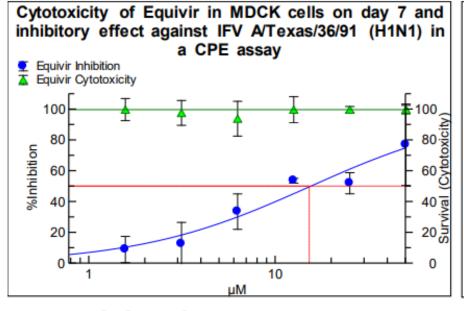


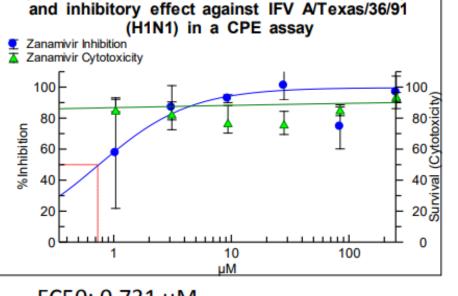




Equivir showed to inhibit viral replication more than the current offered drug compound Zanamivir used to treat influenza. Below are the results to one of the many clinical studies that have been completed.







Cytotoxicity of Zanamivir in MDCK cells on day 7

EC50: 15.24 μM CC50: >50 μM

EC50: 0.731 μM CC50: >250 μM

Efficacy Results (A/TX/36/91)



EQUIVIR SCIENTIFIC STUDIES





- Influenza H1N1 (A/TX/36/91) EC50 15.24 μM
- Influenza H1N1 (A/Perth/265/09) EC50 20.82 μΜ
- Influenza H3N2 (A/HK/1/68) EC50 49.84 μM
- Influenza H5N1 (A/Hong Kong/213/2003) EC50 170 μM
- Influenza H7N9 (A/Shanghai/2/2013) EC50 37 μΜ
- Rhinovirus Type 14 Post-Infection IC50 9.35 μM
- Rhinovirus Type 14 Pre-Infection IC50 549.8 μM
- Ebola IC50 50 μM
 - HepG2 Cells –active at 25 μM 72 hours post-infection
 - THP-1 Cells –active at 2 μM 0 hours post-infection





Equivir US Patent US 20160367517A1 and US 20200306281A1







Equivir is an OTC with in-vitro studies demonstrating broad efficacy against multiple viral infections

EQUIVIR FOR OTC: Contains Myricetin, Hesperidin and Piperine – shown in in-vitro studies to be effective against multiple viruses and bacteria

EQUIVIR GAMMA (RX): Contains Myricetin, Hesperidin, Piperine and 10% Gallic Acid.

 Technology was specifically designed to combat SARS COV2 but is also useful for Rhinovirus, Influenza, and Ebola

Profile/Benefit:

Antiviral- Prophylactic and Acute treatment. SARS COV2, Rhinovirus, Influenza, Ebola



Polyphenol found in vegetables, fruits, nuts, berries, tea, and red wine

MYRICETIN:

The compound exhibits a wide range of activities that include strong anti-oxidant, anticancer, antidiabetic and anti-inflammatory activities It displays several activities that are related to the central nervous system and numerous studies have suggested that the compound may be beneficial to protect against diseases such as Parkinson's and Alzheimer's.



Polyphenol found in citrus fruits

HESPERIDIN:

Is a bioflavonoid, a type of plant pigment with antioxidant and anti-inflammatory effects found primarily in citrus fruit. Oranges, grapefruit, lemon, and tangerines all contain hesperidin, which is also available in supplement form. Hesperidin is purported to provide a wide range of health benefits, ranging from cancer treatment to hot flash relief.

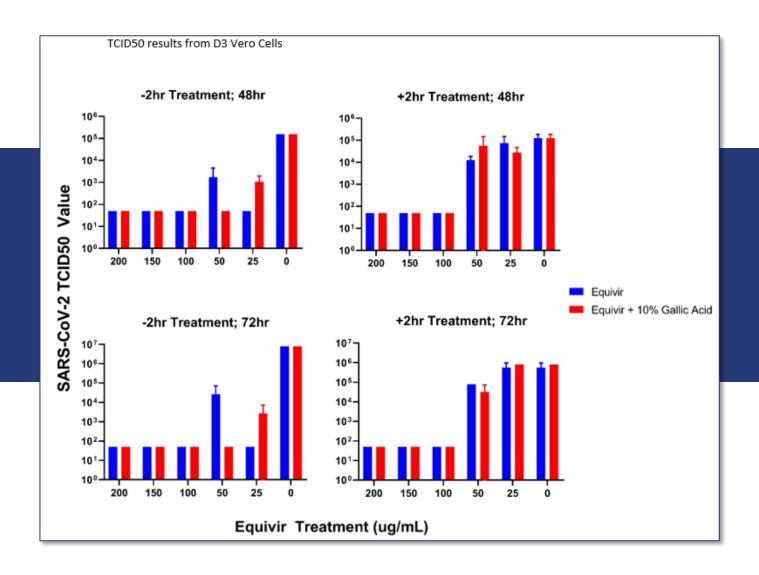
Equivir has demonstrated excellent *in vitro* efficacy against multiple dangerous viruses and bacteria:

- Cholera (Pandemic Strain)
- Ebola
- Coronavirus (Family)
- SARS-CoV-2
- Influenza H1N1
- Influenza H3N2
- Influenza H5N1
- Influenza H7N9
- Rhinovirus Type 14 preand post-infection



EQUIVIR VS EQUIVIR G IN SARS-COV-2 IN VERO STUDY





Equivir and Equivir G both show the ability to inhibit viral replication in SARS-Cov-2 in Vero study. In both 48 and 72 hours post treatment at 200-100ug/mL showed efficacy in viral inhibition.





Equivir is a novel blend of FDA Generally Recognized as Safe (GRAS) eligible polyphenols which have demonstrated antiviral effects with potential applications as medications or health supplements.

- Equivir is designed to work by impeding virulence while also blocking multiple methods used by viruses to infect and replicate in host cells.
- Patented Blend of FDA Registered GRAS Polyphenols
 60% Myricetin
 38% Hesperidin
 2% Piperine
- No adverse side effects or toxicity











Home Ingredients Packaging Manufacturing Finance Events Directory Regulatory Drug Delivery Research & Development Analysis

Equivir shows prophylactic COVID-19 results in independent testing

24-Jun-2020







Research & Development

Impact Biomedical has announced in vitro success with Equivir and 3F Biofra COVID-19 in independent laboratory testing

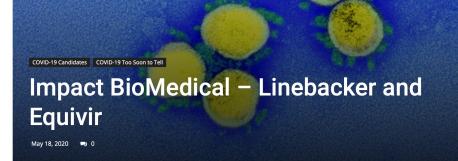
Equivir was tested in-vitro and has been highlighted in numerous science journals for anti-viral properties.



Wilfred Ngwa ¹, Rajiv Kumar ², Daryl Thompson ³, William Lyerly ³, Roscoe Moore ³, Terry-Elinor Reid ⁴, Henry Lowe ⁵, Ngeh Toyang ⁵

05 DOI: 10.3390/molecules25112707

edicines. Here, we report on flavonoid phytomedicines with actics or therapeutics against coronavirus disease 2019 lytomedicines include: caflanone, Equivir, hesperetin, studies show that these flavonoid-based molecules can ein, helicase, and protease sites on the ACE2 receptor used

















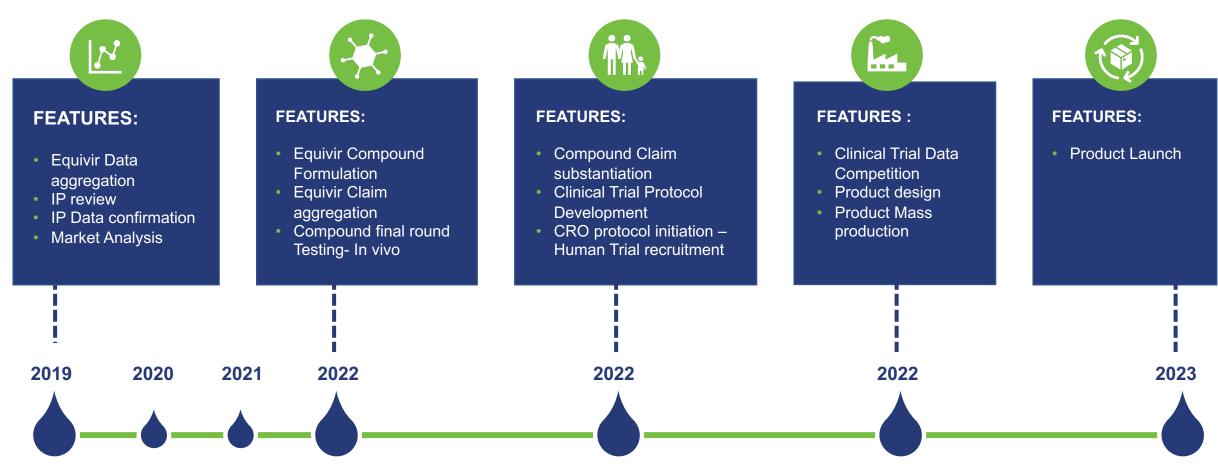


Type: Unspecified compounds with the potential to bind Angiotensin converting enzyme 2 (ACE2) and block SARS-CoV-2 entry into cells. Equivir is designed to work by impeding virulence while also blocking multiple methods used by viruses to infect and replicate in host cells, following deployment in a manner similar to a vitamin. Linebacker was created to mirror the Panacea Project, a U.S. Defense Advanced Research Projects Agency (DARPA)





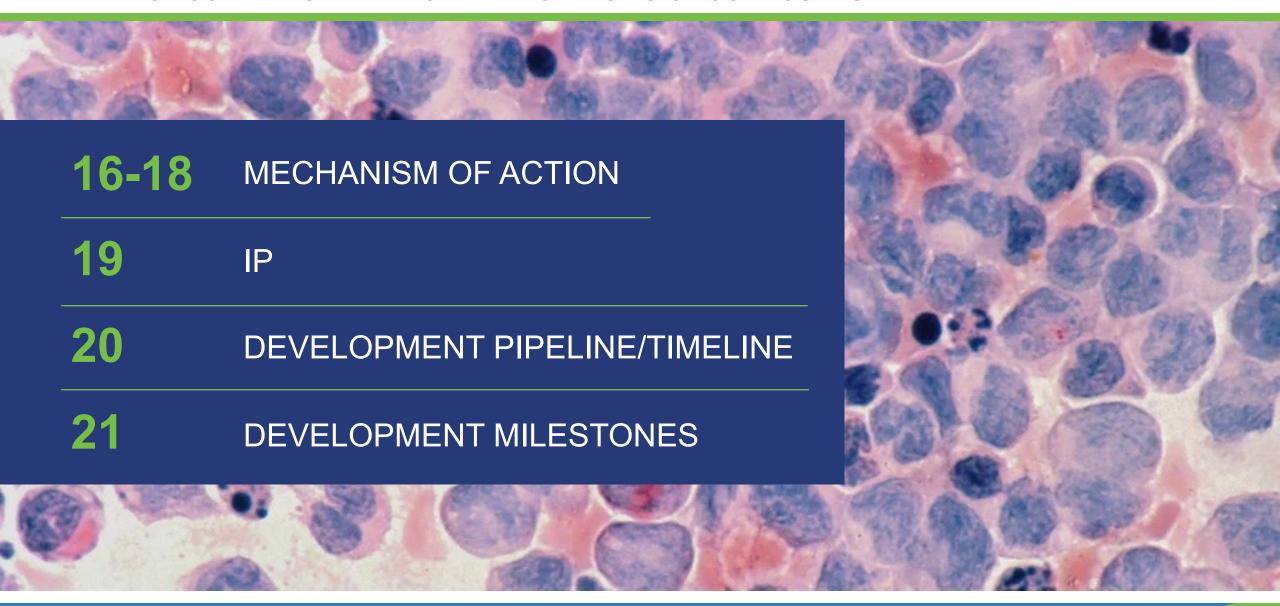
2022



START



TABLE OF CONTENTS: LINEBACKER™ PORTFOLIO OF COMPOUNDS





Linebacker is a modified polyphenol. Polyphenols are substances found in many nuts, vegetables and berries. Linebacker contains Myricetin, which is a common plant-derived flavonoid. Flavonoids are polyphenols.

- Myricetin exhibits a wide range of activities that include strong anti-oxidant, anticancer, antidiabetic and anti-inflammatory activities. It displays activities that are related to the central nervous system and studies have suggested that it may be beneficial to protect against diseases such as Parkinson's and Alzheimer's.*
- · Linebacker 1 (LB-1) is Mono-chlorinated Myricetin with a Chlorine atom substituted for the Hydroxy group at 5' (position 5 on the B-ring.
- Linebacker 2 (LB-2) is Di-chlorinated Myricetin with Chlorine atoms substituted for the Hydroxy groups at 5' and 7 (position 5 on the B-ring and position 7 on the A-ring).
- * LB-1 can be given as a co therapy as a method of down regulating PIM (proviral integration site for moloney murine leukemia virus) kinase that plays a key role as an oncogene in various cancers including myeloma, leukemia, prostate and breast cancers.
- * LB1 is can be considered as an anti-cancer agent. It targets the PIM kinase receptors that are expressed in cancers. Chemotherapy drugs alone, like Taxol (chemically known as paclitaxel), kill healthy cells alongside tumorous ones. LB-1 focuses directly on the PIM expressions rendering the cancer cell transcription and replication useless, so Taxol can effectively kill the tumor cell. If can also be used as a stand alone post therapy to ensure cancer cells do not regenerate.

*Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4772053/

THESE ARE OUR FOUR INITIAL TARGETS FOR LINEBACKER AS A CO-THERAPY:

TAXOL:

Taxol is among the most affordable and best-selling chemotherapy drugs, with annual sales over \$1 billion.

https://videocast.nih.gov/watch=35576#:~:text=Taxol% 20is%20among%20the%20most,annual%20sales%20 over%20%241%20billion.

DOXORUBICIN:

The global market for Doxorubicin estimated at US\$992.8 Million in the year 2020, is projected to reach a revised size of US\$1.3 Billion by 2026, growing at a CAGR of 5.3% over the analysis period.

https://www.reportlinker.com/p06031392/Global-Doxorubicin-Industry.html?utm_source=GNW

TOPOTECAN:

Manufactured by GlaxoSmithKline as Hycamtin, topotecan garnered \$203.5 million in sales in 2003.

https://dtp.cancer.gov/timeline/flash/success stories/s1 4 topotecan.htm

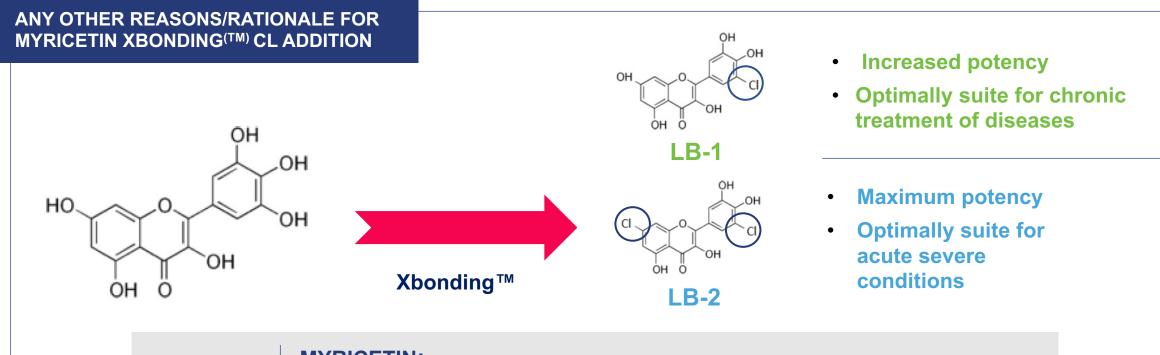
CISPLATIN:

The Cisplatin market revenue was 326 Million USD in 2019, and will reach 547 Million USD in 2025, with a CAGR of 8.95% during 2020-2025.

https://www.marketwatch.com/press-release/cisplatin-market-size-in-2022-top-countries-data-competitive-landscape-corporate-strategy-share-industry-analysis-by-top-manufactures-growth-insights-and-forecasts-to-2029-128-report-pages-2022-06-07



The Linebacker™ portfolio was developed in part utilizing the Xbonding™ platform technology





Polyphenol found in vegetables, fruits, nuts, berries, tea, and red wine Known antioxidant with demonstrated activity in:

CNS diseases, metabolic diseases, oncology and infectious diseases



LB-1, and LB-2 are available as small molecules with an attractive therapeutic index

PROGRAM	TARGET	RESEARCH	PRE-CLIN	
OH OH OH CI OH OH CI OH	PIM Kinase Inhibitor	Neurological	Electrophilic enhancement of natural myricetin has been achieved	
		Cancer	 Designed to increase efficacy of myricetin 	
ОН			 Maintain excellent safety profile of myricetin 	
		Metabolic	 Broad applicability 	
LB-2	PIM Kinase		Strong Rationale for	
	Inhibitor	Infectious Diseases	patentability of multiple molecules	



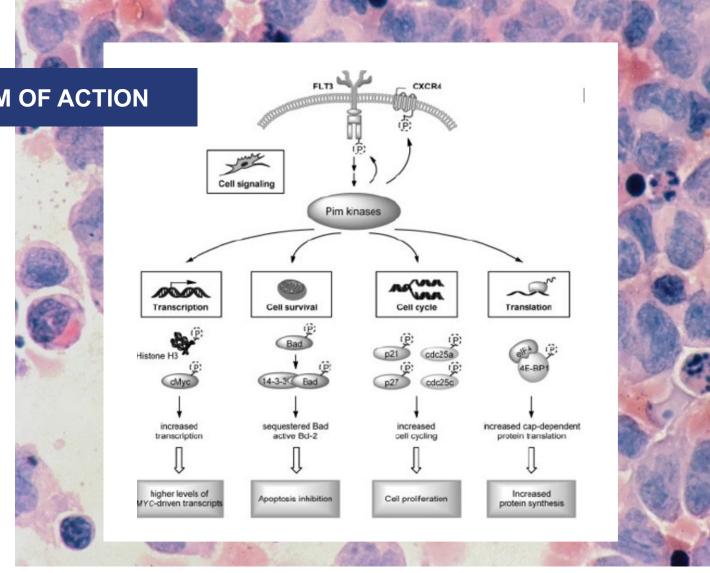
MECHANISM OF ACTION

PIM kinases regulates the regeneration and survival of cancer cells

LB- Has demonstrated the ability to inhibit PIM in several cell lines

The goal is to develop as a co-therapy with known cancer treatments including:

- Taxol
- Doxorubicin
- Topotecan
- cis-platinum





Linebacker™ US patent US10966954 and US10123991



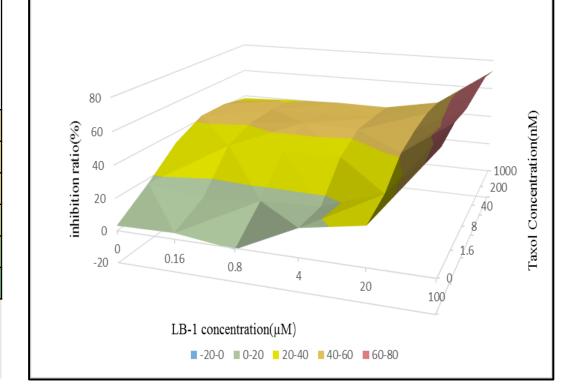


LB Efficacy as Co-therapy with Taxol in cell line proliferation study

T47D / Linebacker-1+Taxol

Linebacker-1+Taxol-Relatively Cell inhibition of vehicle control(%)						
Tax (nM) LB-1 (μM)	100	20	4	0.8	0.16	0
1000	72.51	46.95	40.20	40.68	39.62	38.04
200	75.50	48.03	41.52	41.07	40.90	41.96
40	73.59	45.70	42.59	43.99	40.77	42.16
8	71.60	41.31	34.95	34.65	34.77	33.17
1.6	73.16	28.31	15.94	14.78	12.08	17.03
0	69.94	23.49	17.05	-0.73	3.75	3.08

- LB-1 alone inhibits cell proliferation at 69.94% at 100uM
- Taxol alone inhibits cell proliferation at 41.96% at 200nM
- LB-1 and Taxol combined inhibits cell proliferation at 75.5% (100uM of LB1 + 200nM Taxol)



LB-1 and Taxol combined effect on T47D proliferation

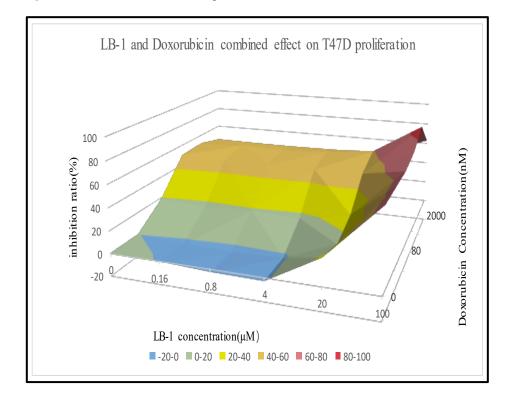
Taxol is used for the treatment of breast, ovarian, lung, bladder, prostate, melanoma, esophageal, as well as other types of solid tumor cancers. It has also been used in Kaposi's sarcoma.



LB-1 CO-THERAPY WITH DOXORUBICIN

LB Efficacy as Co-therapy with Doxorubicin in cell line proliferation study

Linebacker-1+Doxorubicin-Relatively Cell inhibition of vehicle control(%)							
Dox (nM) LB-1 (μM)	100	20	4	0.8	0.16	0	
10000	62.97	45.89	45.16	44.60	44.68	45.28	
2000	86.95	59.08	54.49	52.62	53.10	51.6	
400	73.67	49.43	49.01	49.15	47.85	50.23	
80	68.87	25.55	16.54	18.69	16.67	19.26	
16	69.37	15.92	-2.16	-3.70	-2.43	0.17	
0	69.66	23.23	-2.69	-2.14	-0.06	0.54	



- LB-1 alone inhibits cell proliferation at 69.66% at 100uM
- Doxorubicin alone inhibits cell proliferation at 51.6% at 2000nM
- LB-1 and Doxorubicin combined inhibits cell proliferation at 86.95% (100uM of LB1 + 2000nM Doxorubicin)

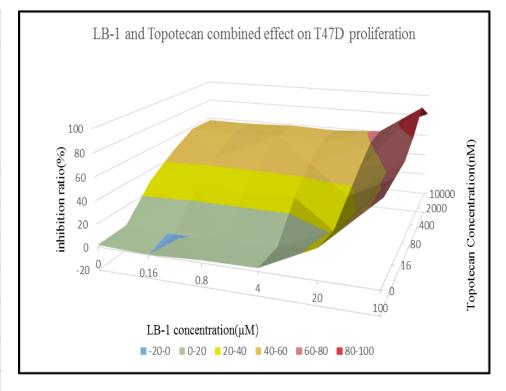
Doxorubicin is used in combination with other medications to treat certain types of bladder, breast, lung, stomach, and ovarian cancer; Hodgkin's lymphoma (Hodgkin's lymphoma (non-Hodgkin's lymphoma (cancer that begins in the cells of the immune system); and certain types of leukemia (cancer of the white blood cells), including acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML, ANLL). Doxorubicin is also used alone and in combination with other medications to treat certain types of thyroid cancer and certain types of soft tissue or bone sarcomas (cancer that forms in muscles and bones). It is also used to treat neuroblastoma (a cancer that begins in nerve cells and occurs mainly in children) and Wilms' tumor (a type of kidney cancer that occurs in children). Doxorubicin is in a class of medications called anthracyclines. It works by slowing or stopping the growth of cancer cells in your body.



LB-1 CO-THERAPY WITH TOPOTECAN

LB Efficacy as Co-therapy with Topotecan in cell line proliferation study

Linebacker-1+Topotecan-Relatively Cell inhibition of vehicle control(%)						
Top (nM) LB-1 (μM)	100	20	4	0.8	0.16	0
10000	81.89	60.55	57.59	58.94	57.29	57.70
2000	97.18	60.03	58.19	59.40	57.25	58.27
400	81.95	48.35	47.20	45.93	45.53	45.72
80	70.93	35.49	29.47	28.43	28.07	29.61
16	70.31	21.80	1.58	0.89	-0.41	2.49
0	69.54	25.74	2.82	2.26	0.02	2.00



- LB-1 alone inhibits cell proliferation at 69.54% at 100uM
- Topotecan alone inhibits cell proliferation at 58.27% at 2000nM
- LB-1 and Topotecan combined inhibits cell proliferation at 97.18% (100uM of LB1 + 2000nM Topotecan)

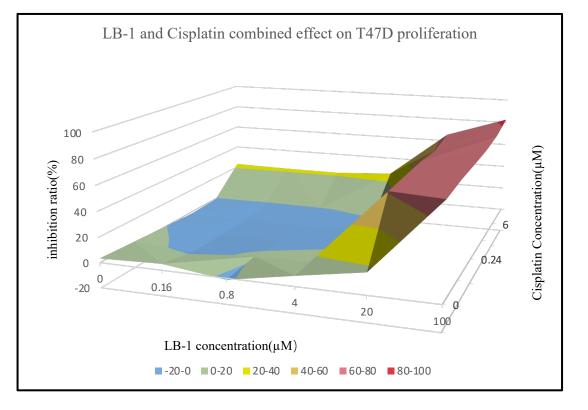
Topotecan injection is used to treat ovarian cancer (cancer that begins in the female reproductive organs where eggs are formed) and small cell lung cancer (a type of cancer that begins in the lungs) that have spread and did not improve after treatment with other medications. It is also used together with other medications to treat cervical cancer (cancer that begins in the opening of the uterus [womb]) that has not improved or has come back after other treatments. Topotecan is in a class of medications called topoisomerase type I inhibitors. It works by killing cancer cells.



LB-1 CO-THERAPY WITH CISPLATIN

LB Efficacy as Co-therapy with Cisplatin in cell line proliferation study

Linebacker-1+Cisplatin-Relatively Cell inhibition of vehicle control(%)						
Cis (µM) LB-1 (µM)	100	20	4	0.8	0.16	0
30	82.48	65.57	25.15	21.89	22.02	22.74
6	76.69	60.57	0.88	-0.24	-1.18	-0.49
1.2	74.41	62.03	-2.60	-3.06	-3.33	-1.67
0.24	74.01	61.77	-0.35	-1.19	-2.49	0.12
0.048	73.94	61.17	1.38	0.59	-1.17	1.63
0	72.33	16.54	7.92	-1.15	5.02	3.37

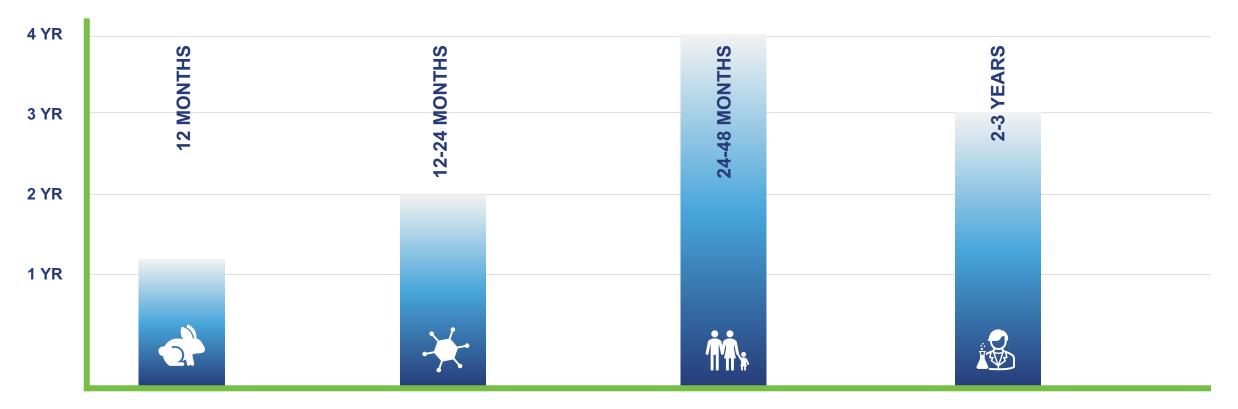


- LB-1 alone inhibits cell proliferation at 72.33% at 100uM
- Cisplatin alone inhibits cell proliferation at 22.74% at 30uM
- LB-1 and Cisplatin combined inhibits cell proliferation at 82.48% (100uM of LB1 + 30uM Cisplatin)

Cisplatin is a chemotherapy drug used to treat testicular, ovarian, bladder, head and neck, lung and cervical cancer. It may also be used to treat other cancers.



Animal studies were also performed for maximum tolerated dose in 2018



FEATURES:

Animal study against protocol on final concentration will be performed within 12 months

FEATURES:

Bioavailability, safety testing for IND submission to follow 12-24 month

FEATURES:

Clinical trial 1 24-48 months (safety in humans)

FEATURES:

Clinical trial 2-3 dependent on subsequent trial completion estimated 2-3 years

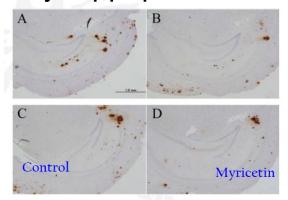


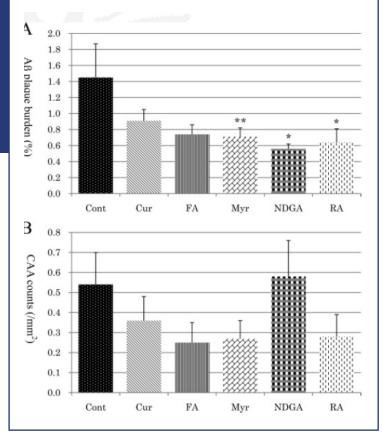
LB1 IN NEUROSCIENCE

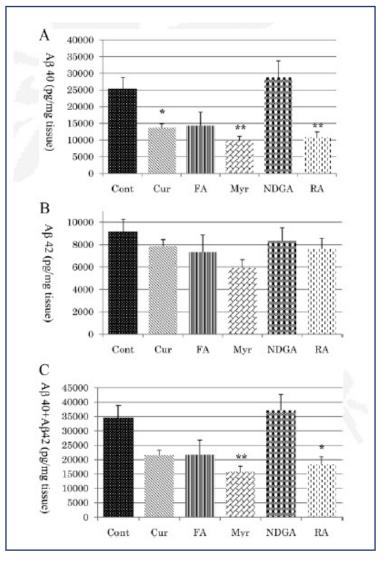
Myricetin has demonstrated a reduction in plaque burden in animals.

Potential Treatment for neurological diseases including Alzheimer's and Dementia

Amyloid β plaque burden

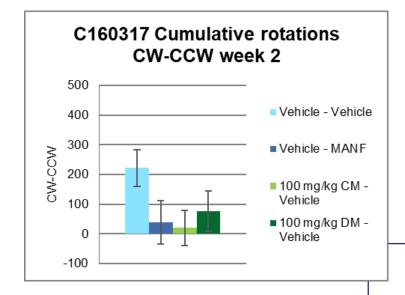


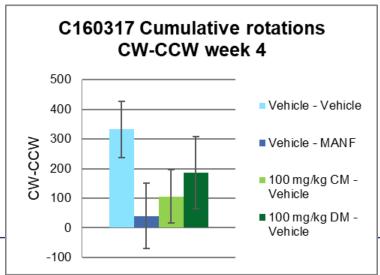


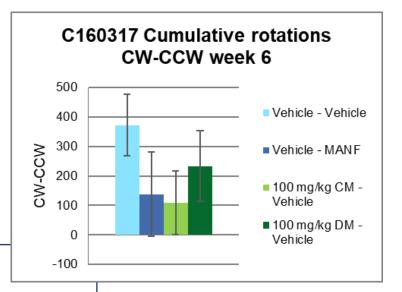




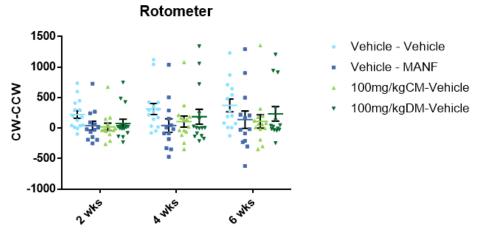
LB1 IN NEUROSCIENCE





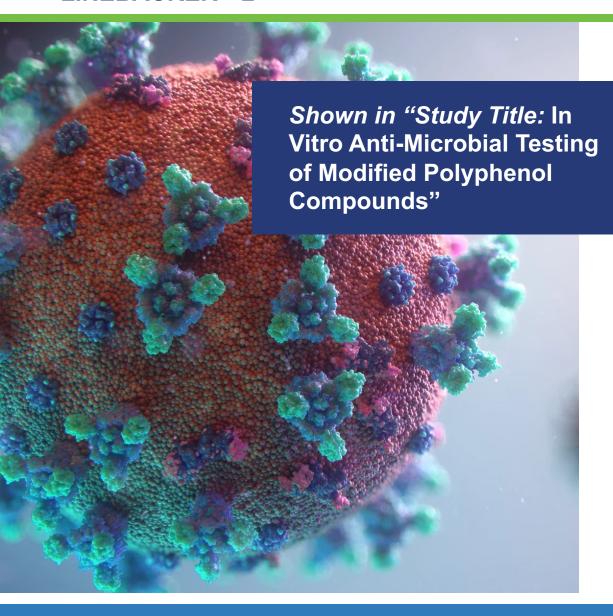


LB-1 has generated significant compelling data in a number of pre-clinical neurological studies





LINEBACKER™2



LINEBACKER 2:

- As Known as LB-FS2 (A7,B5)
- Modified Polyphenol
- Dichlorinated Myricetin (DM)
- Shown in "Study Title: In Vitro Anti-Microbial Testing of Modified Polyphenol Compounds"
- Effective Antiviral capabilities
- Dengue Virus Serotype 2
- MERS Coronavirus (MERS-CoV), EMC/2012 (Variant generation study initial outcome prevents variant generation)
- Human Rhinovirus 16
- SARS Coronavirus (SARS-CoV), HKU39849
- Malaria



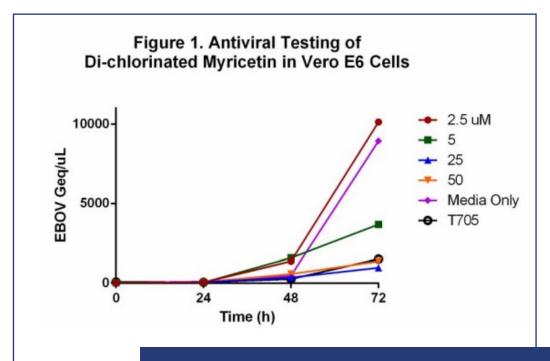
Di-Chlorinated Myricetin improves 2-4 folds inhibition when combined with Imipenem

Bacteria	Compound	MIC (μg/mL) Drug Alone	MIC (μg/mL) (in combination)	MIC (μg/mL) (in combination)
A. baumannii BAA-1793	Dichlorinated Myricetin	50	25	12.5
	Imipenem	50	6.25	12.5
P. aeruginosa BAA-2018	Dichlorinated Myricetin	50		
	Imipenem	12.5		
K. pneumoniae BAA-1705	Dichlorinated Myricetin	>100	*12.5	
	Imipenem	12.5	*6.25	
S. flexneri 0423	Dichlorinated Myricetin	50	12.5	
	Imipenem	0.4	0.2	
S. senftenberg 0405	Dichlorinated Myricetin	>100		
	Imipenem	0.4		

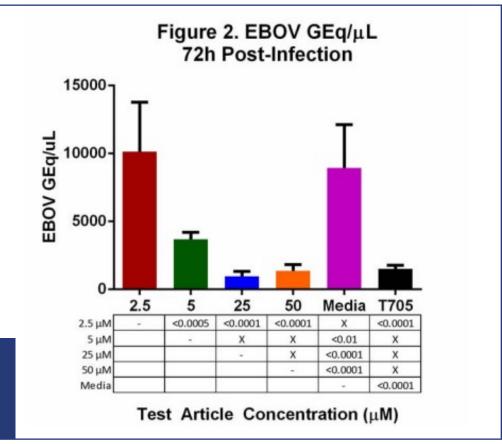
Inhibition of the bacteria was observed when combining 25ug/mL of DM with 6.25 ug/mL of imipenem of each compound/antibiotic resulting in a 2-fold to 4-fold increase in activity of DM and a 4-fold to 8-fold increase in activity of imipenem.



Di-Chlorinated Myricetin In Vero – Ebola (EBOV) Mayinga strain



Significant differences in viral load were detected at the 72 hr time point at concentrations of 25um and 50um of LB2





Equivir (OTC)

:US 20160367517A1

- Substantial in-vitro studies demonstrating broad efficacy against multiple viral infections
- Data shown effectiveness for Coronavirus (SARS), Rhinovirus, influenza (H1N1, H3N2, H5N1, H7N9) and Ebola
- Patented Blend of FDA Registered GRAS Polyphenols 60% Myricetin 38% Hesperidin 2% **Piperine**
- **OTC** supplement "Cold Remedy"

Equivir G (Rx)

:US 20200306281A1

- Contains Myricetin, Hesperidin, Piperine and 10% Gallic Acid
- In Vero study shows capability to inbit viral replication and induce viral inhibition for SARS-Cov-2
- Marketed as Rx antiviral for SAR-Cov-2

LINEBACKER PORTFOLIO: IP 10,123,991, & 10,966954

Linebacker 1 (LB-1)

- Data shows significant improvements to efficacy of 4 chemotherapy drugs utilizing 10 cancer cell lines
- Clinical trials will be performed utilizing LB-1 as Co-Therapy to the initial 4 known chemotherapy drugs (Taxol, Doxorubicin, Topotecan, Cisplatin)
- Possibility to expand to other Chemotherapy drug lines.
- LB-1 Potential as Cotherapy treatment for neurological diseases such as Alzheimer's and Dementia

Linebacker 2 (LB-2)

- In-vero studies shows high Antibacterial and antiviral capabilities.
- LB-2 when combined with antibiotics like Imipenem improves its efficacy to inhibit a wide variety of bacteria infections.
- Positioned to be a broadspectrum solution for antibacterial indications for the military uses.







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