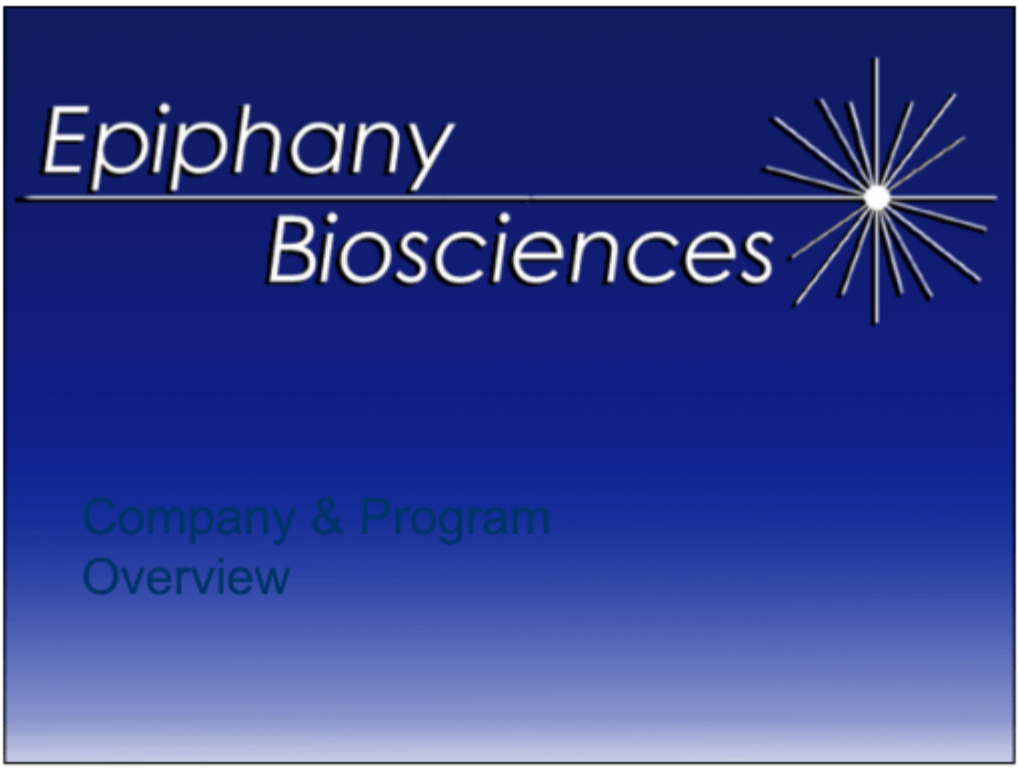
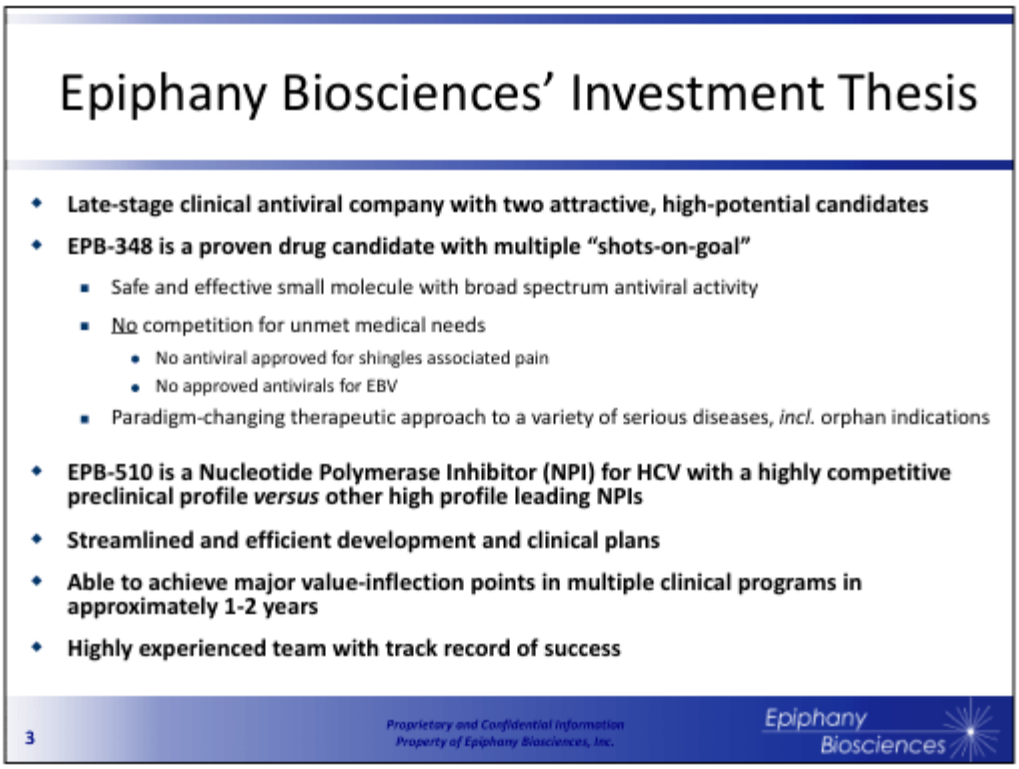


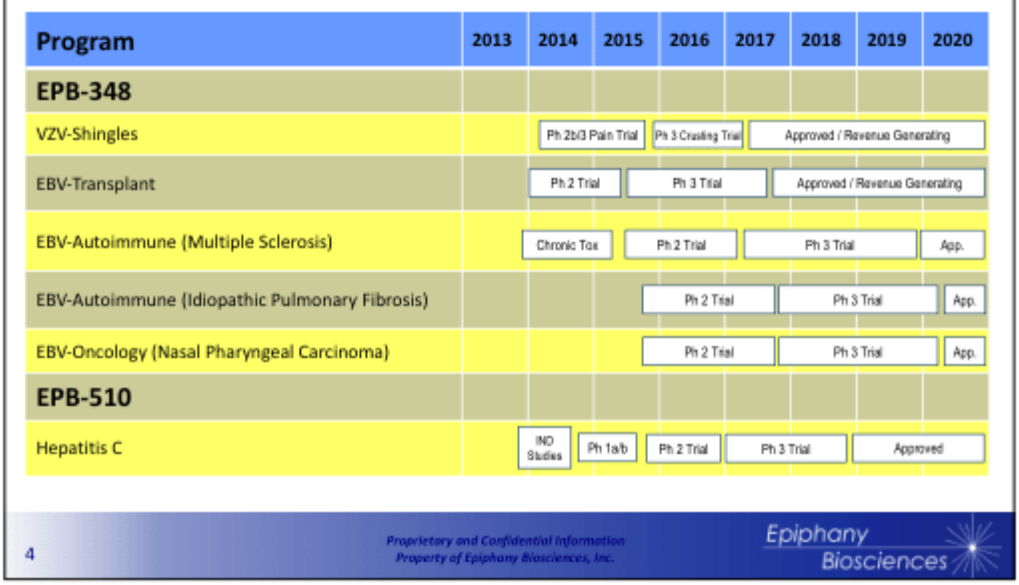
Corporate Overview

- **Mission:** *To improve the health of patients suffering from serious diseases and unmet medical needs of viral origin and to build shareholder value by developing new antiviral therapies*
- **Founded:** 2006
- **Raised:** $36m
- **Ownership:** Privately Held
- **Headquarters:** San Francisco, CA



Add spreadsheet details

Epiphany's product pipeline



Epiphany Biosciences

Valomaciclovir Stearate (EPB-348):
Epiphany's late-stage product opportunity

EPB-348 is an effective, late-stage small molecule antiviral

- Safe and effective small molecule with broad spectrum antiviral activity including Varicella Zoster Virus (VZV), Epstein-Barr Virus (EBV), & Herpes Simplex 1 and 2 (HSV-1/2)

History of Valomaciclovir Stearate (EPB-348)

- EPB-348 invented by Medivir AB (MIV-606)
- Licensed to Abbott Laboratories - developed through Phase 2a (ABT-606)
- Licensed to Reliant Pharmaceuticals - developed tablet formulation (RP-606)
- Licensed to Epiphany Biosciences – completed key Shingles & EBV proof-of-concept Phase 2 studies

Proven antiviral activity, clinical impact, & safety in multiple Phase 1 & 2 trials

- Successful Phase 2b trial for shingles met primary endpoint
- Successful Phase 2 trial for EBV and infectious mononucleosis met primary endpoint

Highly favorable safety profile

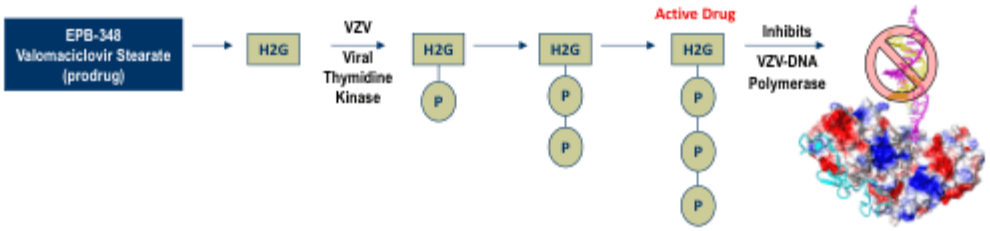
- EPB-348 has been dosed to more than 720 patients
  - More than 130 patients have received multiple doses of 3 grams or more
  - No maximum tolerated dose yet determined

Well characterized mechanism of action

- Selective viral DNA-polymerase inhibitor
- Up to 400-times more potent than Acyclovir with better intracellular concentrations and half-lives

Epiphany Biosciences

Strong *in vitro* & preclinical data provide consistent rationale why EPB-348 is more potent than other antivirals



H2G has improved cellular permeability, a faster phosphorylation rate, and better intracellular stability and persistence

- Against a variety of different VZV strains *in vitro*, H2G is up to 400x more potent than acyclovir (ACV)
- H2G is approx. 250x-better substrate for VZV encoded thymidine kinase than ACV
- The intracellular concentration of H2G-TP is more than 140x greater than ACV-TP
- H2G-TP has a longer $T_{½}$ than ACV-TP
- EPB-348 has excellent activity in the gold-standard *in vivo* Simian Varicella Virus monkey model

Lowe, DM *et al Antimicro. Agents Chemother.* **1995,** *39*,1802; Abele, G *et al Antiviral Chem. Chemother.* **1991,** *2*, 163; Saiko, KF *et al Antimicro. Agents Chemother.* **1993,** *37*, 1370.

Epiphany Biosciences

Valomaciclovir Stearate (EPB-348)

Lead Indication:

Shingles &

Shingles-Associated Pain

Epiphany Biosciences

EPB-348 can address the important unmet needs of shingles

Differentiating advantages of EPB-348 for shingles

- Shingles/Zoster associated pain impact
- Wider treatment window
- Simpler dosing regimen

Proven shingles efficacy

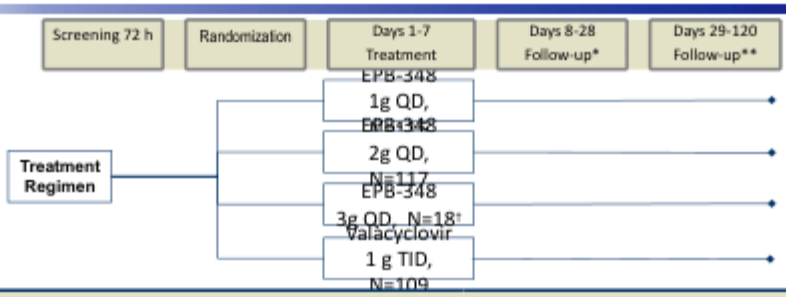
- EPB-348 met Phase 2b Shingles Trial endpoints
  - At lower, less frequent doses, EPB-348 was statistically non-inferior to higher dose Valtrex
- Data is directionally consistent with dose dependent improvement

De-risked & cost effective late stage clinical development plan

- Ability to go against placebo for pain and antiviral endpoints in Phase 3 trials
- Phase 3 trials cost significantly offset if performed in countries with [redacted] credits
- No competing shingles trials actively recruiting

Epiphany Biosciences

Phase 2b shingles study designed to show EPB-348 efficacy *versus* Valacyclovir



Phase 2b Study Design

- Non-inferiority study (Valacyclovir as comparator)
- 80% powered with respect to primary endpoint
- Randomized, double-blind, active-controlled, multi-center, parallel-group
- 46 U.S. clinical centers
- Patients were followed for three months with up to 14 visits
- Baseline demographics homogeneous & balanced across treatment groups
- 373 immunocompetent adult patients randomized into 4 groups

Endpoints

- **Primary:** Time to complete crusting
- **Secondary:** Time to complete cessation of pain
- **Overall safety parameters**

* Day 28 Final Visit for patients with rash & pain resolution

** For patients with ongoing rash or pain at Day 28

† 3g arm for PK purposes. Data included in final analysis

Epiphany Biosciences

EPB-348 met Phase 2b primary antiviral endpoint of time-to-complete crusting *versus* Valacyclovir

- EPB-348 once-a-day was *statistically* non-inferior or superior to valacyclovir three-times-a-day in both the ITT and PP populations for time to complete crusting by day 28

Parameter	EPB-348 1000 mg Once a day			EPB-348 2000 mg Once a day			EPB-348 3000 mg Once a day			Valacyclovir 1000 mg Three times a day		
Patient age range (y.o.)	≥ 18	≥ 18	≥ 50	≥ 18	≥ 18	≥ 50	≥ 18	≥ 18	≥ 50	≥ 18	≥ 18	≥ 50
Analysis	ITT	PP	ITT	ITT	PP	ITT	ITT	PP	ITT	ITT	PP	ITT
Number of patients (N)	115	102	72	117	107	74	18	16	12	109	100	67
Mean (SE)	11.8 (0.77)	11.3 (0.77)	11.8 (0.98)	10.7 (0.66)	10.7 (0.66)	11.2 (0.84)	7.2 (1.06)	7.5 (1.08)	7.2 (1.49)	11.5 (0.79)	11.6 (0.81)	12.4 (1.03)
Confidence interval	-1.848, 2.503	-2.470, 1.942	-3.372, 2.239	-2.843, 1.192	-2.895, 1.255	-3.791, 1.406	-8.252, -0.345	-8.190, -0.073	-10.231, -0.229			
P-value (unadjusted)	0.498	0.601	0.949	0.597	0.571	0.337	0.008	0.019	0.009			

Ref: "Valomaciclovir versus Valacyclovir for the treatment of acute Herpes Zoster in immunocompetent adults: A randomized, double blind, active-controlled trial" Tyring *et al J. Med. Virol.* **2012**, *84* 1224.

Epiphany Biosciences

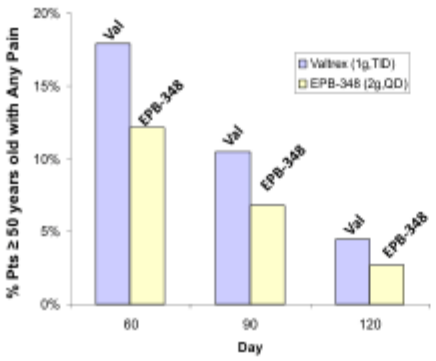
Statistically superior time to complete cessation of pain for patients with pain at Day 28

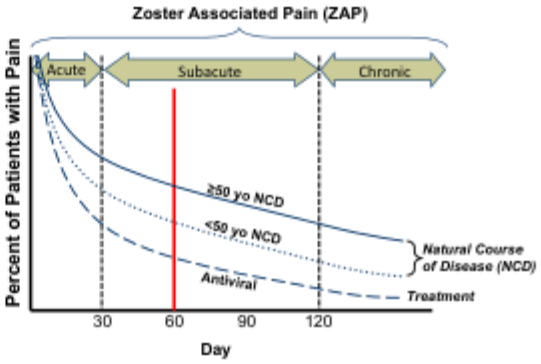
- Patients who still had pain on Day 28 and were treated with EPB-348 (2 g QD) had a statistically significant shorter time to pain resolution by nearly 2 weeks than the valacyclovir control group (ITT)

Parameter	EPB-348 1000 mg Once a day		EPB-348 2000 mg Once a day		Valacyclovir 1000 mg Three times a day	
Patient age range (y.o.)	≥ 18	≥ 50	≥ 18	≥ 50	≥ 18	≥ 50
Number of patients (N)	28	21	29	23	23	20
Mean (SE)	47.9 (6.00)	29.6 (4.38)	33.1 (4.78)	31.4 (5.04)	46.3 (5.60)	47.2 (5.71)
Confidence interval	(0.265, 2.410)	(-32.010, -3.087)	(1.013, 5.976)	(-31.106, -0.474)		
P-value (unadjusted)	0.690	0.833	0.047	0.034		

Epiphany Biosciences

Incidence of any pain in ≥50 year old patients was consistently lower for EPB-348 compared to Valacyclovir





- There is a natural resolution of pain in a subset of patients with shingles
- Antiviral treatment can reduce the incidence of pain and improve time to pain cessation

Epiphany Biosciences

EPB-348 retains its efficacy on day 3 after rash, suggesting a wider treatment window

- EPB-348 has statistically significant faster to time to complete crusting on Day 3 for those 50 years and older compared to valacyclovir (ITT)

Parameter	EPB-348 1000 mg Once a day				EPB-348 2000 mg Once a day				Valacyclovir 1000 mg Three times a day			
Patient age range (y.o.)	≥ 18		≥ 50		≥ 18		≥ 50		≥ 18		≥ 50	
Hours	0-48	48-72	0-48	48-72	0-48	48-72	0-48	48-72	0-48	48-72	0-48	48-72
Number of patients (N)	78	32	50	22	80	37	47	27	75	34	43	24
Mean (SE)	12.7 (9.5)	10.8 (6.7)	12.1 (1.23)	11.3 (1.62)	10.5 (7.2)	11.2 (7.2)	11.2 (1.05)	11.2 (1.42)	10.8 (7.5)	13.3 (9.6)	10.5 (1.12)	16.1 (1.89)
P-value	0.11	0.14	0.152	0.012	0.39	0.59	0.775	0.051				

Epiphany Biosciences

EPB-348 has consistently proven to be a more potent antiviral than Valacyclovir for shingles

In vitro

- H2G is up to 400-times more active than ACV against the shingles virus

In vivo

- EPB-348 is more effective against SVV in a monkey infection model compared to ACV

Clinical

- Phase 2a clinical shingles trial (Abbott)
  - Study showed a 30% decrease in pain duration with 750 mg BID, compared to acyclovir

Parameter	EPB-348 250 mg Twice a day	EPB-348 500 mg Twice a day	EPB-348 750 mg Twice a day	Acyclovir 800 mg Five times a day
N	21	20	17	21
Median (d)	109	107	106	150

- Phase 2b clinical shingles trial (Epiphany)
  - 1 g EPB-348 QD is statistically non-inferior to 1 g Valtrex TID (3g total) for time-to-complete crusting (PP)
  - 2g EPB-348 QD had a statistically significant shorter time to pain resolution for patients
  - No efficacy dropoff for dosing on Day 3 for EPB-348 (1 & 2 g) unlike Valtrex TID (3g total)

Epiphany Biosciences

EPB-348 appears to be very safe

Results to-date show EPB-348 to be safe and well tolerated

- EPB-348 has been dosed to more than 720 patients
- More than 130 patients have received multiple doses of 3 grams or more

Phase 2b Safety Highlights

- No study drug discontinuations due to related adverse events
- Patients with compromised renal function tolerated the drug very well
- Side-effects were similar between treatment groups and generally mild in nature
- Two discontinuations from the study based on adverse events deemed not related to study drug
- Three serious adverse events; all deemed not related to study drug (blind maintained)

Phase 2b/3 pivotal shingles trial to be focused on demonstrating key point of pain differentiation

According to the FDA, Valtrex and Famvir have <u>not</u> shown any statistical differences compared to control for pain

- Consequently, EPB-348 Phase 2b/3 trials can go against placebo for both antiviral (cutaneous) and pain endpoints

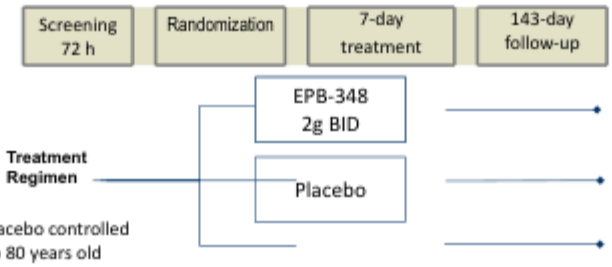
Previous clinical studies with Acyclovir, Valtrex and Famvir suggest that they may have some impact on reducing pain & PHN

- The pain impact of these antivirals have not been proven in sufficiently powered prospective studies
- Use of higher dose levels of these less potent antivirals is not possible as they are already dosed near their maximum approved dosage levels

Since EPB-348 is <u>more</u> effective against shingles than Valtrex across a variety of parameters, it is anticipated that EPB-348 could meet both pain and antiviral endpoints in Phase 2b/3 trials, especially against placebo

Epiphany Biosciences

Phase 2b/3 pivotal shingles pain trial design & milestones



Study Design

- Double-blinded, placebo controlled
- Patients aged 50 to 80 years old
- Primary endpoint: Incidence of pain at Day 60

Milestones

- 7-month enrollment period
- 5 month subject participation period
- 1-Month from Last patient out to database lock
- 1-Month from database lock to topline data

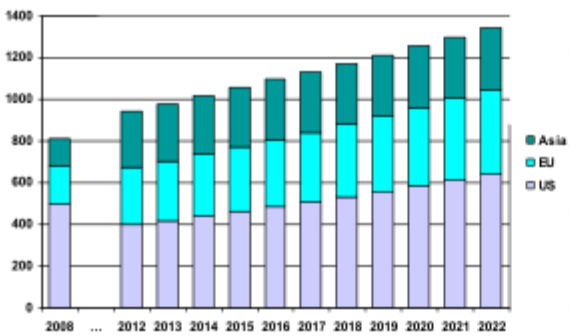
Highly cost-efficient clinical trial plan

- Example: Australia has 45% rebate/ tax credit
- No competing shingles trials actively recruiting

Epiphany Biosciences

Shingles is the first target market for EPB-348, growing to more than $1 Billion

Market Potential (in $millions)*



- Sales volume in the major pharmaceutical markets projected to grow to >$1 billion (IMS)
- Key demographic of patients >60 years old is growing with the aging of the global population
- Annual incidence of shingles in over 60 population is 1.1%
- Projected 38% growth in the number of shingles patients over 60 years old in the Asian markets by 2020, including >5.4 million cases in China
- Branded drugs dominate the worldwide markets solely on *perceived* dosing convenience and effective sales and marketing (GSK)

Source: IMS extrapolated using governmental demographic projections

Epiphany Biosciences

EPB-348's advantages for shingles would allow it to dominate the market

Existing shingles antivirals

- No shingles pain benefits: According to the FDA, Valtrex and Famvir have not shown any statistical differences compared to control for pain
- Narrow therapeutic index: Approved dosages for shingles are very close to maximum approved dose
- Limited treatment window: Must be administered within 72 hours of shingles rash onset & efficacy drops off significantly when administered between 48-72 hours
- Complicated dosing regimens: Acyclovir: 5-times a day; Valtrex ® & Famvir ®: 3 times a day

Shingles Vaccine

- Minimal market impact of only 1-2%
- High co-pay, limited efficacy, unapproved for immunocompromised and those less than 50 years old
- From 2007-2009, Zostavax ® uptake was extremely low at 3.9% (Langan, SM *et al PLoS* **2013**)

Unapproved shingles antivirals

- *ASP-2151*: Helicase inhibitor development officially suspended in 2011 because of toxicity
- *FV-100*: No clinical or *in vivo* demonstration of efficacy
  - No apparent clinical evidence of FV-100 antiviral activity in Phase 2 trial
  - No statistical endpoints achieved with respect to pain in Phase 2 trial
  - Mechanism of action is unknown & no antiviral activity demonstrated in standard *in vivo* models

Epiphany Biosciences

EPB-348 can be marketed for shingles with a small sales force & with the possibility of early revenues

Myth: A large primary-care sales force is required for shingles

- A small sales force can focus on tertiary care centers that see high-volumes of patients such as the urban elderly
- Anticipate sales of approximately of $200 m using this focused approach
- Use at tertiary centers will drive further market expansion

Revenue after Phase 2b/3 Shingles trial & Ph 2 EBV-transplant may be possible as part of Named Patient Programs

Valomaciclovir Stearate (EPB-348)

Second Indication:

Epstein-Barr Virus (EBV) & Transplant

Epiphany Biosciences

EPB-348 has already demonstrated human clinical proof-of-concept efficacy against Epstein-Barr Virus (EBV)

EPB-348 has excellent EBV activity

- 10-20-fold more potent *in vitro* than acyclovir, penciclovir, or foscarnet

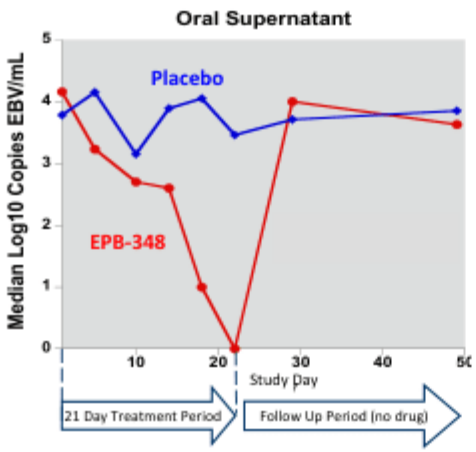
Phase 2 study of EPB-348 for EBV infectious mononucleosis

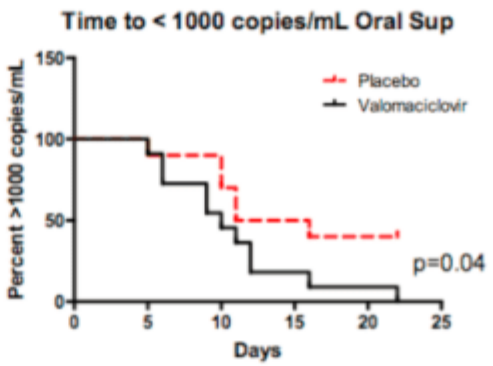
- Double-blinded, placebo-controlled
- Patients received 2 g EPB-348 twice a day for 21 days
- Primary endpoint: proportion of subjects with a 100-fold drop in EBV in oral washings

Oral supernatant	EPB-348 (N=11)	Placebo (N=10)	P value
Number of subjects with ≥2 $\log_{10}$ decrease in EBV copies/ml at end of treatment	8	1	0.008
Median (mean) decrease in EBV viral load during dosing period	3.11 (2.82)	0.30 (0.45)	0.004

Epiphany Biosciences

EPB-348 significantly reduced EBV load in a Phase 2 infectious mononucleosis trial





ICAAC 2009

Epiphany Biosciences

EPB-348, transplant, & Epstein-Barr Virus (EBV)

Background

- EBV-driven diseases such as Post-Transplant Lymphoproliferative Disorder (PTLD), EBV-encephalitis, and EBV-pneumonitis are important complications following organ transplantation and can result in significant morbidity and mortality
- No antiviral approved for EBV – no competition, first to market
- EBV-driven transplant diseases are eligible as an orphan indication
- Additionally, Varicella-zoster virus (VZV) frequently causes severe infections in patients who have undergone bone marrow transplantation.

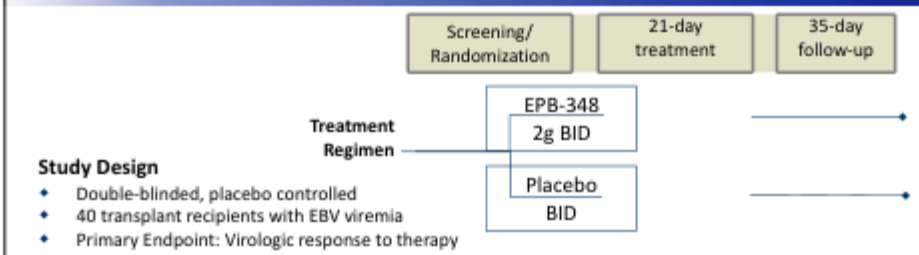
EPB-348 and EBV

- EPB-348 to be used to treat or prophylaxis for at-risk transplant patients

EBV-Transplant Infections and Complications

- Over 28,000 solid organ transplants and 10,000 bone marrow transplants in US annually
- Early sales possible via Named Patient Program
- Potential market of approximately $200 million in the US
  - Comparable: Valganciclovir (Val) had sales of approx. $300 m in the US
  - 70% of Val sales were for transplant patients ($200 m)

EBV-Transplant Phase 2 Trial (EPB-348) Design & Milestones



Study Design

- Double-blinded, placebo controlled
- 40 transplant recipients with EBV viremia
- Primary Endpoint: Virologic response to therapy

Milestones

- 12-month enrollment period
- 2 month subject participation period
- 1.5-Month from Last patient out to database lock
- 1.5-Month from database lock to topline data

Success Factors

- Utilizing established clinical network of well-respected, high-volume centers in US and Canada
- Objective endpoint: Virologic response to therapy
- EPB-348 has already proven to be a potent anti-EBV agent in the previous infectious mononucleosis - therefore, high likelihood of success to reduce EBV (as well as VZV) in viremia transplant patients

Epiphany Biosciences

Valomaciclovir Stearate (EPB-348)

Additional Indications:

Autoimmune & Proliferative Diseases

Impacted By EBV

EPB-348 for orphan autoimmune & proliferative diseases impacted by herpesviruses (EBV, HSV-1)

Background

- EBV appears to play an etiological and/or exasperating role in a number of rare, but serious and life-threatening diseases, including:
  - Multiple Sclerosis, Idiopathic Pulmonary Fibrosis, & Nasopharyngeal Carcinoma

EPB-348 and EBV-Autoimmune/Lymphoproliferative disease

- These indications offer potential significant add-on upside for EPB-348 as well as representing a paradigm-changing therapeutic approach to a variety of serious diseases, many of which have orphan status
- Chronic toxicity studies required prior to trials with longer-term EPB-348 dosing

Multiple market opportunities in orphan diseases

- **Multiple Sclerosis (MS)**
  - US prevalence of approx. 400,000 patients; Potential market of approx. $1.5-3 billion based on Copaxone, Avonex, & Rebif comparables
- **Idiopathic Pulmonary Fibrosis (IPF)**
  - US incidence of approx. 20,000-50,000 cases annually; Global market was valued at $2 billion in 2009
- **Nasopharyngeal Carcinoma (NPC)**
  - Accounts for 18% of all cancers in China; Global market of approx. $50-200 million

Epiphany Biosciences

EPB-510 for Hepatitis C (HCV)

Preclinical Nucleotide
Polymerase Inhibitor (NPI) Program

EPB-510 is a highly differentiated approach to HCV Nucleotide Polymerase Inhibitors (NPIs)

- **Recent data from 2012 AASLD confirm the critical role NPIs will play as the cornerstone of future DAA therapies for HCV**
- **HCV nucleotide polymerase inhibitors have clustered around a narrow set of structures based primary on 2'-substituted ribose**
  - Very limited IP room to operate
  - Members of this class have been withdrawn because of toxicity and/or lack of activity
- **However, acyclic nucleosides have a long history of success and safety in the clinic as antiviral agents against herpes virus, HIV, and HBV**
  - Valtrex, acyclovir, & Famvir
- **Epiphany is developing EPB-510 as the *first* acyclic nucleotide polymerase family to target HCV**
  - Epiphany controls IP around EPB-510, a new class of nucleotide-like polymerase inhibitors
  - Combination of novel scaffold and pro-drug technology
  - Orally bioavailable pro-drug designed to be liver targeting

EPB-510 has an highly competitive *in vitro* & *in vivo* profile for an HCV NPI

Discovery & Development

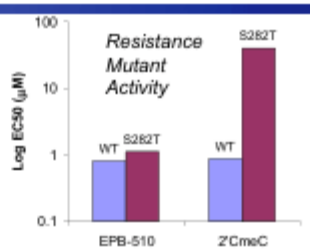
- Epiphany discovered EPB-510 as part of its internal analogue development program

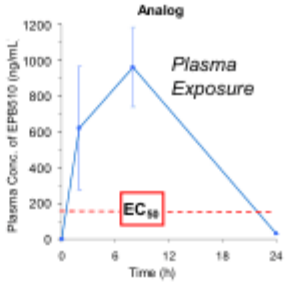
Competitive activity profile

- EPB-510 has sub-μM *in vitro* HCV replicon activity
  - Range of activity very similar to other NPIs including GS-7977
- Series is equipotent against GT 1a & 1b
- Unique resistance pattern compared to GS-7977 & INX-08189
  - S282T mutation associated with resistance to 2'-C-methylated compounds (2'CmeC)
  - Minimal loss of activity against S282T NS5b mutant HCV replicons

Excellent PK and safety profile

- EPB-510 is orally bioavailable and well-tolerated i*n vivo*
- Achieves plasma levels well in excess of therapeutic dose (EC_{50})
- Metabolite(s) derived from pro-drug highly unlikely to pose toxicity issue





Epiphany Biosciences

EPB-510 Value Proposition

New NPI's are desired for HCV

- Next-generation HCV DAA cocktails will likely utilize an NPI
- Well-established comparables for preclinical and clinical stage NPIs

EPB-510 has a competitive NPI profile

- Unique and differentiated approach to NPIs
- EPB-510 has excellent HCV replicon NPI activity
- Preliminary *in vitro* pharmacology and toxicity studies complete
- Scalable synthetic route developed

Clear route to clinic

- IND-enabling studies can be completed in approximately 6 months
- Proof-of-Concept Phase 1b in approximately 9-10 months after IND

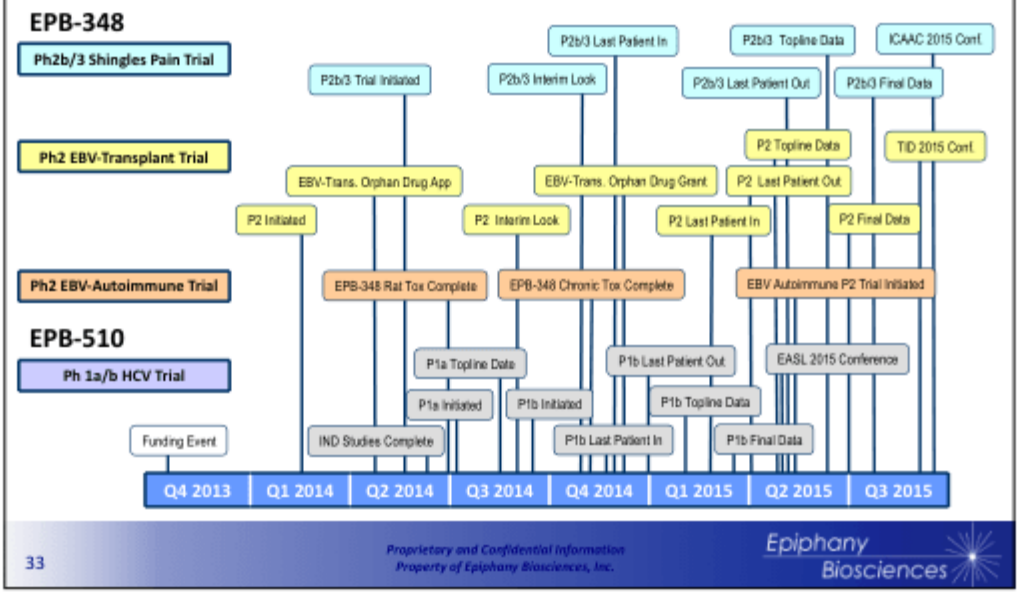
Strategic objective

- Following positive Phase 1b data, seek licensing partner for development through Phases 2 & 3 or sell asset

Epiphany Biosciences Corporate Highlights

Milestones, Team, &
Value Proposition

Anticipated Value-Driving Milestones



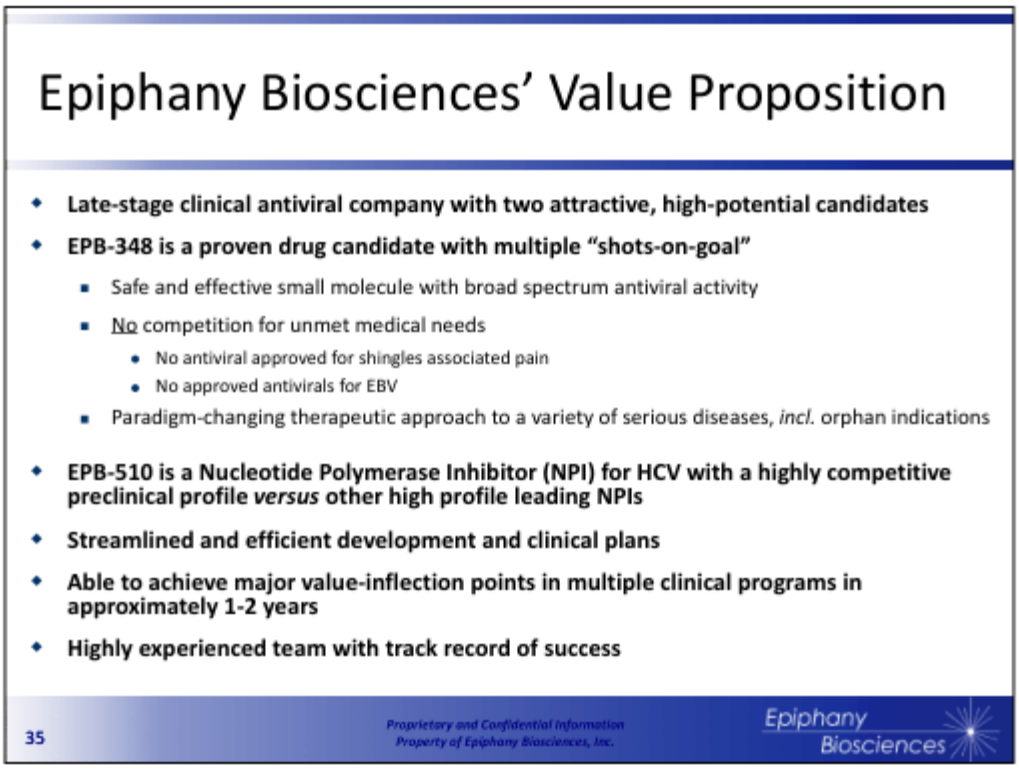
Epiphany Biosciences

Epiphany has a very experienced team

- **Fred Volinsky, MD**, *Founder, Chairman & CEO*
  - Co-founded CoTherix (acquired by Actelion for $420m); member Bailard Life Science Fund SAB
  - Previously Managing Director at RCT BioVentures
  - Held Directorships at Myometrix, Cylene Pharma, Imagine Pharma, Kerberos Proximal Solutions, Catalyst Biosciences
  - Former faculty member at Harvard Department of Emergency Medicine
- **Howard J. Worman, MD**, *Chief Medical & Scientific Consultant* (Prof. of Medicine, Pathology, Cell Biology, Columbia University)
- **Steven Dong, PhD**, *Director of Chemistry* (15+ years of drug discovery & development experience - Kosan Biosciences)
- **Curtis Scribner, MD, MBA**, *Regulatory Affairs* (27+ years regulatory experience; former Medical Officer & Dep. Director at FDA)
- **Paul Flyer, PhD**, *Clinical Statistics* (25+ years of statistical experience - FDA, Amgen, Biogen Idec, ICOS)
- **Solomon Tse, PhD**, *Chemistry, Manufacturing, & Controls* (30+ years CMC experience - J&J)
- **Dan Szeto, PhD**, *QA/QC* (30+ years QC/QA/GMP/GLP operations experience - Elan)
- **Chin-chung Lin, PhD**, *Preclinical Development* (35+ years preclinical development experience - Valeant, ICN, Schering-Plough)
- **Michael Farber, PhD, JD,** *Intellectual Property* (27+ years IP experience, Partner at Ditthavong Mori & Steiner)

Senior Advisory Board

- **Robert Gallo, MD**, *Founder & SAB Chairman* (Co-discoverer of HIV; Lasker Award Laureate; Founder & Director of IHV)
- **Roger Kornberg, PhD,** (2006 Nobel Laureate in Chemistry, Teva Board Member, Prof. Stanford University)
- **Yuan Chang, MD**, (Discoverer of two of the seven known human cancer viruses , University of Pittsburgh Cancer Institute)



Add spreadsheet details