

# Eleven Biotherapeutics

## Equity Research

March 3, 2014

**Price: \$16.20** (02/28/2014)

**Price Target: \$35.00**

### OUTPERFORM (1)

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#### Key Data

Symbol	NASDAQ: EBIO
52-Week Range:	\$19.33 - 10.00
Market Cap (MM):	\$261.5
Net Debt (MM):	\$(5.9)
Cash/Share:	\$6.54
Dil. Shares Out (MM):	16.1
Enterprise Value (MM):	\$311.0
ROIC:	NA
ROE (LTM):	NA
BV/Share:	\$(35.67)
Dividend:	NA

FY (Dec)	2012A	2013E	2014E
<b>Earnings Per Share</b>			
Year	\$(0.43)	\$(1.55)	\$(1.55)
P/E	NM	NM	NM

#### Revenue (MM)

Year	\$0.0	\$0.0	\$0.0
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## Initiating Coverage

# Initiation: A Large, Underserved Market Is Waiting; Valuation is Compelling

### The Cowen Insight

Eleven's EBI-005 is a differentiated approach for dry eye, a condition which remains significantly undertreated. The market leader (and only approved Rx product for this indication) is Allergan's Restasis — which despite its limited efficacy & sometimes difficult side effect profile — is still a \$1B drug. Given Restasis' limitations & our consultants' views on EBI-005 we would be buying EBIO here.

### Clinician Consultants Indicate New Dry Eye Treatments Are Necessary

Dry eye disease is typically defined as a chronic deficiency of moisture in the eye, which then causes itching and irritation and may lead to corneal damage. Scientists believe that a major contributing factor towards the development of the disorder is from inflammation caused by T-cell infiltration, proliferation, and inflammatory cytokine production (IL-1, etc.) that can lead to reduction in tear film quality and ocular surface damage. Eleven's Phase III candidate EBI-005 targets/blocks IL-1, and works far up in the inflammatory cascade. Interestingly, EBI-005 also appears to have significant implications to the pain-aspect of dry eye, which is unique and differentiated. As we indicated above, Allergan's Restasis, the market leader and only approved dry eye drug, currently has sales of roughly \$1B, so this represents a major potential opportunity. Importantly, our consultants indicate that Restasis is a fairly poor treatment given its efficacy and tolerability profile — and they stress that a "better" therapeutic option could expand utilization by 3-4x, making the prescription target market likely actually closer to \$3-4B. Most importantly, given the profile, they indicate that EBI-005 would be an exceedingly welcome addition to the treatment paradigm. Our model has "peak" sales of roughly \$500MM, but we believe this is clearly a conservative number if the initial clinical profile holds up in Phase III. Stated another way, there is no reason why EBI-001 couldn't be a \$1B+ drug, in our view.

### Initial EBI-005 Data Is Encouraging; Phase III Is Underway

We believe the confluence of an exceedingly experienced management team and scientific founder lends even more confidence to the lead program. Along with the solid initial data and the learning from a variety of other earlier companies (failed) dry eye clinical programs, we believe Eleven's differentiated EBI-005 is particularly well-positioned to properly navigate the difficult clinical and regulatory pathway.

### The Valuation Remains Compelling

Assuming clinical and commercial success for EBI-005 (while excluding any potential other pipeline assets given the early nature of the other programs) we arrive at a base valuation of \$35 per share. This assumes that Eleven takes the product to market via their own sales force in 2017, and that by year 5 of the launch EBI-005 has reached \$500MM + in sales. Alternatively, a potential acquirer with its own commercial infrastructure — which would significantly lower our spending assumptions in the DCF — would argue for a valuation of the EBI-005 opportunity alone of \$50-55. Given our belief in the likelihood of clinical success and the potential commercial outcomes, we would be adding at these levels.

Please see addendum of this report for important disclosures.

## At A Glance

### Our Investment Thesis

Assuming clinical and commercial success for EBI-005 (while excluding any potential other pipeline assets given the early nature of the other programs) we arrive at a base valuation of \$30-35 per share. This assumes that Eleven takes the product to market via their own sales force in 2017, and that by year 5 of the launch EBI-005 has reached \$500MM+ in sales. Alternatively, a potential acquirer with its own commercial infrastructure — which would significantly lower our spending assumptions in the DCF — would argue for a valuation of the EBI-005 opportunity alone of \$50-55. Given our belief in the likelihood of clinical success and the potential commercial outcomes, we would be adding at these levels.

### Base Case Assumptions

\$30-35 on EBI-005 clinical success in dry eye

### Upside Scenario

\$50-55 on an acquisition

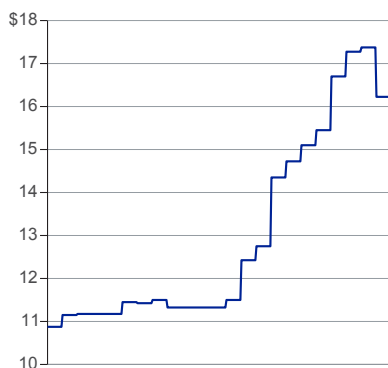
### Forthcoming Catalysts

- 1H:2014 – Initiation of Phase II study for EBI-005 in allergic conjunctivitis
- Mid-2014 – Initiation of long-term safety study for EBI-005 in dry eye
- 1H:2015 – Data readout out from first pivotal Phase III study of EBI-005 in dry eye
- 1H:2015 – Initiation of second pivotal Phase III study of EBI-005 in dry eye

### Downside Scenario

\$8-9 on EBI-005 clinical delay/failure

### Price Performance



Source: Bloomberg

### Company Description

Eleven uses its propriety AMP-Rx protein engineering platform to develop product candidates for ocular surface diseases. Specifically, the Company's pipeline of protein therapeutics leverages what is known about cytokine biology to target current unmet needs in various ocular surface diseases. EBI-005 is the Company's lead drug candidate in Phase III development for DED and Phase II development for allergic conjunctivitis (AC).

### Analyst Top Picks

	Ticker	Price (02/28/2014)	Price Target	Rating
Allergan	AGN	\$127.00	\$145.00	Outperform
Actavis	ACT	\$220.82	\$255.00	Outperform
Shire Pharmaceutical	SHPG	\$165.15	\$215.00	Outperform

Importantly, our consultants indicate that Restasis is a fairly poor option given its efficacy and tolerability profile – and they stress that a "better" therapeutic option could expand treatment by 3-4x the current utilization, making the target market closer to \$3-4B. And they note that EBI-005 would be an exceedingly welcome addition to the treatment paradigm. Our model has "peak" sales of roughly \$500MM, but we believe this is clearly a conservative number if the initial clinical profile holds up in Phase III. Stated another way, there is no reason why EBI-001 couldn't be a \$1B+ drug.

## This Market Is Waiting (And Desperate) For A Better Solution

Eleven's EBI-005 is a differentiated treatment for dry eye, a condition which remains significantly undertreated. The market leading (and only approved Rx product for this indication) is Allergan's Restasis – which despite its limited efficacy and sometimes difficult side effect profile – is still a \$1B drug. Given the confluence of this market size and EBI-005's initial profile – this should be a significant opportunity. Dry eye disease (DED) is typically defined as a chronic deficiency of moisture in the eye, and is usually caused by inadequate tear production and/or a change in tear composition that leads to rapid evaporation. The drying of the ocular surface causes itching and irritation, and may lead to corneal damage. Scientists believe that a major contributing factor towards the development of the disorder is from inflammation caused by T-cell infiltration, proliferation, and inflammatory cytokine production (IL-1, etc.) that can lead to reduction in tear film quality and ocular surface damage. Patients with dry eye disease typically experience ocular discomfort and pain, eye dryness, and tear film instability due to decreased quality of quantity of tears. Eleven's Phase III candidate EBI-005 targets/blocks IL-1, and works far up in the inflammatory cascade. Interestingly, EBI-005 also appears to have significant implications for the pain-aspect of dry eye, which appears unique and differentiated. As we indicated above, Allergan's Restasis, the market leader and only approved dry eye drug, currently has sales of roughly \$1B, so this represents a major potential opportunity. Importantly, our consultants indicate that Restasis is a fairly poor treatment given its efficacy and tolerability profile – and they stress that a "better" therapeutic option could expand utilization by 3-4x, making the prescription target market likely actually closer to \$3-4B. Most importantly, given the profile, they indicate that EBI-005 would be an exceedingly welcome addition to the treatment paradigm. Our model has "peak" sales of roughly \$500MM, but this is clearly a conservative number if the initial clinical profile holds up in Phase III. Stated another way, there is no reason why EBI-001 couldn't be a \$1B+ drug.

Figure 1 U.S. Dry Eye Treatment Market Build

ESTIMATED U.S. DRY EYE TREATMENT MARKET										
	2012	2013	2014E	2015E	2016E	2017E	2018E	2019E	2020E	CGR Comments
<b>Restasis U.S. Penetration Of Est Dry Eye Market (AGN)</b>	80%	80%	80%	78%	74%	67%	62%	56%	51%	- Leading treatment – market creator
Estimated Patients ('000)	1,825	2,070	2,180	2,185	2,190	2,120	2,080	2,010	1,975	- Generics may not come upon market expiry; poor compliance
Average Price Per Year Due To Low Utilization	\$685	\$720	\$765	\$805	\$845	\$885	\$930	\$975	\$1,025	- ~5% annual price increases
Annual Prescriptions ('000)	2,820	2,955	\$3,112	\$3,119	\$3,126	\$3,026	\$2,969	\$2,869	\$2,819	
Estimated Sales U.S. (\$MM)	\$750	\$895	\$1,000	\$1,055	\$1,110	\$1,125	\$1,160	\$1,175	\$1,215	+6% - US sales dominate
<b>Lifitegrast U.S. Penetration Of Est Dry Eye Market (SHPG)</b>				4%	8%	13%	16%	20%	22%	- First treatment to address symptoms of dry eye
Patients ('000)				39	89	159	205	266	323	- Compliance should be better than Restasis due to efficacy
Average Price Per Year				\$1,610	\$1,690	\$1,770	\$1,860	\$1,950	\$2,050	- Priced at a premium to Restasis; and higher utilization
Annual Prescriptions ('000)				46	106	189	244	316	384	
Estimated Sales U.S. (\$MM)				\$50	\$120	\$225	\$305	\$415	\$530	- Expected to rapidly gain market share
<b>EBI-005 U.S. Penetration Of Est Dry Eye Market</b>							4%	8%	10%	- Second player to reach market that treats symptoms effectively
Patients ('000)							81	144	186	- Potential 2018 U.S. market launch
Average Price Per Year							\$1,860	\$1,950	\$2,050	- Pricing in-line with Lifitegrast
Annual Prescriptions ('000)							96	172	221	
Estimated Sales U.S. (\$MM)							\$50	\$120	\$225	\$305 - Strong launch anticipated in exceedingly large market
<b>Steroids/Tears/Others U.S. Estimated Penetration Of Dry Eye Market</b>	21%	20%	20%	19%	18%	17%	15%	14%	13%	- Use declines with the entrance of new, more effective products
Patients ('000)	1,510	1,630	1,740	1,735	1,765	1,730	1,695	1,665	1,640	- Compliance low and similar to Restasis; short duration of treatment
Average Price Per Year	\$215	\$225	\$235	\$245	\$255	\$270	\$285	\$300	\$315	- Mainly generic or low priced products
Estimated Sales U.S. (\$MM)	\$195	\$220	\$245	\$255	\$270	\$280	\$290	\$300	\$310	+6% - Use remains steady
<b>Total U.S. Dry Eye Market Sales (\$MM)</b>	<b>\$945</b>	<b>\$1,115</b>	<b>\$1,245</b>	<b>\$1,380</b>	<b>\$1,500</b>	<b>\$1,680</b>	<b>\$1,875</b>	<b>\$2,115</b>	<b>\$2,360</b>	<b>+12%</b> - Larger % of market penetrated due to multiple treatment options
<b>% Growth</b>	<b>+15%</b>	<b>+18%</b>	<b>+12%</b>	<b>+9%</b>	<b>+10%</b>	<b>+12%</b>	<b>+12%</b>	<b>+13%</b>	<b>+12%</b>	- Growth should be rapid given new, more effective drugs

Source: Cowen and Company; PriceRx

## Initial Data Is Encouraging and Phase III Is Set To Begin

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The confluence of an exceedingly experienced management team and scientific founder lends even more confidence to the lead program. Along with the solid initial data and learning from a variety of other earlier companies' (failed) dry eye clinical programs, we believe Eleven's differentiated EBI-005 is particularly well-positioned to properly navigate the difficult clinical and regulatory pathway. Specifically, the Phase III program will be enriched from patient understanding in the earlier Phase I/II studies to provide a maximum chance for success. Our consultants are enthusiastic about the initial data discussed below.

Before briefly discussing the results to date, we wanted to provide two thoughts upfront: first, a brief description of EBI-005, and then second, a discussion of the unique regulatory pathway for dry eye drug development. As for EBI-005, it is a recombinant protein and topically administered IL-1 inhibitor that acts by inhibiting both inflammation (immune response; T-cell activation) and nociception (pain). Increased IL-1 levels are caused from stress on the ocular surface, which initiates and maintains an inflammatory response leading to ocular surface damage. Increased levels of IL-1 also lead to increased stimulation of nerve cells, which causes chronic ocular pain. Therefore, by inhibiting the body's immune response in the eye and reducing inflammation, dry eye symptoms should improve – while inhibiting nociception will work in parallel to ameliorate the pain and discomfort associated with dry eye.

As for the regulatory process, to garner FDA approval for a dry eye product it is necessary for a drug to achieve both a favorable “sign” and “symptom” endpoint in Phase III development. For reference, a “sign” is an endpoint observed by the doctor such as dry spots or corneal staining, while a “symptom” is something reported/observed by the patient, so while a patient may look better per the treating physician, they may not always “feel better.” Historically, no company has been able to achieve success on both endpoints and gain regulatory approval (note Allergan was approved with less rigorous guidelines). This may be partially due to the fact that many physicians believe that there is not a tight correlation between the two.

As for the brief review of the clinical data to date, in the initial Phase II studies of EBI-005 its CFS's (“sign”) endpoint, (which will also be the planned Phase III co-primary signs endpoint), the 5 mg/mL TID and 20 mg/mL TID arms demonstrated a 33% change from baseline. Eleven also conducted an analysis of “EE50 Population” (a subset of moderate to severe patients), which showed a 39% change in total CFS from baseline and a clear separation from placebo at week 6. The magnitude of these results is particularly impressive when you consider that Shire's Lifitegrast demonstrated less than a 5% reduction (p-value= 0.0148) in total corneal staining in the Phase III OPUS-1 study. The important takeaway from the initial EBI-005 data is that the magnitude of effect justifies a great deal of enthusiasm as we enter Phase III. For the “symptoms” endpoint, (which is essentially a question about patients feeling of pain or soreness) the initial Phase I/II data has also been very encouraging. In the total study population, EBI-005 treatment resulted in a 46% change from baseline and in the EE50 subset patient population, a 61% change from baseline was observed. When comparing these results to Shire's Lifitegrast's OPUS-1 ocular discomfort results (15% change from baseline in ITT population, p-value= 0.0273; 25% change from baseline in artificial tears population, p-value= 0.0001) the relative magnitude of improvement for EBI-005 is impressive. The bottom-line is that we believe Eleven moves into Phase III with what appears to be the right patient subset (EE50) and the most appropriate endpoints to target.

The future expected catalysts to occur for Eleven are:

- 1H:2014 – Initiation of Phase II proof-of-concept study (n=145) for EBI-005 in allergic conjunctivitis
- Mid-2014 – Initiation of long-term, 1-year dosing safety study (n>100) for EBI-005 in dry eye
- 1H:2015 – Data readout out from first pivotal Phase III study of EBI-005 in dry eye
- 1H:2015 – Initiation of second pivotal Phase III study of EBI-005 in dry eye
- 2H:2016 – Potential EBI-005 BLA submission for dry eye

### Valuation Remains Compelling

Assuming clinical and commercial success for EBI-005 (while excluding any potential other pipeline assets given the early nature of the other programs) we arrive at a base valuation of \$35 per share. This assumes that Eleven takes the product to market via their own (yet to be built) salesforce in 2017, and that by year 5 of the launch EBI-001 has reached \$500MM+ in sales. We believe that our sales forecasts could prove conservative, given Allergan's \$1.0B in Restasis sales despite a significant level of deficiencies for that product.

And given the potential size of the market and already built ophthalmology sales forces of other companies, we also believe that if EBI-005 is successfully developed it would likely be an acquisition target. If we were to remove the necessary spending burden of building and maintaining a sales force from our model our DCF on the EBI-005 opportunity alone inflects to an estimated \$50-55. We believe that even these higher valuations could increase further following clinical and regulatory success as our DCF is using a "punishing" discount rate given the historical risk in dry eye drug development. And we would also note that each of these valuation parameters exclude any pipeline success, while still attributing some degree of R&D spending. Completely removing our attributed development spending in both of those scenarios (given we provide no pipeline success in our models) inflects both our base case DCF of \$35 and our acquisition DCF of \$50-55, by \$10-15 additional per share, respectively. Given our belief in the likelihood of clinical success – combined with the corresponding valuations on the likely commercial outcomes – we would be adding at these levels.

On the following page we publish our base-case standalone DCF scenario, as well as an acquisition (and therefore less promotional spend) scenario.

### Figure 2 Base DCF Indicates \$35 Per Share

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Source: Cowen and Company.

### Figure 3 In An Acquisition Scenario, Our DCF Indicates \$50-55 Per Share

Assumptions:	Output:	
5.0%	Equity Value	\$835.0
Increase in WC		
Discount Rate	13.0%	Estimated Share Price \$80.00
Shares Outstanding	16.1	Detmtd 50.0
	Cash	50.0
	Enterprise Value	\$835.0

ELEVEN DCF																										
2012A	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E	2033E	2034E	2035E	2036E	2037E	2038E
Total Revenues	\$0.0	\$0.0	\$0.0	\$0.0	\$60.0	\$120.0	\$225.0	\$305.0	\$400.0	\$525.0	\$650.0	\$775.0	\$880.0	\$1,000.0	\$1,140.0	\$1,250.0	\$1,350.0	\$1,450.0	\$1,500.0	\$750.0	\$500.0	\$300.0	\$200.0	\$100.0	\$100.0	\$100.0
% Change							+88%	+36%	+31%	+31%	+24%	+19%	+14%	+14%	+14%	+10%	+8%	+7%	+3%	-50%	-33%	-40%	-33%	-50%	+0%	+0%
Cost of Goods					\$5.0	\$12.0	\$22.5	\$30.5	\$40.0	\$52.5	\$65.0	\$77.5	\$88.0	\$1,00.0	\$1,14.0	\$1,25.0	\$1,35.0	\$1,45.0	\$1,50.0	\$75.0	\$50.0	\$30.0	\$20.0	\$10.0	\$10.0	\$10.0
Gross Profit	\$45.0	\$108.0	\$202.5	\$274.5	\$360.0	\$50.0	\$585.0	\$669.5	\$792.0	\$900.0	\$1,026.0	\$1,125.0	\$1,215.0	\$1,305.0	\$1,215.0	\$1,305.0	\$1,350.0	\$1,350.0	\$775.0	\$450.0	\$270.0	\$180.0	\$90.0	\$90.0	\$90.0	\$90.0
Gross Margin - Total					90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
SG&A	\$5.0	\$6.0	\$8.0	\$12.0	\$40.0	\$40.0	\$60.0	\$65.0	\$80.0	\$105.0	\$120.0	\$140.0	\$160.0	\$170.0	\$175.0	\$190.0	\$190.0	\$190.0	\$190.0	\$75.0	\$75.0	\$75.0	\$40.0	\$25.0	\$25.0	\$25.0
% of Revs	NM	NM	NM	NM	NM	33.3%	26.7%	21.3%	20.0%	20.0%	18.5%	18.1%	18.2%	17.0%	15.4%	15.2%	11.1%	5.2%	5.0%	10.0%	15.0%	16.7%	20.0%	25.0%	25.0%	25.0%
SGD	\$20.0	\$20.0	\$20.0	\$20.0	\$25.0	\$30.0	\$20.0	\$25.0	\$35.0	\$45.0	\$50.0	\$50.0	\$50.0	\$50.0	\$50.0	\$50.0	\$50.0	\$50.0	\$50.0	\$50.0	\$50.0	\$20.0	\$25.0	\$25.0	\$10.0	\$10.0
% of Revs	NM	NM	NM	NM	NM	25.0%	8.9%	8.2%	6.2%	6.7%	6.9%	6.5%	5.7%	5.0%	4.4%	4.0%	3.7%	3.4%	3.3%	6.7%	10.0%	16.7%	12.5%	25.0%	10.0%	10.0%
Operating Expenses	\$25.0	\$26.0	\$28.0	\$32.0	\$65.0	\$70.0	\$80.0	\$90.0	\$105.0	\$140.0	\$165.0	\$190.0	\$210.0	\$220.0	\$225.0	\$240.0	\$200.0	\$150.0	\$125.0	\$125.0	\$100.0	\$60.0	\$50.0	\$50.0	\$50.0	\$50.0
% of Revenues	NM	NM	NM	NM	NM	58.3%	35.6%	29.5%	26.3%	26.7%	25.4%	24.5%	23.9%	22.0%	19.7%	19.2%	14.8%	8.6%	8.3%	16.7%	25.0%	33.3%	32.5%	50.0%	35.0%	35.0%
Operating Income	(\$25.0)	(\$26.0)	(\$28.0)	(\$32.0)	(\$20.0)	\$38.0	\$122.5	\$184.5	\$255.0	\$332.5	\$420.0	\$507.5	\$582.0	\$680.0	\$801.0	\$885.0	\$1,015.0	\$1,180.0	\$1,225.0	\$550.0	\$325.0	\$170.0	\$115.0	\$40.0	\$55.0	\$55.0
% Operating Margin	NM	NM	NM	NM	NM	NM	60.5%	63.8%	63.3%	64.6%	65.5%	66.1%	68.0%	70.3%	70.8%	75.2%	81.4%	81.7%	73.3%	65.0%	56.7%	57.9%	40.0%	55.0%	55.0%	55.0%
Other Income	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adjusted EBIT	(\$25.0)	(\$26.0)	(\$28.0)	(\$32.0)	(\$20.0)	\$38.0	\$122.5	\$184.5	\$255.0	\$332.5	\$420.0	\$507.5	\$582.0	\$680.0	\$801.0	\$885.0	\$1,015.0	\$1,180.0	\$1,225.0	\$550.0	\$325.0	\$170.0	\$115.0	\$40.0	\$55.0	\$55.0

Source: Cowen and Company.

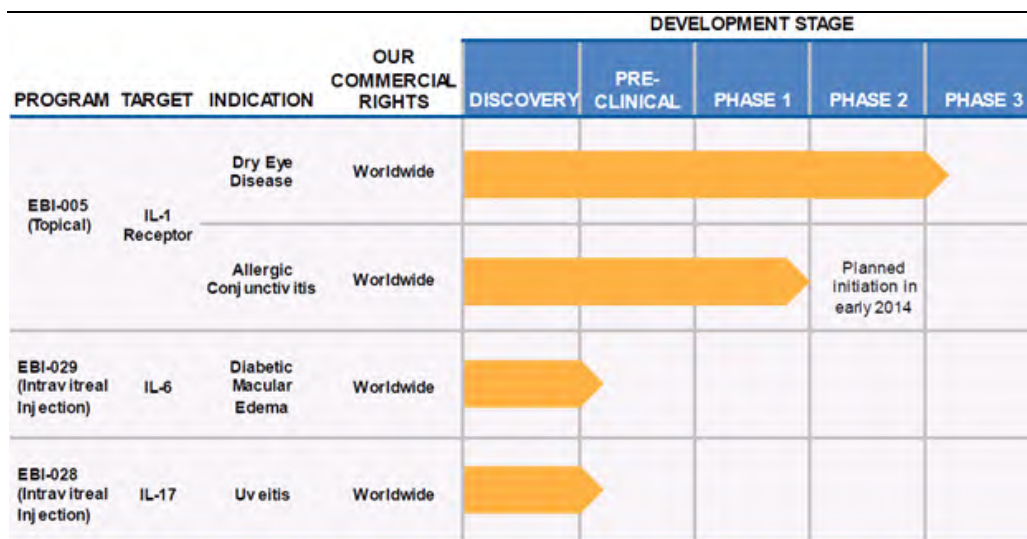


## Eleven Biotherapeutics – Designing Proteins Optimized To Address Ocular Surface Diseases

EBI-005 was formulated using a comfortable and well-tolerated vehicle, which we believe is critically important for such a product. It also has a dual mechanism of action that addresses both the signs and symptoms of DED. Additionally, EBI-005 is preservative-free and stable at room temperature for at least 5 months, which is a necessary characteristic for commercialization.

Eleven uses its propriety AMP-Rx protein engineering platform to develop product candidates for ocular surface diseases. Specifically, the Company's pipeline of protein therapeutics leverages what is known about cytokine biology to target current unmet needs in various ocular surface diseases. EBI-005 is the Company's lead drug candidate in Phase III development for DED and Phase II development for allergic conjunctivitis (AC). EBI-005 was formulated using a comfortable and well-tolerated vehicle, which we believe is critically important for such a product. It also has a dual mechanism of action that addresses both the signs and symptoms of DED. Additionally, EBI-005 is preservative-free and stable at room temperature for at least 5 months, which is a necessary characteristic for commercialization. The first pivotal Phase III study for EBI-005 in DED was just initiated in February and a Phase II study initiation in AC should occur shortly. If/when granted, EBI-005 has composition of matter patent coverage through 2031 (formulation to 2034), which clearly would provide a long duration asset if successfully developed. The Company also has early-stage preclinical programs in diabetic macular edema (DME; EBI-029) and uveitis (EBI-028). Eleven maintains global rights to all of its development programs, which we believe could provide future licensing/partnering opportunities and additional capital – at least for ex-US territories. We fully expect Eleven to commercialize EBI-005 in the US with a targeted, specialty sales force, if approved. We also believe that Eleven's proprietary AMP-Rx protein engineering platform could generate additional partnerships and capital. Precedent for this is Eleven's collaboration with ThromboGenics, the makers of JETREA (ocriplasmin) for the symptoms of vitreomacular adhesion (VMA). With this collaboration, Eleven is applying its AMP-Rx protein engineering platform to generate protein therapeutics that can modulate a specific undisclosed novel pathway in retinal disease. Furthermore, we believe Eleven possesses a strong management team with relevant experience in Ophthalmology (Novartis, Genentech, Regeneron, Tufts Medical Center and New England Eye Center) and we believe that management has a number of ways to successfully execute on the Company's clinical development plans.

Figure 4 Eleven's Development Pipeline Is Led By EBI-005



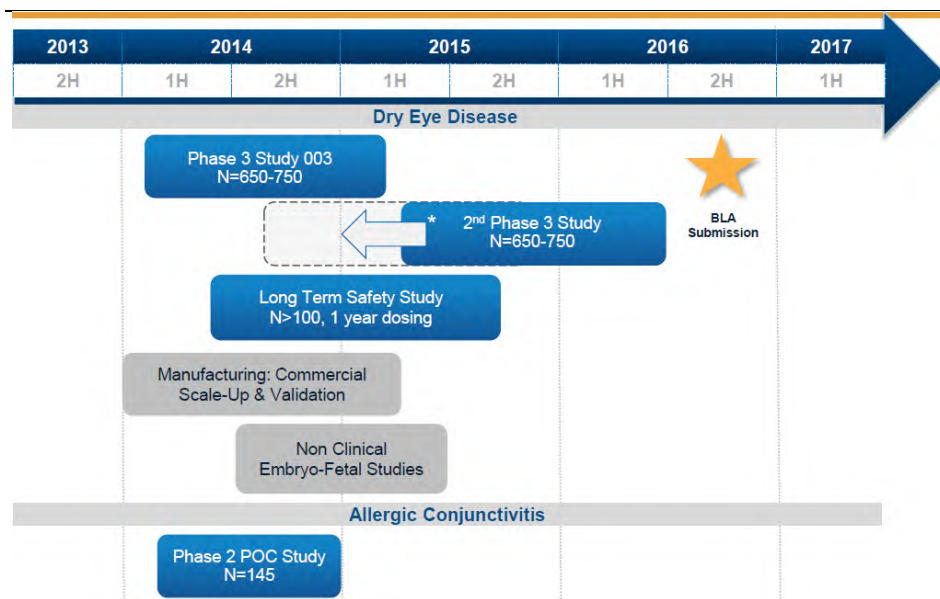
Source: Company Reports; modified by Cowen and Company

This should all set Eleven up for an EBI-005 BLA submission by the end of 2016 at the latest, assuming everything goes according to plan and EBI-005 is successfully developed for DED.

Specifically for EBI-005, the first Phase III pivotal dry eye trial should report data in the first half of 2015. The second Phase III pivotal study should be initiated shortly after the first study reads out, but the Company is retaining the option of potentially initiating it earlier. Given the difficulty of dry eye studies, we view this sequential study design as prudent given that additional learning could occur with the first Phase III results which would allow for modifications if necessary. For instance, if for whatever reason, one co-primary endpoint hit in the first Phase III study and the second co-primary endpoint did not, this would allow the company to potentially further patient enrich or somewhat alter the trial design for its second Phase III. This occurred with Shire's still ongoing development for Lifitegrast where the FDA did allow the changing of the symptoms endpoint in its second Phase III. It does appear from conversations with our consultants that the FDA (specifically Deputy Director Wiley Chambers) might be more amenable to looking at the "totality of the data" from Phase III programs. In addition to the Phase III program, commercial scale-up and validation and non-clinical reproductive studies will occur concurrently in the 2014/2015 timeframe. This should allow for an EBI-005 BLA submission by the end of 2016 at the latest.

EBI-005's second clinical program, in allergic conjunctivitis, should begin a Phase II study shortly with data readout by year-end 2014/early 2015. We imagine the decision to advance the program into Phase III will occur at that time.

Figure 5 EBI-005 Clinical Development Timeline



Source: Company Reports

Currently, the only FDA-approved prescription drug for dry eye patients is Restasis. However, our consultants note that Restasis does have tolerability issues resulting in burning/stinging and irritation post administration for some patients. This results in roughly a 50% turnover (by prescriptions) of Restasis patients. Therefore, our consultants suggest that if a new product were to reach the market and be superior to Restasis on the efficacy or tolerability front, which should not be difficult, then the dry eye market could be larger than the current \$2-3B per year

## EBI-005, A Novel Protein Designed Specifically To Address The Signs and Symptoms Of Dry Eye Disease

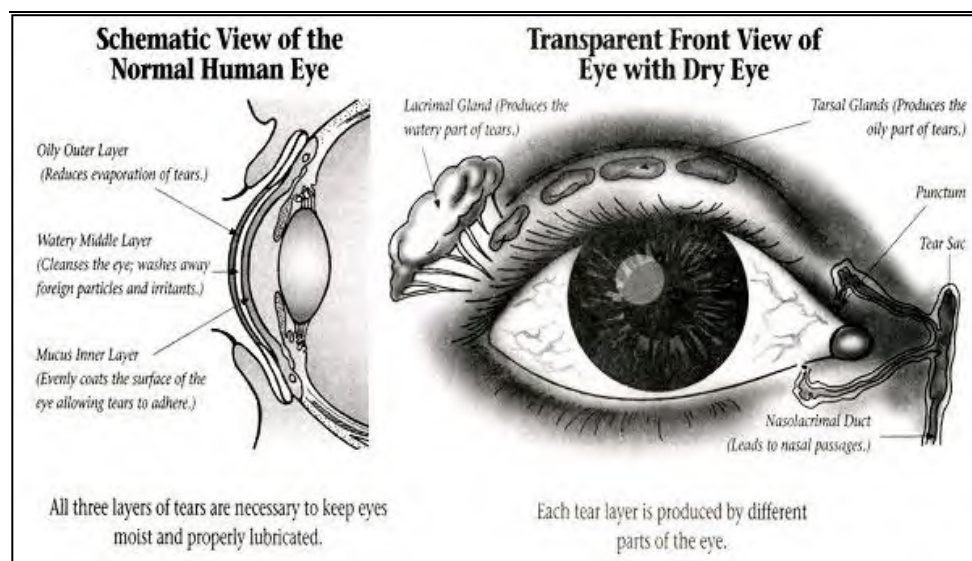
Dry eye disease is typically defined as a chronic deficiency of moisture in the eye, and is usually caused by inadequate tear production and/or a change in tear composition that leads to rapid evaporation. The drying of the ocular surface causes itching and irritation, and may lead to corneal damage. Dry eye often is associated with certain autoimmune diseases, including hypergamma-globulinemia (abnormally high blood



levels of antibodies) and rheumatoid arthritis. Prior to the launch of Allergan's Restasis (cyclosporine ophthalmic emulsion; modulates T-cell activation) in April 2003, dry eye treatment options were limited to over-the-counter artificial tear products, which remain the first-line therapy. However, OTC artificial tear products provide only short-term symptom relief, and do not provide adequate protection against potential corneal damage, leaving the market open to new, more efficacious treatments. Off-label steroids may also be used to initiate therapy, but physicians are reluctant to use them long-term given steroids have associated detrimental side effects. For more severe dry eye, silicone plugs may be inserted in the lacrimal (tear) ducts to prevent tear drainage.

As noted earlier, the only FDA-approved prescription drug for dry eye patients is Restasis. However, our consultants note that Restasis does have tolerability issues resulting in burning/stinging and irritation post administration for some users. This results in roughly a 50% turnover (by prescriptions) of Restasis patients. Therefore, our consultants suggest that if a new product were to reach the market and be superior to Restasis on the efficacy or tolerability front, (which should not be difficult), then the dry eye market could be larger than the current \$1B per year that Restasis currently captures (potentially by 3-4x). A number of dry eye drugs are currently in development including Eleven's EBI-005 in Phase III, Shire's Lifitegrast in Phase III, Acucela's/Otsuka's rebamipide in Phase III, Mimetogen's/Bausche + Lomb's MIM-D3 in Phase III, Ophthalix' CF101 in Phase III, Rigel's R9348 in Phase II, and Allergan's AGN-195263 in Phase II. However, if the protracted regulatory path of Inspire's Prolacria (diquafosol) is any indication, challenges along the way are almost guaranteed to arise – and it does appear that Eleven has the most elegant approach. And as we discuss later in this report, the regulatory landscape for these drugs does appear to be improving, which bodes well for Eleven. Lastly, our consultants suggest that different drugs may be required to block the various components of the inflammatory cascade and therefore, they believe that the market has both needs and room for multiple drugs with different mechanisms of action, potentially used in combination.

Figure 6 Dry Eye Disease Schematic



Source: Cowen and Company; [www.prof-vision.com](http://www.prof-vision.com)

Eleven estimates that the global dry eye patient population is 68MM (26MM with moderate to severe DED). 19MM people are in the US, with 7MM of them being moderate to severe. Our consultants still see a “big market” for products in development like EBI-005 and lifitegrast – even with a potential generic Restasis (which we don’t believe will come anytime soon) – even with another product reaching the market.

### Dry Eye Disease Is a Severely Underserved Market

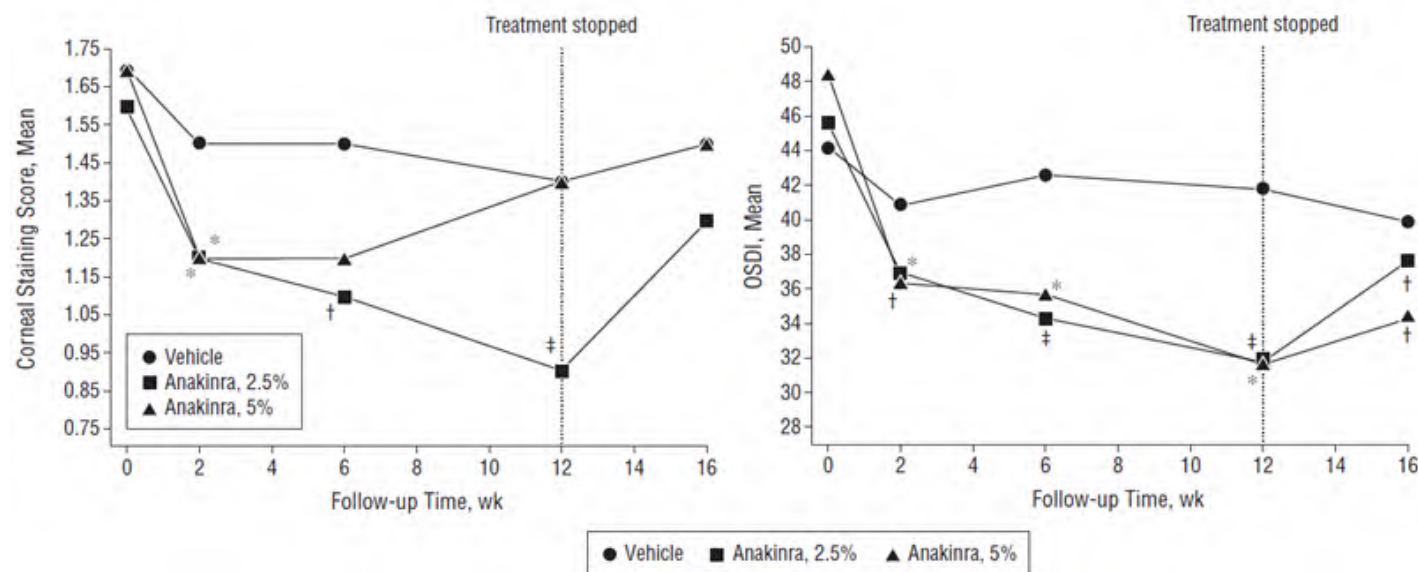
Dry eye disease is one of the leading causes of patient visits to eye care professionals. Furthermore, dry eye is a ubiquitous problem being driven by our aging population and increasing co-morbidities and our consultants suggest that 75-80% of the population has some level of dry eye symptoms. It is almost guaranteed that 75% of Americans over age 65 will experience episodes of dry eye: post-menopausal women, Asians, and Hispanics are the sub-populations most likely to experience symptoms. Eleven estimates that the global dry eye patient population is 68MM (26MM with moderate to severe DED). 19MM people are in the US, with 7MM of them being moderate to severe. Our consultants still see a “big market” for products in development like EBI-005 and Shire’s Lifitegrast.

Topical anakinra (2.5%; compounded in artificial tears) administered over 12 weeks was safe, well-tolerated, and reduced signs (mean corneal staining) and symptoms (mean OSDI). Also, Eleven conducted a retrospective analysis with the data that showed a statistically significant separation between anakinra and vehicle on the painful or sore eyes question of the OSDI scale – EBI-005’s Phase III clinical co-primary endpoint. Thus, the basis for developing a novel IL-1 antagonist (EBI-005) for DED patients was formed.

### Topical IL-1 Receptor Antagonist, Anakinra, Reduces Signs and Symptoms And Serves As The Basis For EBI-005 Development

Initial research conducted by Eleven’s scientific Co-founder, Reza Dana, MD, from the Schepens Eye Research Institute, Massachusetts Eye and Ear Infirmary, and Harvard’s Department of Ophthalmology, formed the basis for development of EBI-005. During his research, Dr. Dana hypothesized that by targeting IL-1, he could affect the immunopathic mechanisms that result in the signs and symptoms of dry eye disease. Anakinra, is a recombinant, nonglycosylated form of the human interleukin-1 receptor antagonist (IL-1Ra) marketed under the name, Kineret, by Amgen for moderate to severe rheumatoid arthritis. Hence, he aimed to test anakinra’s effect on DED patients in a Phase I/II study (published in JAMA; Amaparo et. al. JAMA Ophthal April 2013). In 75 patients with refractory DED associated with meibomian gland dysfunction, while not statistically significant (most likely due to the small study size), topical anakinra (2.5%; compounded in artificial tears) administered over 12 weeks was safe, well-tolerated, and reduced signs (mean corneal staining) and symptoms (mean OSDI). Also, Eleven conducted a retrospective analysis with the data that showed a *statistically significant* separation between anakinra and vehicle on the painful or sore eyes question of the OSDI scale – EBI-005’s Phase III clinical co-primary endpoint. Thus, the basis for developing a novel IL-1 antagonist (EBI-005) for DED patients was formed. We would note that while EBI-005 and anakinra’s ability to inhibit IL-1 has not been directly compared, later in the report we discuss that EBI-005 has demonstrated a 10-fold increased potency when compared to IL-1Ra (similar to anakinra) in preclinical studies, so EBI-005 is likely a much more potent IL-1 inhibitor than anakinra.

Figure 7 Signs And Symptoms Data Of Anakinra In Dry Eye Disease



Source: JAMA Ophthalmol. 2013;131(6):715-723

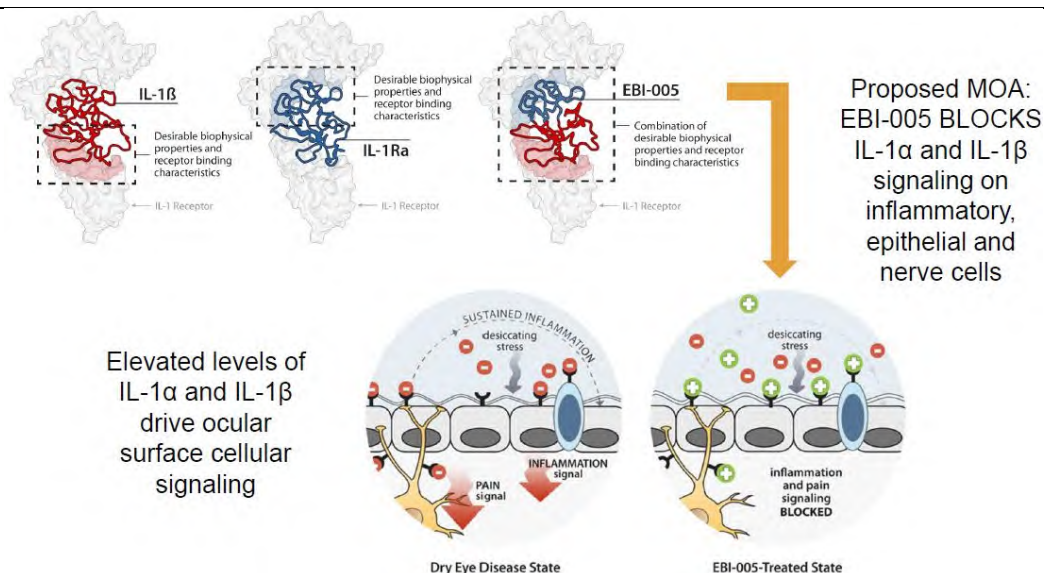
#### EBI-005, A Potent IL-1 Inhibitor, Was Designed Using Eleven's AMP-Rx Platform

Eleven's AMP-Rx protein engineering platform uses an efficient process relative to the traditional stepwise approach. The traditional stepwise approach involves: (1) library generation/epitope production; (2) screen and selection; (3) library screening; (4) more screening and selection; (5) empirical binding/activity maturation; (6) more screening and selection; (7) immunogenicity evaluation; (8) and again, more screening and selection; and finally, (9) productivity optimization/stability optimization/delivery optimization. Eleven is differentiated as its simultaneous AMP-Rx approach removes some of the intermediate steps, particularly all of the separate screen and selection processes which can take a significant amount of time: (1) choice of optimal protein scaffold; (2) computational library construction; (3) unbiased binding/activity maturation; (4) immunoprediction; (5) and global CMC optimization (production, stability, and delivery) – the number of steps are almost cut in half. Forms of proteins such as antibodies, enzymes, soluble receptors, and signaling proteins can be selected and optimized. Additionally, these proteins are able to be designed with rapid onset of action, increased half-life, and improved ocular surface retention in mind. Also, they have favorable manufacturing characteristics such as high production yield and improved solubility and thermal stability.

For EBI-005, the AMP-Rx platform was used to create a protein with the optimal biophysical properties and receptor binding characteristics to bind the IL-1 receptor.

For EBI-005, the AMP-Rx platform was used to create a protein with the optimal biophysical properties and receptor binding characteristics to bind the IL-1 receptor. The IL-1 family is a group of 11 cytokines that induce many proinflammatory cytokines and regulate and initiate inflammatory responses. This is similar to Restasis or lifitegrast, which acts to modulate T-cell activation, or the immune response. These characteristics appear to mimic IL-1 $\beta$  and IL-1Ra, which are well-known IL-1 receptor antagonists and block IL-1 $\alpha$  and IL-1 $\beta$  signaling on inflammatory, epithelial, and nerve cells. EBI-005 is essentially a chimera of sequences from both of these molecules (IL-1 $\beta$  and IL-1Ra). Elevated levels of IL-1 $\alpha$  and IL-1 $\beta$  have been shown to drive ocular surface cell signaling and ultimately, inflammation and pain.

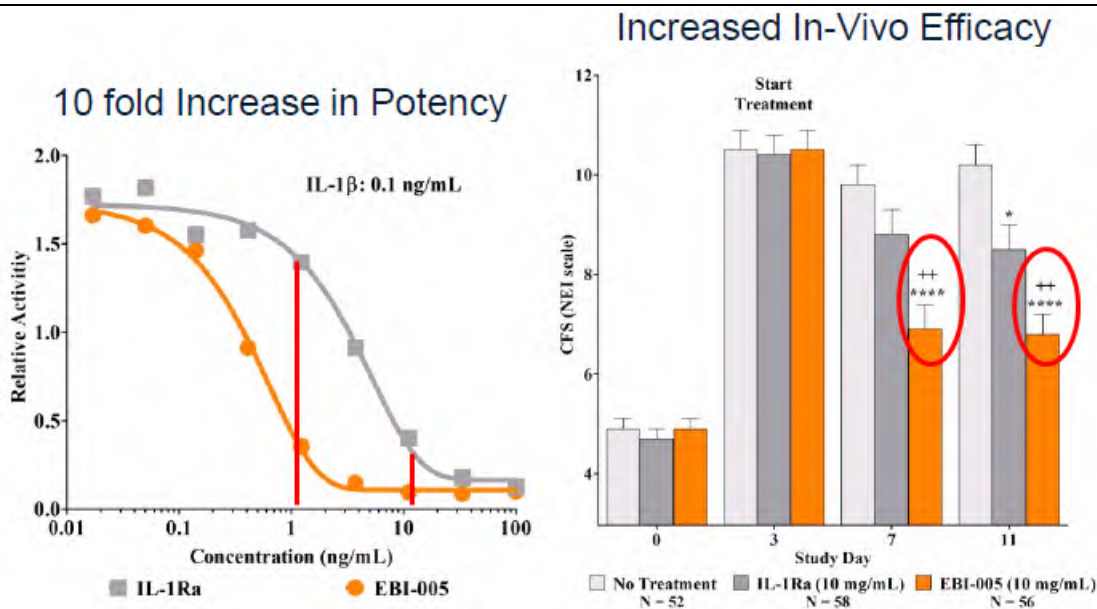
Figure 8 EBI-005 Was Created Using The AMP-Rx Protein Engineering Platform



Source: Company Reports

To confirm the IL-1 antagonistic effect of EBI-005, Eleven conducted *in vitro* preclinical studies. Below, EBI-005 demonstrated a 10-fold increase in potency with respect to inhibiting IL-1 relative to IL-1Ra (similar to anakinra), a well-known IL-1 receptor antagonist. *In vivo* (in animals), EBI-005 also had a statistically significant increase in IL-1 inhibition relative to IL-1Ra. Clearly, Eleven has successfully designed a protein – EBI-005 in this case – that is a better, and more potent IL-1 receptor antagonist.

Figure 9 Preclinical Data Demonstrating IL-1 Inhibition



Source: Company Reports



## EBI-005's Dual Mechanism of Action Targets Both Inflammation and Pain

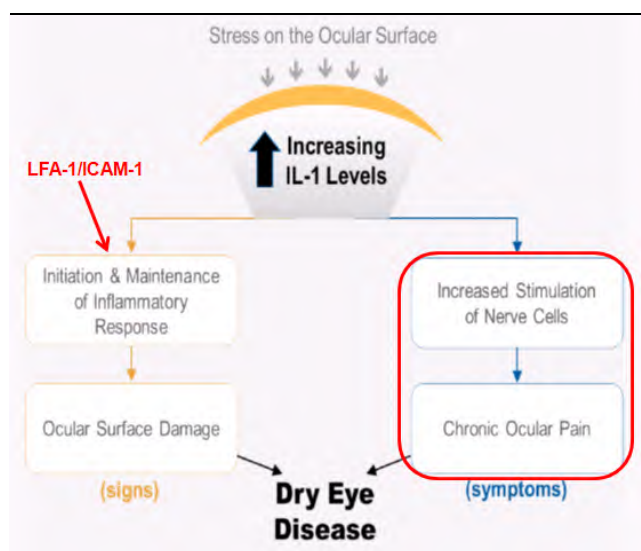
With respect to dry eye disease, scientists believe that a major contributing factor towards the development of the disorder is from inflammation caused by T-cell infiltration, proliferation, and inflammatory cytokine production (IL-1, etc.) that can lead to reduction in tear film quality and ocular surface damage. Patients with dry eye disease typically experience ocular discomfort and pain, eye dryness, and tear film instability due to decreased quality of quantity of tears – these are the symptoms Eleven aims to address with EBI-005.

However, EBI-005 differs from lifitegrast in that it also affects nociception, or pain. Since IL-1 has a broader mechanism of action and is higher up in the signaling cascade than LFA-1/ICAM-1, it also inhibits increased stimulation of nerve cells and ultimately, reduces chronic ocular pain. Our consultants believe that this affect could be significant for treating dry eye patients and potentially differentiate the product from lifitegrast if successfully developed and approved.

### Targeting IL-1 Leads To A Broad Clinical Effect

EBI-005 is a recombinant protein and topically administered IL-1 inhibitor that acts by inhibiting both inflammation (immune response; T-cell activation) and nociception (pain). Increased IL-1 levels are caused from stress on the ocular surface, which initiates and maintains an inflammatory response leading to ocular surface damage. Increased levels of IL-1 also lead to increased stimulation of nerve cells, which causes chronic ocular pain. Therefore, by inhibiting the body's immune response in the eye and reducing inflammation, dry eye symptoms should improve, while inhibiting nociception will work in parallel to ameliorate the pain and discomfort associated with dry eye. Similarly, Shire's lifitegrast reduces chronic inflammation by inhibiting LFA-1/ICAM-1 binding, thereby breaking the cycle of chronic T-cell mediated inflammation. LFA-1/ICAM-1 binding influences T-cell activation, mobility, and cytokine release. Interestingly, LFA-1/ICAM-1 is further down in the inflammatory cascade than IL-1 and IL-1 can actually induce ICAM-1 activity. Hence, both EBI-005 and Lifitegrast – EBI-005's main competition as far as other drugs currently in development – affect the same inflammation pathway. However, EBI-005 differs from Lifitegrast in that it also affects nociception, or pain. Since IL-1 has a broader mechanism of action and is higher up in the signaling cascade than LFA-1/ICAM-1, it also inhibits increased stimulation of nerve cells and ultimately, reduces chronic ocular pain. Our consultants believe that this affect could be significant for treating dry eye patients and potentially differentiate the product from lifitegrast if successfully developed and approved.

Figure 10 EBI-005 Mechanism Of Action



Source: Company Reports

## Clinical Development in Dry Eye Has Been Difficult, but Regulatory Hurdles for Dry Eye Products Appear To Have Lowered, Opening Up New Opportunity

Over the past decade, dry eye products have had a fairly high clinical/regulatory failure rate for a variety of reasons. However, our consultants indicate that the key reason is an “unreasonably high” regulatory hurdle of achieving success on both co-primary endpoints of improvement in dry eye signs and symptoms. For reference once again, a “sign” is an endpoint observed by the doctor such as dry spots or corneal staining, while a “symptom” is something reported/observed by the patient, so while a patient may look better per the treating physician, they may not always “feel better.” Historically, no company has been able to achieve success on both endpoints and gain regulatory approval. This may be partially due to the fact that many physicians believe that there is not a tight correlation between the two.

Allergan’s Restasis, the only approved product on the market, achieved regulatory clearance on the basis of a signs endpoint of an increase in Schirmer wetting, which we – and our consultants – argue would not be accepted in the current regulatory environment if it was up for approval today. Specifically, the Schirmer wetting test measures tear production via a paper strip – not symptoms – which our consultants indicate calls into question its accuracy and is believed to be a “very non-reproducible” test. Even Restasis, the only approved product on the market, had a difficult time in development as Allergan received an approvable letter initially in 1999 before a later 2002 approval and early 2003 launch.

### Inspire’s Prolacria Program Discontinued After an Exhaustive Development Program And Multiple Changed Endpoints

Despite it being considered a good drug, we believe the spectacular regulatory failure of Prolacria in the US highlights the true difficulty of the regulatory hurdles that need to be overcome in dry eye development. However, these hurdles appear to be lowering.

Prolacria (diquafosol) is a P2Y2 receptor agonist that is believed to stimulate the release of natural tear-film components: water, salt, mucins, and lipids. In December 2005, Inspire announced the receipt of a second FDA “approvable” letter for the Prolacria NDA. In the approvable letter, the FDA noted that “the submitted clinical studies...are inadequate to demonstrate efficacy. Based on our review of the submitted data, consistent findings of corneal clearing need to be demonstrated to support the efficacy of the drug product.” Inspire met with the FDA multiple times to discuss Prolacria following the second “approvable” letter, arguing that complete clearing of the central cornea is a valid measure of efficacy in dry eye. Prolacria successfully achieved this endpoint in an earlier Phase III trial, but the primary endpoint of the trial, which Prolacria missed, was complete clearing of the entire cornea (five regions, not just the central region). Inspire hired a CRO to conduct a “validation exercise” to support the use of central corneal clearing as a clinical efficacy endpoint for dry eye. An SPA agreement with the FDA and the fourth Phase III trial, which used central corneal clearing as the primary endpoint, was the result of this validation. Eventually in January 2010, after an exhaustive development effort in conjunction with Allergan, Inspire announced the failure of the Company’s final Phase III Prolacria study and later in August 2010, announced that development would be discontinued. Today, Prolacria is sold in Japan and apparently, our physician consultants still believe that it is a good drug for treating dry eye. Despite it being considered a good drug, we believe the spectacular regulatory failure of Prolacria in the US highlights the true difficulty of the regulatory hurdles that need to be overcome in dry eye development. However, these hurdles appear to be lowering.

### Paving the Way – A Significant Change In Regulatory Stance Appears To Have Been Initiated Recently By Lifitegrast Development – Eleven Stands To Benefit

Even though the FDA seemed somewhat flexible with the endpoints during Inspire’s Prolacria Phase III development program, real significant changes in regulatory stance



have not occurred until recently with the development of lifitegrast. As for Shire's Lifitegrast, OPUS-1 was a Phase III safety and efficacy study that concluded in 2012 and met the co-primary endpoint of reducing signs of dry eye (inferior corneal fluorescein staining), while the other co-primary endpoint of reducing symptoms (visual-related function subscale of OSDI) was not achieved. Despite the missed symptoms endpoint in OPUS-1, the FDA, in accordance with Shire/SARcode, agreed that the Phase III program should continue which provides some increased confidence in the agency's initial view of the product. Following OPUS-1, Shire/SARcode initiated OPUS-2, which is a safety and efficacy study measuring both signs (inferior corneal staining score; which is the same as the first study) and symptoms of dry eye disease (patient-reported dryness score; which is a new endpoint). We discuss this changed endpoint in detail below, but at first glance, it appeared that it may be more achievable (and it was as demonstrated by the positive OPUS-2 results) than the visual-related function subscale of OSDI (4/12 questions of the OSDI scale), which was the co-primary endpoint used – and not achieved – in OPUS-1.

Interestingly, management indicated that the FDA agreed on this new symptoms endpoint. One consultant was “shocked” with the FDA's flexibility on this endpoint given their history, and believes that the FDA may becoming a “little more lenient,” and noted that “eye dryness” as a specific symptomatic endpoint was a “big achievement.”

Ultimately, with all the necessary caveats noted, it does appear to us and our consultants that the recent flexibility with dry eye trial designs could suggest that the regulatory environment is improving and that the chance of success for drugs in development for dry eye disease is increased.

In general, CFS seems to be a more achievable endpoint than symptoms endpoints. We would also note that our physician consultants believe that total CFS, as opposed to just central or inferior, seems to provide for a more consistent and accurate measure as it measures the whole eye and patients can have staining in different regions of their eye.

Most importantly, the new more simple and direct symptoms endpoint (relative to the full OSDI scale below), “patient-reported dryness score,” led our physician consultants to believe the probability for clinical success in OPUS-2 could be increased. In fact, they were partially correct as Shire did achieve success on the co-primary endpoint of patient-reported eye dryness score in OPUS-2 (Lifitegrast also achieved success on this measure as a secondary endpoint in the initial OPUS-1 study). Interestingly, management indicated that the FDA agreed on this new symptoms endpoint. One consultant was “shocked” with the FDA's flexibility on this endpoint given their history, and believes that the FDA may becoming a “little more lenient,” and noted that “eye dryness” as a specific symptomatic endpoint was a “big achievement.” We were not surprised to learn that this change in stance regarded a symptomatic endpoint as Prolacria – in addition to Lifitegrast – have historically had little success on symptoms, when compared to signs.

As we discuss below, the FDA seems to have taken a similar stance with the EBI-005 development program as the co-primary symptoms endpoint for Phase III development is a single question from the ocular surface disease index (OSDI) scale. This is a single, more direct, symptom-related question that is similar to lifitegrast's patient-reported eye dryness endpoint. Hence, Eleven appears to have benefitted from Prolacria's failures and SARcode's/Shire's headaches. Ultimately, with all the necessary caveats noted, it does appear to us and our consultants that the recent flexibility with dry eye trial designs could suggest that the regulatory environment is improving and that the chance of success for drugs in development for dry eye disease is increased. Our consultants have long indicated that eventually the FDA would have to accept a symptoms endpoint for dry eye trials, which simply asks the patient if their eyes feel more or less dry/painful/sore – and we believe this was the case with OPUS-2 and is also the case with EBI-005's Phase III program.

#### Scoring The Signs And Symptoms Of Dry Eye Disease – EBI-005's Phase III Endpoints Appear Favorable

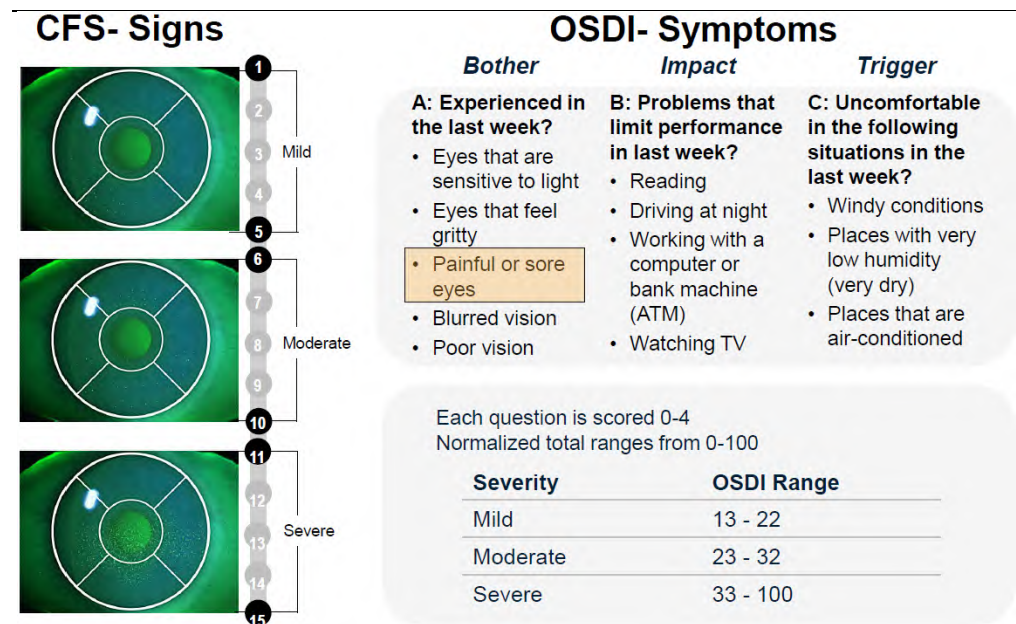
For EBI-005's Phase III development program, the two co-primary signs and symptoms endpoints are total corneal fluorescein staining (CFS) and the painful or sore eyes question from the OSDI scale, respectively. Eleven met with the FDA and during the End of Phase II meeting, came to an agreement on these endpoints. For total CFS, all five regions of the eye (central, inferior, superior, nasal, and temporal) are measured to account for a score that ranges from 1-15 (NEI Scale). A score of 1-5 is considered mild, 6-10 is moderate, and 11-15 is severe dry eye. In general, CFS seems to be a more achievable endpoint than symptoms endpoints. We would also note that our

In general, our consultants believe that a single symptom endpoint, as opposed to measuring 3, 4, or even 12 symptoms as in the full OSDI scale, is a very positive development.

physician consultants believe that total CFS, as opposed to just central or inferior, seems to provide for a more consistent and accurate measure as it measures the whole eye and patients can have staining in different regions of their eye. While the vast majority of Lifitegrast's staining data was positive, it did miss on *inferior* corneal (the bottom portion below the eyelid) staining in the second OPUS-2 Phase III study – hence, total CFS may have been a more reliable endpoint (we would also note that the magnitude of improvement in staining was only 3% leading to the miss as well). Put simply, our physician consultants are positive on using total CFS for the co-primary signs endpoint.

Regarding the symptoms endpoint, we – and our physician consultants – believe that using a more direct, single question (painful or sore eyes) to measure symptoms is a more reliable endpoint, which introduces less subjectivity and variability in responses. Patient will simply be asked, on a scale of 0–4, whether or not pain and soreness associated with their dry eye has improved. Potentially questions could be: (1) today and the last 7 days, how is your eye pain or soreness feeling? or (2) describe on the scale (0–4) how much pain and soreness you feel. The patients do this every visit, so they should interpret the scale relatively consistently. In general, our consultants believe that a single symptom endpoint, as opposed to measuring 3, 4, or even 12 symptoms as in the full OSDI scale, is a very positive development. This is in contrast to the full OSDI scale, which as seen below, introduces a whole host of other functional and indirect questions that frankly probably confuse patients and provide for a less reliable measurement of symptoms. Patients tend to confuse symptom terminology with one another. For example, two patients may have the same sensation, but one may refer to it as “blurred vision,” while the other refers to it as “poor vision.” Therefore, when a single patient is reporting up to 12 symptoms, our consultants note that they easily confuse them with each other effectively confounding the study results. Sometimes, they will report the worst symptom and downplay the others.

Figure 11 Scoring Signs And Symptoms Of Dry Eye Disease

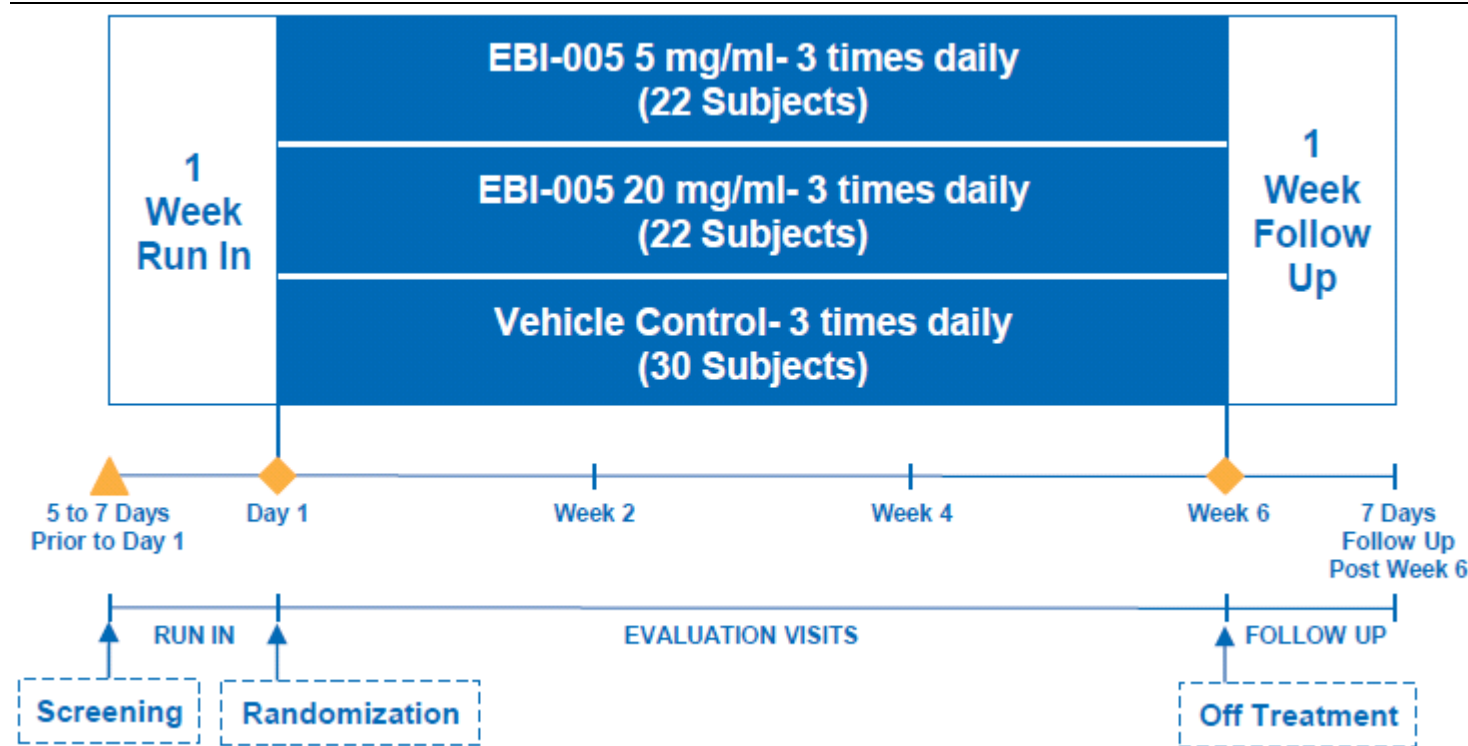


Source: Company Reports

## EBI-005's Phase I/II Data Demonstrates a Strong Magnitude of Effect on Signs and Symptoms

Eleven conducted a Phase Ib/IIa study (EBI-005-2) with EBI-005 and achieved a strong magnitude of effect on signs and symptoms. This was a natural environment (as opposed to using the Ora controlled adverse environment, which Eleven believes can artificially introduce symptoms) study conducted in 8 centers with 74 patients, which was double-masked, vehicle-controlled, and randomized. The objectives of the study were to examine dose selection, signs (total CFS), symptoms by OSDI (including eye pain and soreness), artificial tear use, and safety and tolerability. Patients were screened for moderate to severe CFS and OSDI scores and rescue tear use was allowed. An analysis of the combined dose arms (5 mg/mL TID and 20 mg/mL TID) was pre-defined for treatment over 6 weeks.

Figure 12 Phase I/II Trial Design Of EBI-005-2 Study



Source: Company Reports

### Total Corneal Fluorescein Staining Scores Show 33-39% Improvement from Baseline

Eleven also conducted an analysis of "EE50 Population" patients, which showed a 39% change in total CFS from baseline and a clear separation from placebo at week 6. The magnitude of these results is particularly impressive when you consider that Lifitegrast demonstrated less than a 5% reduction (p-value= 0.0148) in total corneal staining in the Phase III OPUS-1 study.

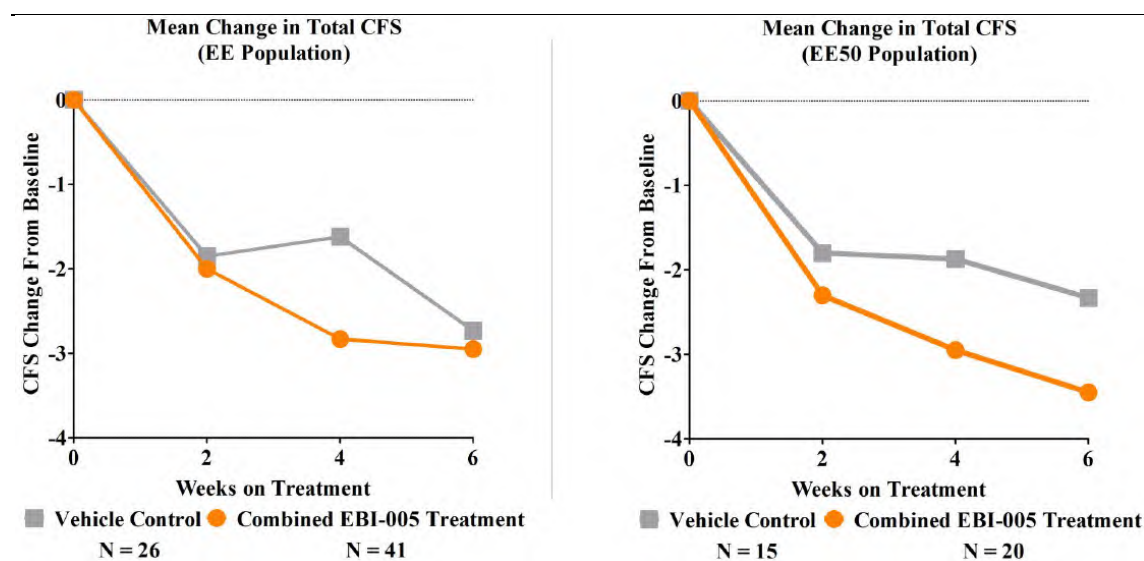
For total CFS, the planned Phase III co-primary signs endpoint, combined EBI-005 treatment (5 mg/mL TID and 20 mg/mL TID) demonstrated a 33% change from baseline. While separation occurred rapidly starting at 2 weeks, similarly to lifitegrast's Phase III data, at 6 weeks EBI-005 resulted in a similar effect to placebo. However, Eleven also conducted an analysis of "EE50 Population" patients, which showed a 39% change in total CFS from baseline and a clear separation from placebo at week 6. The magnitude of these results is particularly impressive when you consider that Lifitegrast demonstrated less than a 5% reduction (p-value= 0.0148) in total corneal staining in the Phase III OPUS-1 study. While we would caution one from making cross-trial comparisons as OPUS-1 was much larger, had a different design (longer time interval,

etc.), and the endpoint was measured on a different scale (Ora scale, 0-12 vs. Eleven's NEI, 0-15), we still believe the EBI-005 magnitude of improvement relative to what was observed in OPUS-1 is impressive.

As shown previously, the OSDI scale is scored based upon 12 questions (bother, impact, and trigger) each scored from 0-4 and the total score is normalized to a range of 0-100. A score of 13-22 on the OSDI is considered mild, while 23-32 is moderate, and 33-100 is severe. Hence, the "EE50 Population" (OSDI = 19-50) defined patients, which are scored as 50 or less on the OSDI scale, but more than 19 to limit the least mild patients. This still includes mild (but not too mild), moderate, and severe patients, but excludes the extremely severe patients (51-100). The dry eye patient population is large and consultants state it is very heterogeneous and as discussed above, companies have had to adapt to new endpoints for this population and even be careful about how they define the patients that are enrolled into studies. Consultants have noted that enriching for more severe patients in OPUS-2 may have caused the signs failure when all other previous signs data (conducted with less severe patients) was otherwise positive. Also, Eleven noted that in the Phase I/II study, greater variability in results was observed among patients who had an OSDI score greater than or equal to 50. Therefore, we believe that Eleven's observations and inclusion of the EE50 patient population is a sound strategy and consistent with what has been observed with the lifitegrast experience. The patients enrolled in the Phase III program will be considered part of the EE50 population.

While the magnitude of improvement in these results are impressive, would note that these results were not statistically significant. This is most likely due to the small number of patients in the study and we expect the Phase III studies, which are much larger, to be sufficiently powered. The important takeaway from this study is that the magnitude of effect of the earlier results observed with anakinra treatment was confirmed and that these results justify conducting future, larger-scale clinical trials, which are already ongoing.

Figure 13 EBI-005-2 Signs Data – Total Corneal Staining



Source: Company Reports

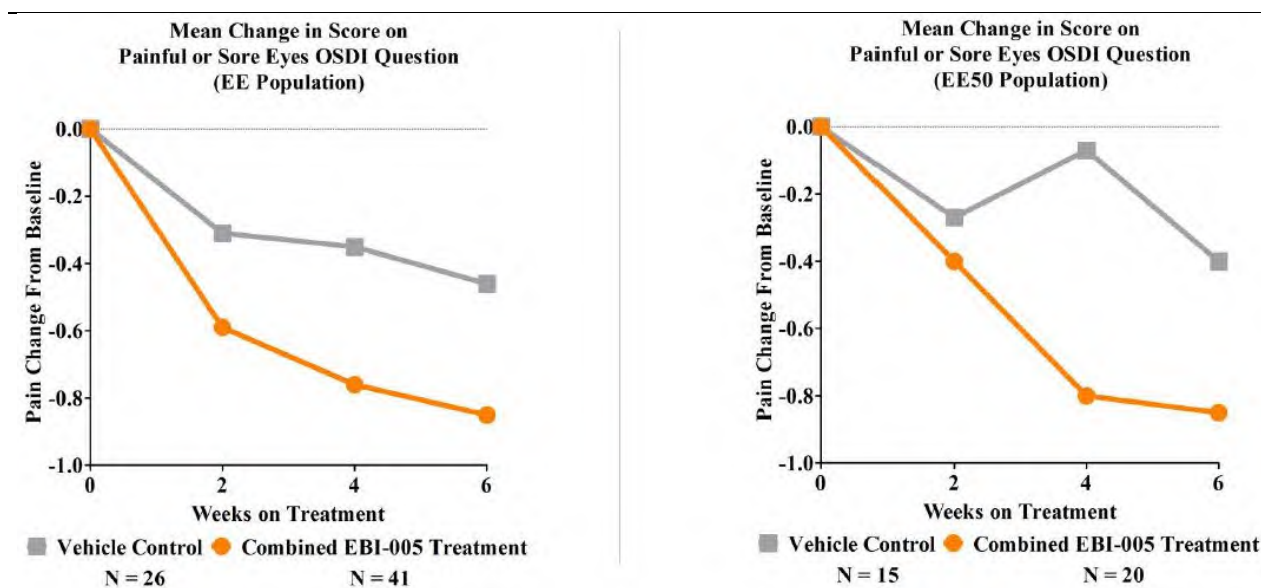


For the other endpoint, the painful or sore eyes question on the OSDI that will be the co-primary symptoms endpoint in the EBI-005 Phase III program, an impressive magnitude of effect was also observed. In the total study population, EBI-005 treatment resulted in a 46% change from baseline and in the EE50 patient population, a 61% change from baseline was observed.

### EBI-005's Effect on Symptoms (Painful/Sore Eyes) Is Even More Impressive

For the other endpoint, the painful or sore eyes question on the OSDI that will be the co-primary symptoms endpoint in the EBI-005 Phase III program, an impressive magnitude of effect was also observed. In the total study population, EBI-005 treatment resulted in a 46% change from baseline and in the EE50 patient population, a 61% change from baseline was observed. These results were also not statistically significant – again, most likely due to the small study size. Still, when comparing these results to lifitegrast's OPUS-1 ocular discomfort results (15% change from baseline in ITT population, p-value= 0.0273; 25% change from baseline in artificial tears population, p-value= 0.0001) – which again must be interpreted with caution as the endpoints are measured a different way (Ora scale; 0-4) and the studies are designed differently – the relative magnitude of improvement is impressive.

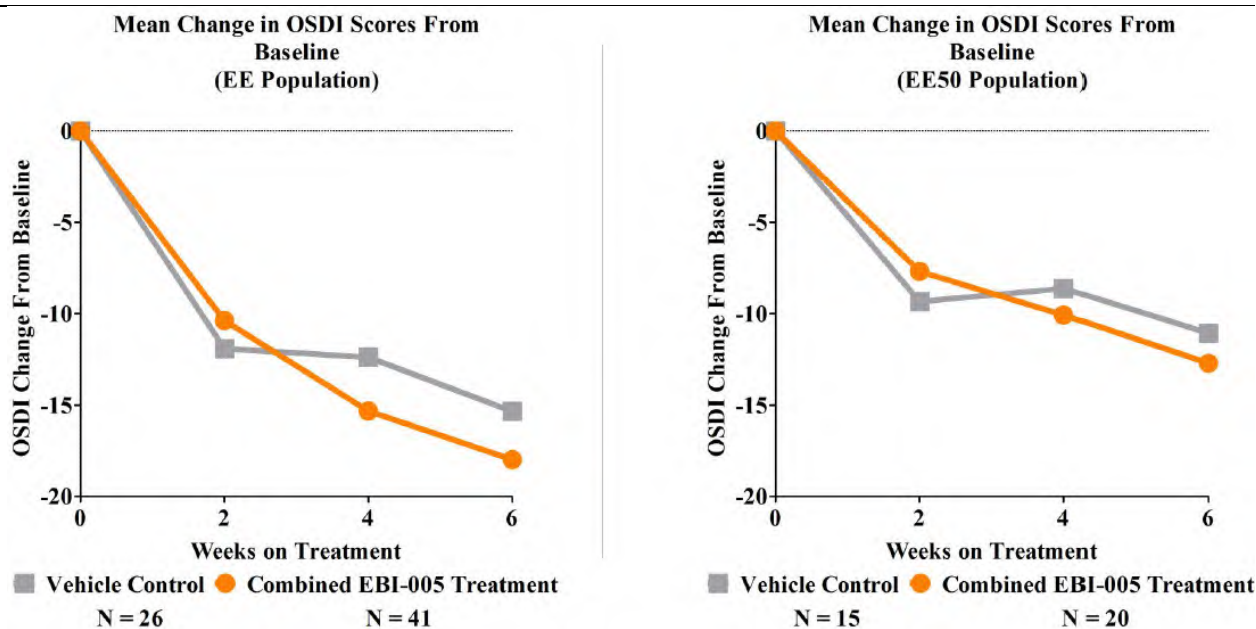
Figure 14 EBI-005 Symptoms Data – Painful Or Sore Eyes



Source: Company Reports

On the OSDI endpoint, EBI-005 demonstrated 36% and 41% changes from baseline to the end of treatment in the study and EE50 patient populations, respectively. These results were also not statistically significant most likely due to the small study size. Also, while there was not much separation observed from placebo, we are not incredibly surprised as the OSDI endpoint has been particularly difficult for drugs to achieve success on in studies (we described why earlier in the report) – including lifitegrast studies, which did not hit statistical significance (p-value=0.7894) or show a significant magnitude of improvement on the OSDI in OPUS-1. This will be a secondary endpoint in Phase III, but will not be required for study success.

Figure 15 More EBI-005-2 Symptoms Data – OSDI



Source: Company Reports

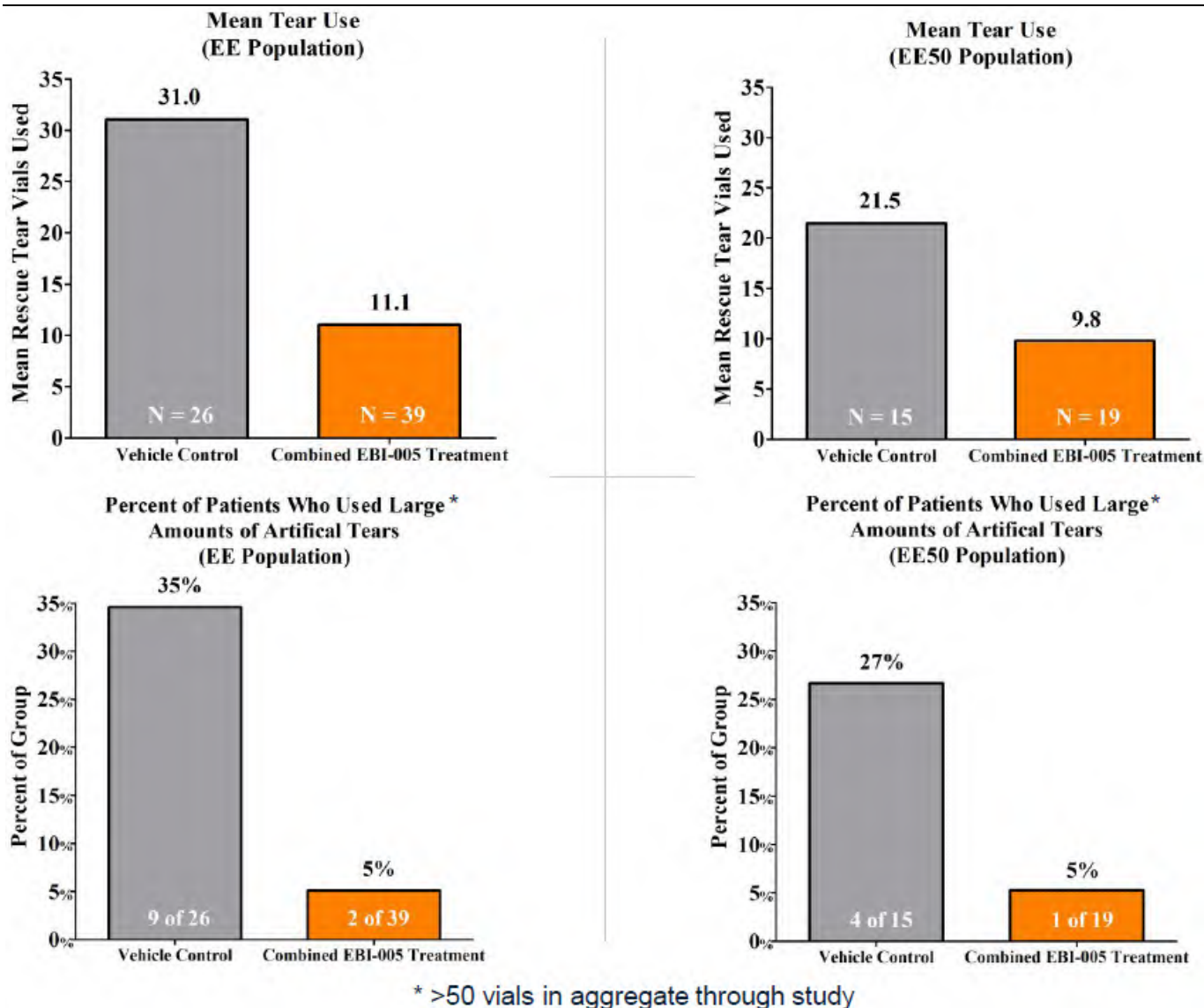
In summary, dry eye is considered a symptomatic disease by our physician consultants and we believe the dramatic reductions of artificial tear use observed in EBI-005-treated patients relative to placebo serves almost as a surrogate endpoint and demonstrates that the drug is working and effectively improving symptoms.

#### EBI-005-Treated Patients' Artificial Tear Consumption Was Dramatically Reduced

Artificial tear use in dry eye patients is rampant as artificial tears are typically used as first-line treatment and even if patients are prescribed Restasis, their symptoms are usually not adequately addressed. In this study, EBI-005 meaningfully reduced artificial tear use in EE50-treated patients by at least half. Furthermore, the percent of EE50 patients who used large amounts of artificial tears (>50 vials in aggregate through study) was reduced by more than 20% in EBI-005-treated patients. Note however that due to the small study size, this analysis only includes 5 patients who are "large users," so it must be interpreted with caution. In summary, dry eye is considered a symptomatic disease by our physician consultants and we believe the dramatic reductions of artificial tear use observed in EBI-005-treated patients relative to placebo serves almost as a surrogate endpoint and demonstrates that the drug is working and effectively improving symptoms.



Figure 16 EBI-005-2 Artificial Tear Use Data



Source: Company Reports

#### EBI-005 Treatment Appears To Be Safe and Well-Tolerated

EBI-005 demonstrated a clean safety profile in this study with no significant imbalances observed between drug and vehicle. Importantly, AEs observed were mostly mild, transient, and self-resolving.

EBI-005 demonstrated a clean safety profile in this study with no significant imbalances observed between drug and vehicle. Importantly, AEs observed were mostly mild, transient, and self-resolving. In all EBI-005-treated patients (5 mg/mL and 20 mg/mL; n=44), 9 ocular adverse events were reported in a total of 3 patients (7% of subjects). In terms of ocular AEs, 1 patient (2% of subjects; not necessarily the same patient) reported eye irritation, foreign body sensation, increased tearing, and ocular redness, while 2 patients (5% of subjects) reported eye pain. Importantly, no dropouts were reported. One interesting thing to note is that often dysgeusia (change in taste) occurs with treatment of ophthalmic drugs (13-16% rate with lifitegrast) and it was not reported with EBI-005. Anti-EBI-005 antibody formation occurred in 3 of 44 subjects, but this has been deemed by the Company as clinically irrelevant. Overall, EBI-005 treatment appears to be safe and well-tolerated.

Figure 17 EBI-005-2 Safety And Tolerability

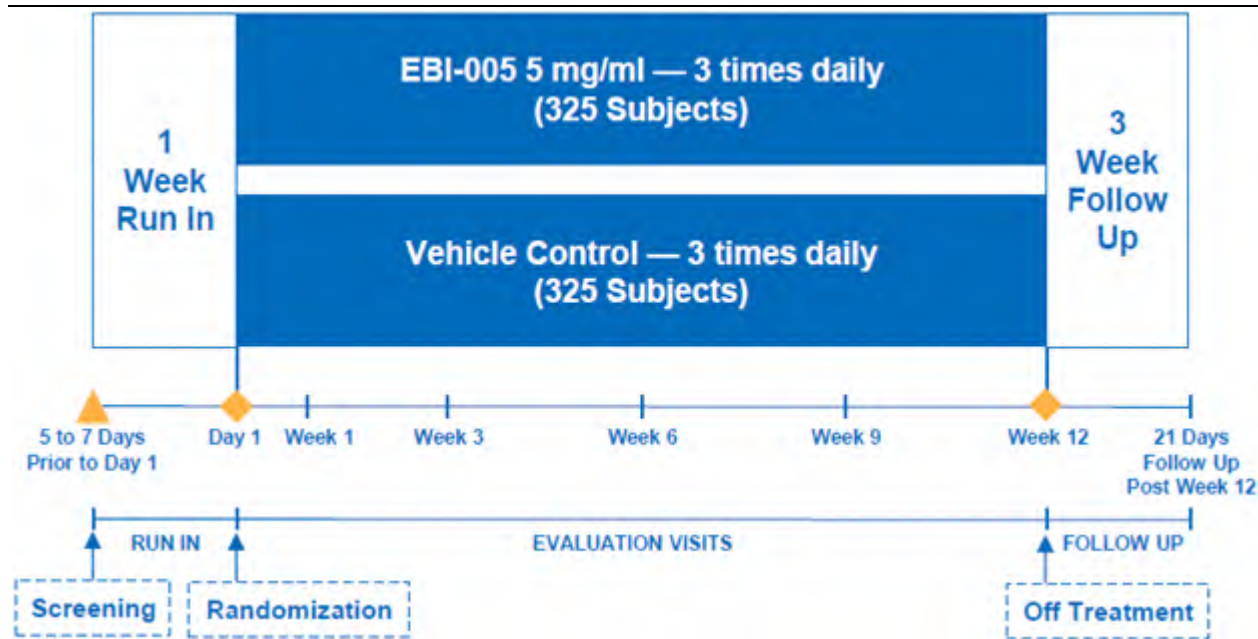
Study EBI-005-2	Vehicle (N=30)	EBI-005 (5mg/ml) (N=22)	EBI-005 (20mg/ml) (N=22)	EBI-005 (combined) (N=44)
Number of patients with 1 or more ocular adverse events	0 (0%)	1 (5%)	2 (9%)	3 (7%)
Eye irritation	0 (0%)	0 (0%)	1 (5%)	1 (2%)
Eye pain	0 (0%)	1 (5%)	1 (5%)	2 (5%)
Foreign body sensations in eyes	0 (0%)	1 (5%)	0 (0%)	1 (2%)
Increased tearing	0 (0%)	1 (5%)	0 (0%)	1 (2%)
Ocular redness	0 (0%)	1 (5%)	0 (0%)	1 (2%)
• No dropouts		• No detectable levels in serum		

Source: Company Reports

#### OASIS – First Pivotal Phase III EBI-005 Study Just Initiated

Just a couple weeks ago, in mid-February, Eleven initiated the first of two pivotal Phase III EBI-005 efficacy studies, termed OASIS. This is a natural environment, double-masked, vehicle controlled, and randomized study being conducted in the US with a planned enrollment of 650 patients (325 each arm) that we expect should occur quickly (a few months) just like OPUS-1 and OPUS-2 and that receiving data by early 2015 seems like a reasonable time frame. We would also note that the study size seems adequately powered and is comparable to Lifitegrast's OPUS-1 and OPUS-2 Phase III studies, which had 588 and 718 patients, respectively. Eleven will be screening for patients who are moderate to severe on both measures of CFS and OSDI (Rand<50; EE50). Artificial tear use will be restricted (as opposed to Phase II when it was allowed), which is also similar to the Phase III lifitegrast studies. The objectives of this study will be to measure total CFS and pain or soreness by OSDI (co-primary endpoints), total OSDI and CFS regions (secondary endpoints), and safety, tolerability, and immunogenicity. Patients will be treated for a total of 84 days, or 12 weeks, with 5 mg/mL EBI-005 three times daily (TID). Overall, the OASIS study design is remarkably similar to the Phase III lifitegrast OPUS-1 and OPUS-2 studies.

Figure 18 EBI-005-3 – First Phase III Pivotal Study



Source: Company Reports

## Understanding Shire's Lifitegrast Is Important in Understanding EBI-005

In March 2013, Shire acquired lifitegrast for dry eye disease from SARcode. Shire has agreed to make an upfront payment of \$160MM and SARcode's shareholders will be eligible to receive additional undisclosed payments upon the achievement of certain clinical, regulatory, and/or commercial milestones. The SARcode acquisition, in addition to the Premacure acquisition, represents a new therapeutic category for the company and a natural transition for Dr. Flemming Ornskov, who has significant experience in the ophthalmology space (international experience with Eylea as CMO at Bayer, Global President at Bausch & Lomb, and helped license Lucentis at Novartis).

Lifitegrast, is a small-molecule integrin antagonist that is believed to work by reducing inflammation through binding inhibition of the proteins lymphocyte function-associated antigen 1 (LFA-1) and intercellular adhesion molecule-1 (ICAM-1), thereby influencing T-cell activation and cytokine protein release. Scientists have discovered that the interaction between these two proteins play a pivotal role in the chronic inflammation associate with dry eye. Furthermore, this dual mechanism of action is thought to inhibit multiple targets of the inflammatory cascade, potentially reducing the signs and symptoms of dry eye. Our consultants believe that SARcode developed a molecule with good irreversible binding affinity, which results in continuous inhibition, so the target gets bound and takes a long time to let go. Additionally, lifitegrast is administered in a preservative-free topical aqueous solution and it has a 2-year shelf-life – which is a very favorable product profile.

The Phase III lifitegrast development program is made up of three clinical trials: OPUS-1, OPUS-2, and SONATA. OPUS-1 (n=588 and OPUS-2 (n=718), the two efficacy studies, have completed and the SONATA safety trial (n=300) has an expected March 2014 completion and is due to read out in the following months. Regarding lifitegrast's

clinical trial history, our consultant mentioned that the Phase II data had “absolutely overwhelming” data with the signs endpoint and that it potentially was the “most convincing trial ever run.” He stated that there were outstanding trends in terms of symptoms as well. Regarding the first Phase III OPUS-1 trial, which was statistically significant on the corneal staining signs endpoint, he mentioned that it was highly statistically significant starting by day 14 or 2 weeks (day 84 was the end of the trial) in some patients, which is comparable to the onset of action only currently achieved with steroids, which have a difficult side effect profile that limits their use in practice. He mentioned that even though he was blinded, he could clearly tell with “99% accuracy” what patients were on drug due to the obvious amelioration of symptoms. Nonetheless, the symptoms endpoint was missed – albeit barely – and he stated that this may be due to the lack of severity of disease for many of the patients in the study which disrupted the statistical analysis. While there was a heavy focus on the signs endpoint, admittedly he stated, that they did not stratify patients for symptom severity upon enrollment effectively causing a “flooring effect” where many patients had a low level of symptoms, therefore, their response, or the delta, was not enough to achieve statistical significance. With that said, patients still did “very well” on individual symptom scores such as ocular discomfort and ocular dryness and achieved highly statistically significant results, which was the premise of the “new” Phase III OPUS-2 endpoint.

Figure 19 Lifitegrast Phase III Clinical Development Program

Patient population	18 Years and older with history of dry eye in both eyes	18 Years and older with history of dry eye in both eyes	18 Years and older with history of dry eye in both eyes
Phase/study	Ph 3 OPUS-1	Ph 3 OPUS-2	Ph 3 SONATA
# of patients	N=588	N~700	N~300
Design	Multicenter, Randomized, Double-Masked and Placebo-Controlled Study	Multicenter, Randomized, Double-Masked and Placebo-Controlled Study <ul style="list-style-type: none"> <li>• Patients must have used Artificial Tears within 30 days</li> </ul>	Multicenter, Randomized, Double-Masked and Placebo-Controlled Study <ul style="list-style-type: none"> <li>• Long-term safety</li> <li>• 1-year duration</li> </ul>
Primary endpoint	<ul style="list-style-type: none"> <li>• Inferior Corneal Fluorescein Staining</li> <li>• Visual-related function subscale of OSDI</li> <li>• Safety and tolerability of lifitegrast Ophthalmic Solution (5.0%) compared to placebo, including incidence and severity of ocular and non-ocular adverse events.</li> </ul>	<ul style="list-style-type: none"> <li>• Corneal staining score</li> <li>• Patient-reported dryness score</li> <li>• Safety and tolerability of lifitegrast Ophthalmic Solution (5.0%) compared to placebo, including incidence and severity of ocular and non-ocular adverse events</li> </ul>	<ul style="list-style-type: none"> <li>• The Safety of Lifitegrast as assessed by ocular and Non-Ocular AEs</li> </ul>

Source: Shire

#### Mixed Top-Line Results for OPUS-2 Reported – Now, Lifitegrast Hit on Symptoms and Not Sign as Opposed To OPUS-1, Which Was the Other Way Around

In December 2013, Shire reported mixed top-line results for the Phase III lifitegrast OPUS-2 trial. Our consultants believe that lifitegrast may still indeed be approvable – based upon the totality of the Phase III data generated. In OPUS-2 Lifitegrast achieved statistical significance ( $p < 0.0001$ ) on the new, patient-reported eye-dryness co-primary endpoint and was the first dry eye drug ever to do so on a symptoms endpoint in a Phase III study. Importantly, this symptoms endpoint of patient-reported eye dryness was statistically significant in both Phase III OPUS-1 (secondary endpoint) and OPUS-2 studies (co-primary endpoint). Nonetheless, while this symptom data

The signs endpoint of inferior corneal staining endpoint missed ( $p=0.6186$ ), which was perplexing as all previous lifitegrast staining/signs data was very impressive – this highlights the difficulty of developing drugs in dry eye. We and our consultants believe that the most plausible explanation was that Shire overenriched the OPUS-2 study for severe patients, which may have introduced too much variability, as Eleven has observed, hence the EE50 population.

While neither study is fillable or approvable by itself, our consultants believe that the combination of both studies may still represent an approvable product based upon the totality of the data. Moreover, our consultants state that Wiley Chambers – the Deputy Director of the Ophthalmology Division at the FDA – has explicitly stated in the past that he will examine Phase III dry eye programs by looking at the totality of the data. Furthermore, it appears Chambers has previously stated that it is not necessary to hit on both endpoints in both studies, which appears to be his view of the meaning of the “totality of the data.”

surprisingly was positive, the signs endpoint of inferior corneal staining endpoint missed ( $p=0.6186$ ), which was perplexing as all previous lifitegrast staining/signs data was very impressive – this highlights the difficulty of developing drugs in dry eye. We and our consultants believe that the most plausible explanation was that Shire overenriched the OPUS-2 study for severe patients, which may have introduced too much variability, as Eleven has observed, hence the EE50 population. Also, the switch to an enriched study with only artificial tear users in the OPUS-2 study may have caused some negative sign effect. As we point out below, this was foreshadowed in the earlier OPUS-1 data, which analyzed a subset of artificial tear users. Treatment-emergent adverse events were similar to previous studies and no ocular TEAEs or drug-related serious TEAEs were reported. Our consultants were unanimously impressed with this result and are encouraged with the combined data set, and now await the subset analysis.

Shire is now left with two Phase III lifitegrast studies: OPUS-1, which hit on signs as a co-primary endpoint and patient-reported eye dryness symptoms as a secondary endpoint; and OPUS-2, which hit on symptoms of patient-reported eye dryness as a co-primary endpoint, but missed on the co-primary of inferior corneal staining that hit in OPUS-1. While neither study is fillable or approvable by itself, our consultants believe that the combination of both studies may still represent an approvable product based upon the totality of the data. Moreover, our consultants state that Wiley Chambers – the Deputy Director of the Ophthalmology Division at the FDA – has explicitly stated in the past that he will examine Phase III dry eye programs by looking at the totality of the data. Furthermore, it appears Chambers has previously stated that it is not necessary to hit on both endpoints in both studies, which appears to be his view of the meaning of the “totality of the data.” If this is truly the case, we believe the lifitegrast program may still be approvable on the current data set, but we will not learn of this until Shire has a meeting with the FDA. The bottom line is that some may now perceive this program as having two failed Phase III studies – but the reality is that when considering the totality of the data – we believe lifitegrast has generated the most impressive clinical data in dry eye disease to date and both consultants believe is approvable without additional clinical work.

#### The Move to An Artificial Tear Patient Population From OPUS-1 to OPUS-2 Might Explain The Mixed Lifitegrast Results

Given that lifitegrast has had such strong signs data on corneal staining in all previous studies, we – and our consultants – had gone into the OPUS-2 data release believing that the majority of risk was associated with hitting the new symptoms endpoint of patient-reported eye dryness; especially since the previous OSDI symptoms endpoint was just barely missed in the first OPUS-1 trial. However, one of the more significant study design changes from OPUS-1 to OPUS-2 – the move to only include artificial tear users – while improving the effects on symptoms, may have caused the signs endpoints to miss.

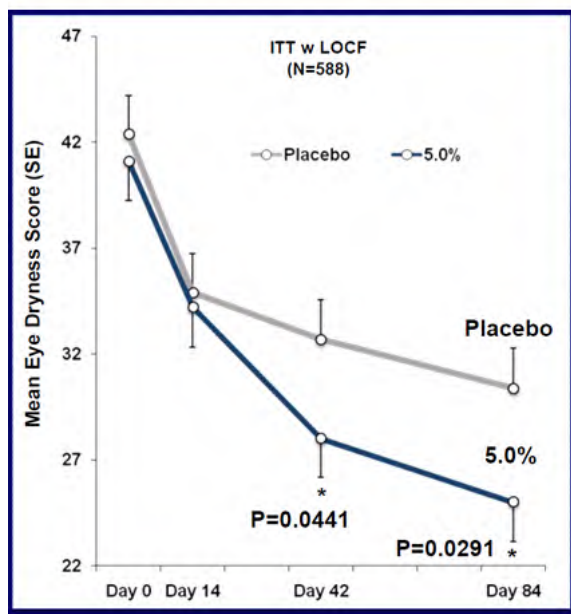
If we take a closer look at the OPUS-1 intent-to-treat (ITT) and artificial tear user (AT) data (via a subset analysis;  $n=257/588=44\%$ ), it is clear that the statistical significance on the eye dryness score endpoint at day 84 improves dramatically from the ITT population ( $p=0.0291$ ) to the artificial tear (AT) user population ( $p=0.0012$ ). Since all previous signs/staining data had been so strong and the symptoms/OSDI endpoint missed in the first OPUS-1 study, Shire clearly moved to an artificial tear user population to ensure success on the symptoms/eye dryness endpoint in OPUS-2 and as we learned recently, it worked ( $p<0.001$ ). Consistent with this, one of our



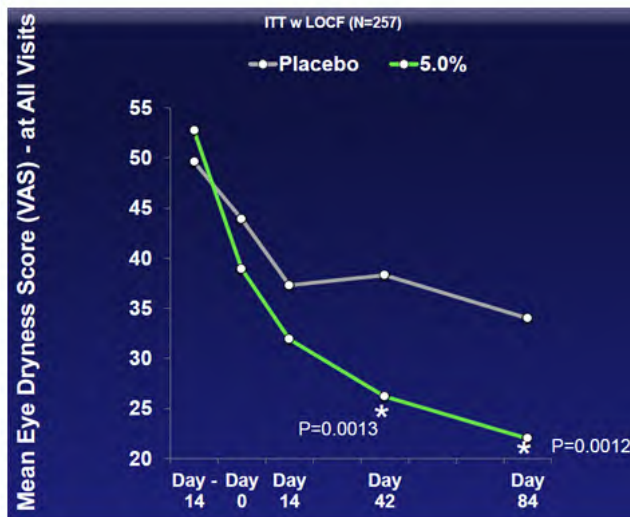
consultants noted that he certainly saw people in the study that had a “marked benefit” in their symptomatic dry eye disease.

Allowed/Issued Claims Intent To Treat vs. Artificial Tear Users: OPUS-1 Eye Dryness Score (VAS; 0-100; All Visits)

Intent To Treat Population



Artificial Tear User Population

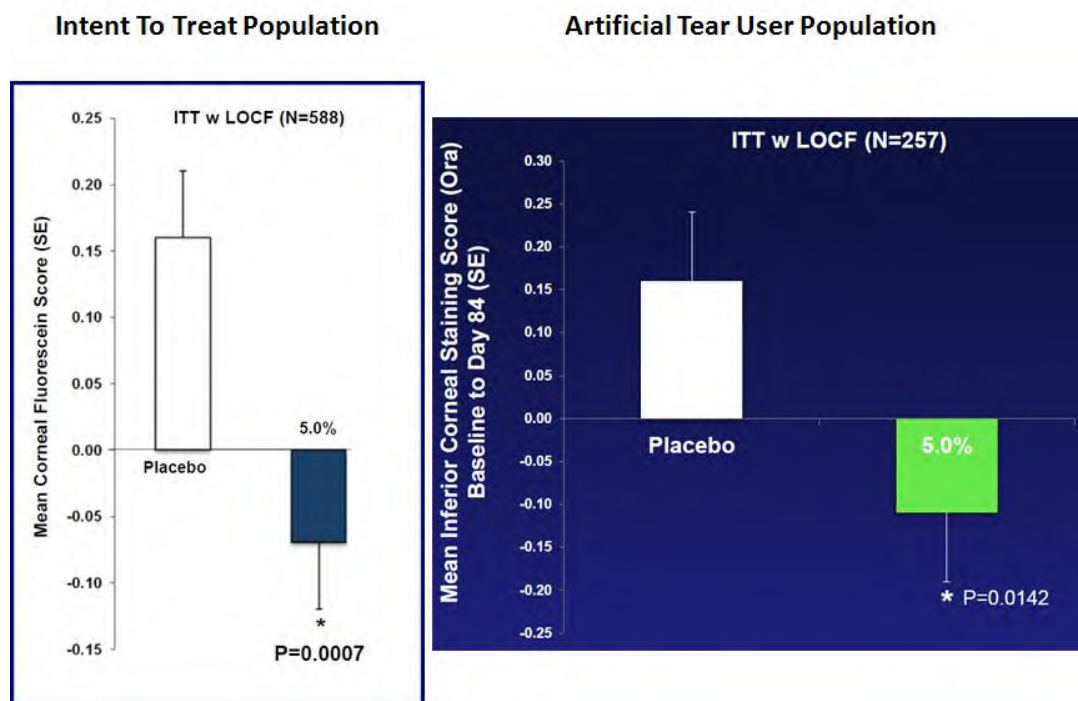


Source: Sheppard AAO and ASCRS 2013 presentations: Cowen and Company

However, while the eye dryness symptoms endpoint improved significantly in AT users, the corneal staining/signs endpoint actually performed worse. In OPUS-1, the ITT population had a p-value of  $p=0.0007$ , while the AT population had a p-value of  $p=0.0142$ . We, our consultants, and most likely Shire, had not paid much attention to this as all of the previous staining/signs data was so incredibly strong, however, clearly it had an impact on the OPUS-2 results as the inferior corneal staining endpoint was missed ( $p=0.6186$ ). Also, our consultants note that it is unusual that in such a large study, the vehicle that acts like artificial tears and should have some effect over the course of the study, actually had a negative effect on patients. If in the OPUS-2 study, the vehicle or placebo patients improve, as our consultants believe they should have, this could have also caused the significant miss.



Intent To Treat vs. Artificial Tear Users: OPUS-1 Inferior Corneal Staining Score (Ora; 0-4)



Source: Sheppard AAO and ASCRS 2013 presentations: Cowen and Company

Therefore, our consultants believe that perhaps total or central corneal staining may have been a better, or more sensitive signs endpoint. We note that Eleven will be using the total corneal staining measure in Phase III.

We believe that Shire is most likely continuing to cut and stratify the data and conduct subgroup analyses, so any potential information regarding staining, differences between the patient population from OPUS-1 to OPUS-2, and/or information related to the thesis above will be interesting to observe. Continuing with the severe patient thesis, a consultant suggested that by enrolling patients with increased disease severity in OPUS-2 vs. OPUS-1 – instead of observing a greater magnitude of treatment effect – many of these patients became non-responsive to treatment because their disease was so severe. Lastly, most dry eye patients have a combination of aqueous deficiency (lack of water production) and/or eyelid deficiency (meibomitis; lack of oil/lipid production). While patients with meibomitis can have dry eye symptoms, many times they may not have corneal staining and inferior corneal staining is less sensitive in these patients than it is in aqueous deficient patients. Therefore, our consultants believe that perhaps total or central corneal staining may have been a better, or more sensitive signs endpoint. We note that Eleven will be using the total corneal staining measure in Phase III. We reiterate that clearly although a fully positive (both signs and symptoms) result would have been preferable, we do believe that the FDA might still be amenable to analyzing the totality of the data set, and that indeed lifitegrast may still be approvable on the data generated to date.

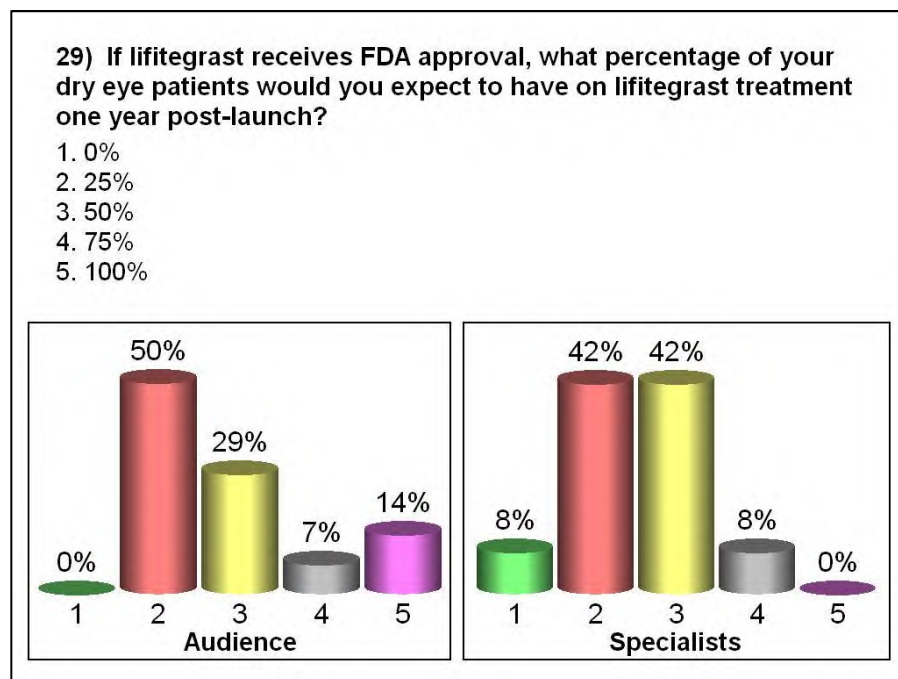
#### Lifitegrast And EBI-005 Could Both Have Rapid Uptake

We believe that if successfully developed and approved, EBI-005 could achieve a similar market uptake to this and even if both lifitegrast and EBI-005 hit the market, there will be plenty of room for both.

Assuming a potential lifitegrast approval, physicians expect 25-50% of their dry eye patients to go on lifitegrast treatment one year post launch. Interestingly, the majority (58%) of physicians believe that lifitegrast will be used as a monotherapy in dry eye patients as opposed to in combination with Restasis. This is most likely due to the repetitive nature of the anti-inflammatory mechanisms of both drugs. Additionally, the majority of physicians (85%) believe that as much as 25% of patients in Restasis

clinical practice experience significant ocular burning and stinging, possible leading to the 50% attrition rate (as noted by a physician) of patients on Restasis. And we would once again note that is while only attaining mild efficacy. We believe that if successfully developed and approved, EBI-005 could achieve a similar market uptake to this and even if both lifitegrast and EBI-005 hit the market, there will be plenty of room for both.

Figure 20 Percentage Of Patients On Lifitegrast 1 Year Post Launch (If Approved)



Source: Cowen and Company October 2013 Therapeutics Conference; Vistacom

### Restasis Generics Not Likely To Be On Market Anytime Soon – Even If They Were, We Believe They Would Not Meaningfully Impact EBI-005's Opportunity

In our view, it is unlikely that there is any other generic applicant on file besides Actavis, which itself appears to have an unapprovable application. Allergan CEO David Pyott confirmed on the Q4:13 earnings call that the company "has received no further such (Paragraph IV) notices, so therefore the situation may become clearer by mid-year." We view this commentary as being exceedingly positive and still relatively conservative.

Over the past year, the Restasis generic situation has been a bit unclear to many on the Street. We explain below why we don't believe that Restasis generics will be available in May 2014 come patent expiry, but even if they were, we – and our consultants – still believe that the significant potential future opportunity for EBI-005 dry eye would remain. In our view, it is unlikely that there is any other generic applicant on file besides Actavis, which itself appears to have an unapprovable application. Allergan CEO David Pyott confirmed on the Q4:13 earnings call that the company "has received no further such (Paragraph IV) notices, so therefore the situation may become clearer by mid-year." We view this commentary as being exceedingly positive and still relatively conservative. Moreover, Pyott also indicated that "given the timing, it sort of becomes somewhat probable and more and more likely that a next step from a generic filer would be Paragraph IV." This again reinforces our conviction that regardless of the status of a filing before January 14 (the timing of the listing of the Restasis patent in the Orange Book) that it is likely (even according to Allergan) that a certification and disclosure to them would have been made by now. Importantly, any subsequent ANDA filed on January 14 or later would

The bottom line is that our consultant believes that there is no reason that any generic placed on file before the January 14 '111 patent listing would not have certified Paragraph IV on January 14 and have by now notified Allergan (accepted filing or not). For these reasons we conclude that Actavis - with what appears to be a damaged filing - is likely alone at this point, and that the Restasis franchise will remain durable for the foreseeable future, potentially out to patent expiry in 2024.

The bottom line here is that the newly issued/allowed Restasis patents may cause generic manufacturers to reformulate and potentially conduct clinical studies, which would result in significant delays and very meaningful accretion to Allergan earnings.

be subject to a 30-month stay. The bottom line is that it has become increasingly likely that Actavis - which we believe has a deficient filing - may be the only potential generic "threat," and that is likely an overstatement. And even in what appears to be the low-probability case that Actavis' filing is approvable, we would note that as the likely exclusivity holder in that scenario - given the strength of the intellectual property - a settlement on very favorable terms to Allergan (2020+) would be most likely.

We hosted a regulatory consulting call to attempt to further understand and clarify the issue. Our consultant has concluded that any company that was on file (whether as late as January 13 and therefore not yet officially "accepted" by the FDA) would still have sought to certify Paragraph IV on the recent '111 Orange Book listed patent and would have by now notified Allergan. In fact he made it clear that the statutory language would indicate that even if a filing was not yet "accepted" by the FDA, a listed patent after that originally filing (say made on January 13) would not have the luxury to wait for an official acceptance as the later listed patent (on January 14) would force a Paragraph IV filing and an "amendment" to the not yet accepted filing. The language states that any Paragraph IV certification and amendment to the original ANDA filing (whether accepted yet or not) requires an immediate disclosure to the brand company, in this case Allergan. Since that has not occurred, it is his - and our - belief that Actavis is alone in having an ANDA on file before January 14. If that is true, any subsequent application on or after January 14 would be subject to an automatic 30-month stay. And given Actavis' generic filing has been deemed "refuse to receive" it is unclear whether that product is approvable. Additionally, even if the Actavis product is eventually accepted for filing - depending on the original deficiencies - the newly submitted information could be deemed a major amendment and place the actual acceptance date after January 14 and therefore also be subject to the automatic 30-month stay. Even in the case where Actavis' filing is accepted and Actavis is granted exclusivity, we believe that the strength of the patents and risk of damages in an "at risk" launch will lead to an eventual settlement on favorable terms to Allergan. The bottom line is that our consultant believes that there is no reason that any generic placed on file before the January 14 '111 patent listing would not have certified Paragraph IV on January 14 and have by now notified Allergan (accepted filing or not). For these reasons we conclude that Actavis - with what appears to be a damaged filing - is likely alone at this point, and that the Restasis franchise will remain durable for the foreseeable future, potentially out to patent expiry in 2024.

## EBI-005 To Enter Phase II In Allergic Conjunctivitis Very Soon

Allergic conjunctivitis (AC) is a group of ocular surface diseases typically associated with hypersensitivity reactions. It is an inflammatory disease of the conjunctiva—the membrane covering the inside of the eyelids and white part of the eye—primarily from a reaction to allergy-causing substances such as pollen or pet dander. It is often difficult to differentiate allergic conjunctivitis from other ocular surface disorders, as they may share some of the same signs and symptoms. In medical literature, older population studies estimate a prevalence of 15-20% for allergic conjunctivitis, but more recent studies implicate rates as high as 40%. Therefore, it is a significantly prevalent condition. Allergic conjunctivitis can be divided into two main categories: (1) seasonal allergic conjunctivitis (SAC, also called hay fever conjunctivitis), which appears to be the most common form of allergic conjunctivitis, and coincides with regional seasonal increases in circulating allergens, such as grass pollens. Seasonal conjunctivitis is not generally considered to be serious but causes much discomfort and loss of productivity during the spring and fall allergy seasons; and (2) perennial

allergic conjunctivitis (PAC) – individuals with PAC experience symptoms throughout the year and seasonal spikes can occur.

Allergic conjunctivitis is currently treated with a variety of drugs. These include topical antihistamines, mast cell stabilizers, nonsteroidal anti-inflammatory drugs (NSAIDs), and corticosteroids. Essentially, mast cells and histamine are both part of the mechanisms involved in creating the allergic reaction. Therefore, drug therapy is often focused on countering their actions and thereby alleviating the condition. The common, first-line method of treating conjunctivitis is via antihistamines. Allergan's Elestat (epinastine), for example, is an antihistamine. It is available as a prescription eye drop and is indicated for the prevention of ocular itching associated with allergic conjunctivitis. We estimate Elestat sales of approximately \$40MM in 2014.

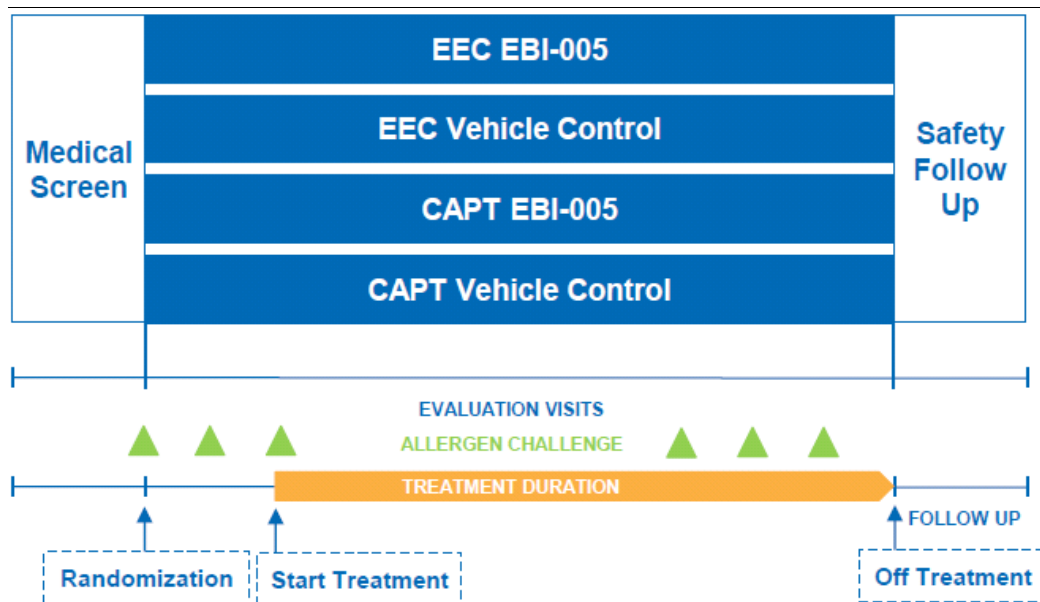
#### EBI-005 In Allergic Conjunctivitis – IL-1 May Play A Significant Role Here Too

The rationale for EBI-005 would be similar to its potential effect in dry eye disease in that that elevated levels of IL-1 appear to play a role in the redness and itching associated with allergic conjunctivitis. In particular, Eleven notes that there is evidence that the more persistent and severe allergic conjunctivitis is caused by IL-1-mediated inflammatory processes.

Eleven plans to initiate a Phase II clinical trial to evaluate the use of EBI-005 in patients with allergic conjunctivitis in 2014. The rationale for EBI-005 would be similar to its potential effect in dry eye disease in that that elevated levels of IL-1 appear to play a role in the redness and itching associated with allergic conjunctivitis. In particular, Eleven notes that there is evidence that the more persistent and severe allergic conjunctivitis is caused by IL-1-mediated inflammatory processes.

The Phase II trial design is highlighted below. The trial will enroll approximately 145 patients who have not responded adequately to antihistamines or mast cell stabilizers. The primary endpoint is subject-reported ocular itching, while the secondary endpoints are redness, swelling and other signs of ocular allergy.

Figure 21 Planned Phase II Study In Allergic Conjunctivitis



Source: Company Reports

#### Preclinical Programs In Development For Diabetic Macular Edema And Uveitis

Eleven is also pursuing early-stage intravitreal programs that target IL-17 inhibition in uveitis and IL-6 inhibition in diabetic macular edema (DME). We would note that both

programs are still in very early preclinical stages, but given the market potential in either indication, positive data – even in Phase I/II – would lead to significant value creation. We expect Eleven to advance these candidates over time, as EBI-005 progresses through later stage trials.

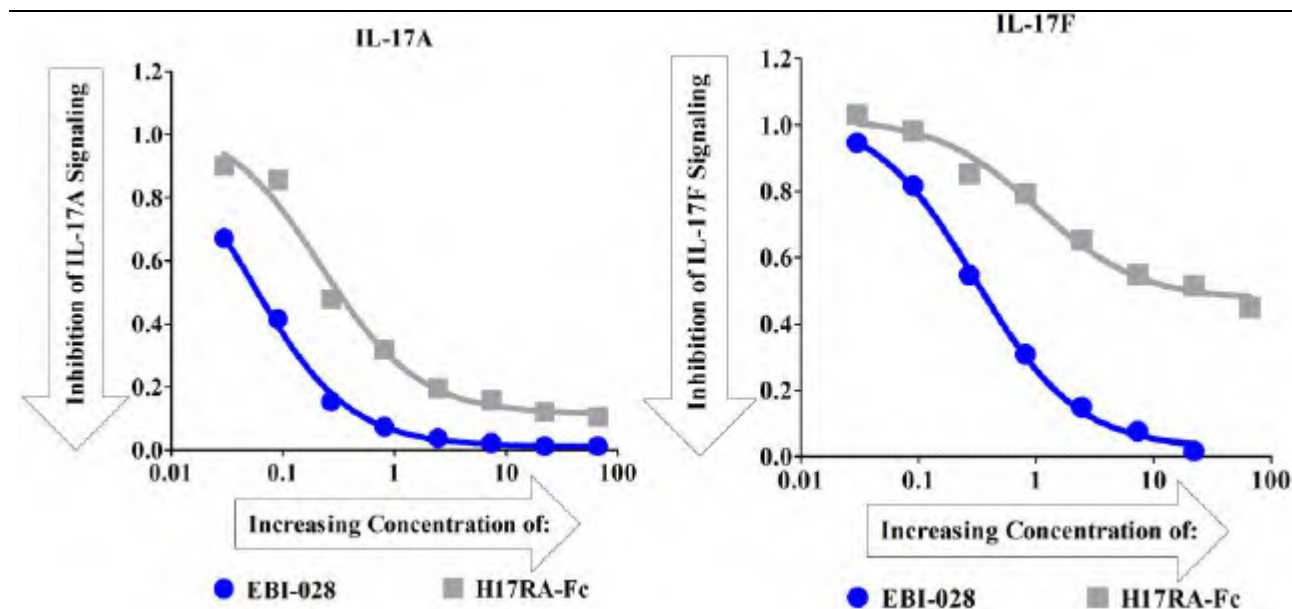
### EBI-028 – Elevated Levels Of IL-17 Are Associated With Uveitis

Uveitis is characterized by inflammation of the eye's uvea; uveitis of the front of the uvea is more common and typically does not lead to vision impairment, while back of eye uveitis is associated with more severe outcomes that can include blindness, cataracts, and secondary glaucoma. Eleven estimates the prevalence of uveitis is about 200,000-300,000 patients. Uveitis can be either non-infectious or infectious. Noninfectious uveitis means that although the uvea is inflamed, no bacteria or viruses are found in the eye.

Patients that have uveitis tend to also have elevated levels of IL-17 and therefore, it is Eleven's belief that blocking IL-17 would be effective in treating the condition. EBI-028, the Company's candidate for uveitis, blocks the two most common forms of IL-17 – IL-17A and IL-17F.

Patients that have uveitis tend to also have elevated levels of IL-17 and therefore, it is Eleven's belief that blocking IL-17 would be effective in treating the condition. EBI-028, the Company's candidate for uveitis, blocks the two most common forms of IL-17 – IL-17A and IL-17F. The history of IL-17 inhibition and its success in uveitis is unclear and therefore, we view this program as fairly nascent, with data yet to fully emerge. Novartis was developing an IL-17A inhibitor called Secukinumab (AIN457) in uveitis, but those trials did not succeed. Together, the AIN457 Phase III studies had included 118 patients with Behçet's uveitis; 31 patients with active, noninfectious, non-Behçet's uveitis; and 125 patients with quiescent, noninfectious, non-Behçet's uveitis.

Figure 22 Rationale Behind EBI-028 For Uveitis – IL-17 Inhibition



Source: Company Reports

### EBI-029 – IL-6 May Play A Vascular Permeability Role In DME

Diabetic macular edema, or DME as many call it, is the most common complication of diabetic retinopathy, refers to a swelling of the retina caused by fluid leakage from capillaries in the macula. DME results from chronically elevated blood sugar levels, which cause structural changes in the endothelium of retinal blood vessels, leading to vascular dysfunction and eventually vascular occlusion. It is believed that upregulation



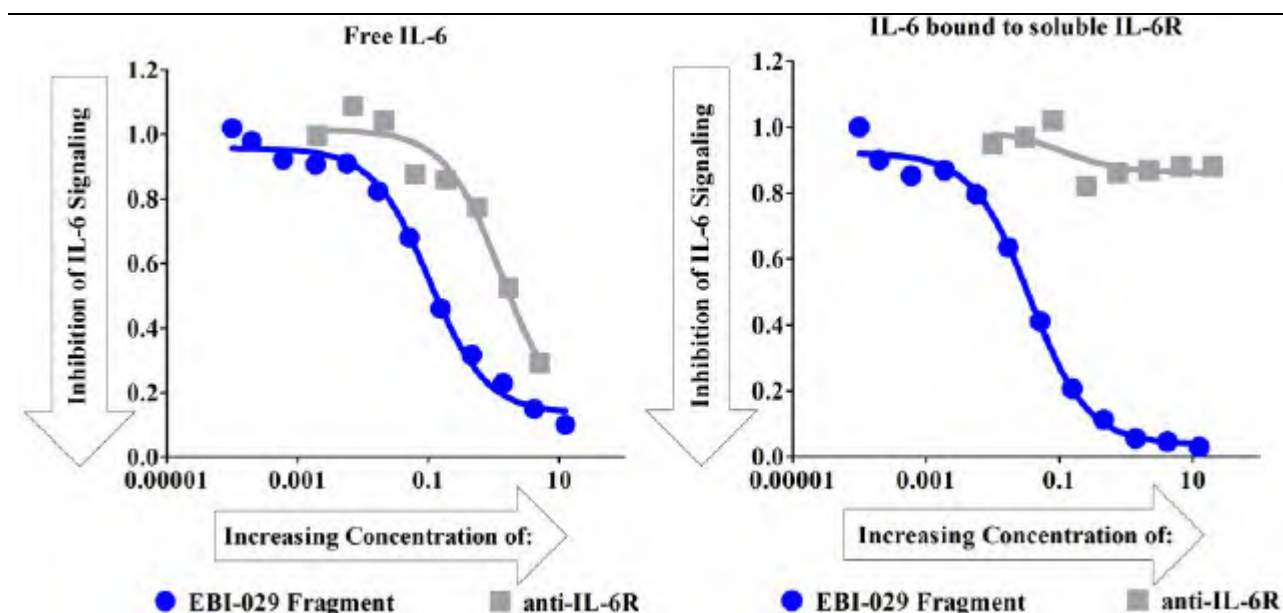
of growth factors in the retina, such as IL-6 and VEGF, induce vascular permeability. That vascular permeability leads to a breakdown of the blood-retina barrier, allowing fluid and proteins to leak into the retina, thickening the macula and distorting nerve cells. The result is a reversible decrease in visual acuity which becomes permanent if left untreated.

Though we believe that the U.S. DME population may be nearly as large as the wet AMD population, the opportunity for anti-VEGFs in this indication appears to be somewhat smaller. The Cowen biotech team estimates that there are nearly 400K DME patients in the U.S. today. However, Roche estimates that only about half of patients have clinically significant disease, such that only about 190K DME patients are under an ophthalmologists' care. While the DME population size – both diagnosed and undiagnosed – is unclear, it does appear to be a sizeable market opportunity.

Eleven believes that there is a positive correlation of vitreal IL-6 levels with both disease severity and VEGF-refractory patients. Hence, the IL-6 blockade might potentially treat refractory patients or provide some level of synergy with anti-VEGF therapy (such as Lucentis or Eylea).

Eleven believes that there is a positive correlation of vitreal IL-6 levels with both disease severity and VEGF-refractory patients. Hence, the IL-6 blockade might potentially treat refractory patients or provide some level of synergy with anti-VEGF therapy (such as Lucentis or Eylea). EBI-029 blocks free IL-6 and IL-6 bound to soluble IL-6R. The effect of EBI-029 on free IL-6 and soluble IL-6R is shown below.

Figure 23 Rationale Behind EBI-029 For DME – IL-6 Inhibition



Source: Company Reports



Figure 24 Eleven Annual P&L

ELEVEN - 2013-2025 ESTIMATED ANNUAL EPS BUILDUP (\$MM)																
	2011	2012	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	CGR Comments
<b>EBI-005 U.S. Sales</b>																
Dry Eye Disease							\$50	\$120	\$225	\$305	\$400	\$525	\$650	\$775	\$880	- EBI-005 to initiate Phase III in 1H14; potential 2018 launch
Growth Rate									+88%	+36%	+31%	+31%	+24%	+19%	+14%	- Rapid growth expected with one real competitor; 2031-2034 patent expires
Allergic Conjunctivitis																- Phase II to start in 2014; assumes 2020 launch
Growth Rate																- More competitive and established market than DED
<b>Total Eleven Revenues</b>							<b>\$80.0</b>	<b>\$120.0</b>	<b>\$225.0</b>	<b>\$305.0</b>	<b>\$400.0</b>	<b>\$525.0</b>	<b>\$650.0</b>	<b>\$775.0</b>	<b>\$880.0</b>	
% Change									+88%	+36%	+31%	+31%	+24%	+19%	+14%	
Cost of Goods							\$5.0	\$12.0	\$22.5	\$30.5	\$40.0	\$52.5	\$65.0	\$77.5	\$88.0	
Gross Profit							\$45.0	\$108.0	\$202.5	\$274.5	\$360.0	\$472.5	\$585.0	\$697.5	\$792.0	
Gross Margin							90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	- Solid margins
SG&A	\$3.3	\$4.2	\$5.0	\$6.0	\$8.0	\$12.0	\$40.0	\$75.0	\$115.0	\$130.0	\$160.0	\$210.0	\$240.0	\$280.0	\$315.0	+22% - Salesforce expansion in 2016/2017, in preparation for EBI-005 launch
% of Revs	NM	NM	NM	NM	NM	NM	80.0%	62.5%	51.1%	42.6%	40.0%	40.0%	36.9%	36.1%	35.8%	- 100 reps @ \$300K adds \$30MM
R&D	\$9.4	\$15.3	\$20.0	\$20.0	\$20.0	\$20.0	\$25.0	\$30.0	\$40.0	\$45.0	\$45.0	\$65.0	\$85.0	\$100.0	\$100.0	+10%
% of Revs	NM	NM	NM	NM	NM	NM	50.0%	25.0%	17.8%	14.8%	11.3%	12.4%	13.1%	12.9%	11.4%	- Additional clinical trials for EBI-005 indications and preclinical assets
Operating Expenses	\$12.7	\$19.5	\$25.0	\$26.0	\$28.0	\$32.0	\$65.0	\$105.0	\$155.0	\$175.0	\$205.0	\$275.0	\$325.0	\$380.0	\$415.0	+15%
% of Revenues	NM	NM	NM	NM	NM	NM	130.0%	87.5%	68.9%	57.4%	51.3%	52.4%	50.0%	49.0%	47.2%	
Operating Income	(\$12.7)	(\$19.5)	(\$25.0)	(\$26.0)	(\$28.0)	(\$32.0)	(\$20.0)	\$3.0	\$47.5	\$99.5	\$155.0	\$197.5	\$260.0	\$317.5	\$377.0	NM - Operating profit expected in 2020
% Operating Margin	NM	NM	NM	NM	NM	NM	NM	2.5%	21.1%	32.6%	38.8%	37.6%	40.0%	41.0%	42.8%	
Non-Operating Income																
Interest Income	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Interest Expense	(0.2)	(0.2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Other Income	(1.4)	(3.1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Non-Operating Income	(\$1.6)	(\$3.3)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Pretax Income	(\$14.3)	(\$22.8)	(\$25.0)	(\$26.0)	(\$28.0)	(\$32.0)	(\$20.0)	\$3.0	\$47.5	\$99.5	\$155.0	\$197.5	\$260.0	\$317.5	\$377.0	NM
% of Revs	NM	NM	NM	NM	NM	NM	NM	NM	32.6%	38.8%	37.6%	40.0%	41.0%	42.8%		
Income Taxes									\$16.6	\$34.8	\$54.3	\$69.1	\$91.0	\$111.1	\$132.0	NM
Income Tax Rate									35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	
Net Income - Operations	(\$14.3)	(\$22.8)	(\$25.0)	(\$26.0)	(\$28.0)	(\$32.0)	(\$20.0)	\$3.0	\$30.9	\$64.7	\$100.8	\$128.4	\$169.0	\$206.4	\$245.1	NM
% Net Margin	NM	NM	NM	NM	NM	NM	NM	NM	21.2%	25.2%	24.5%	26.0%	26.6%	27.8%		
Extraordinary Items	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Reported Net Income	(\$14.3)	(\$22.8)	(\$25.0)	(\$26.0)	(\$28.0)	(\$32.0)	(\$20.0)	\$3.0	\$30.9	\$64.7	\$100.8	\$128.4	\$169.0	\$206.4	\$245.1	NM
Interest Add-Back	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
EPS (GAAP) - Before Ex. Items	(\$2.80)	(\$0.43)	(\$1.55)	(\$1.55)	(\$1.65)	(\$1.80)	(\$1.10)	\$0.15	\$1.50	\$3.00	\$4.45	\$5.45	\$6.85	\$8.05	\$9.20	NM - Profitable in 2020 following the launch of EBI-005
Growth	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	+48%	+22%	+26%	+18%	+14%	
EPS - Extraordinary Items	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
EPS - Reported	(\$2.80)	(\$0.43)	(\$1.55)	(\$1.55)	(\$1.65)	(\$1.80)	(\$1.10)	\$0.15	\$1.50	\$3.00	\$4.45	\$5.45	\$6.85	\$8.05	\$9.20	NM
Shares - Fully Diluted (MM)	5.1	45.2	16.1	16.6	17.1	17.6	18.1	18.6	20.6	21.6	22.6	23.6	24.6	25.6	26.6	-17% - Diluted shares; assuming some onward dilution from options

Source: Cowen and Company

Figure 25 US Dry Eye Treatment Market Build

ESTIMATED U.S. DRY EYE TREATMENT MARKET											
	2012	2013	2014E	2015E	2016E	2017E	2018E	2019E	2020E	CGR	Comments
<b>Restasis U.S. Penetration Of Est Dry Eye Market (AGN)</b>	80%	80%	80%	78%	74%	67%	62%	56%	51%		- Leading treatment - market creator
Estimated Patients ('000)	1,825	2,070	2,180	2,185	2,190	2,120	2,080	2,010	1,975		- Generics may not come upon market expiry; poor compliance
Average Price Per Year Due To Low Utilization	\$685	\$720	\$765	\$805	\$845	\$885	\$930	\$975	\$1,025		- ~5% annual price increases
Annual Prescriptions ('000)	2,820	2,955	\$3,112	\$3,119	\$3,126	\$3,026	\$2,969	\$2,869	\$2,819		
Estimated Sales U.S. (\$MM)	\$750	\$895	\$1,000	\$1,055	\$1,110	\$1,125	\$1,160	\$1,175	\$1,215	+6%	- US sales dominate
<b>Lifitegrast U.S. Penetration Of Est Dry Eye Market (SHPG)</b>				4%	8%	13%	16%	20%	22%		- First treatment to address symptoms of dry eye
Patients ('000)				39	89	159	205	266	323		- Compliance should be better than Restasis due to efficacy
Average Price Per Year				\$1,610	\$1,690	\$1,770	\$1,860	\$1,950	\$2,050		- Priced at a premium to Restasis; and higher utilization
Annual Prescriptions ('000)				46	106	189	244	316	384		
Estimated Sales U.S. (\$MM)				\$50	\$120	\$225	\$305	\$415	\$530		- Expected to rapidly gain market share
<b>EBI-005 U.S. Penetration Of Est Dry Eye Market</b>							4%	8%	10%		- Second player to reach market that treats symptoms effectively
Patients ('000)							81	144	186		- Potential 2018 U.S. market launch
Average Price Per Year							\$1,860	\$1,950	\$2,050		- Pricing in-line with Lifitegrast
Annual Prescriptions ('000)							96	172	221		
Estimated Sales U.S. (\$MM)							\$50	\$120	\$225	\$305	- Strong launch anticipated in exceedingly large market
<b>Steroids/Tears/Others U.S. Estimated Penetration Of Dry Eye Market</b>	21%	20%	20%	19%	18%	17%	15%	14%	13%		- Use declines with the entrance of new, more effective products
Patients ('000)	1,510	1,630	1,740	1,735	1,765	1,730	1,695	1,665	1,640		- Compliance low and similar to Restasis; short duration of treatment
Average Price Per Year	\$215	\$225	\$235	\$245	\$255	\$270	\$285	\$300	\$315		- Mainly generic or low priced products
Estimated Sales U.S. (\$MM)	\$195	\$220	\$245	\$255	\$270	\$280	\$290	\$300	\$310	+6%	- Use remains steady
<b>Total U.S. Dry Eye Market Sales (MM)</b>	<b>\$945</b>	<b>\$1,115</b>	<b>\$1,245</b>	<b>\$1,360</b>	<b>\$1,500</b>	<b>\$1,680</b>	<b>\$1,875</b>	<b>\$2,115</b>	<b>\$2,360</b>	<b>+12%</b>	- Larger % of market penetrated due to multiple treatment options
<b>% Growth</b>	<b>+15%</b>	<b>+18%</b>	<b>+12%</b>	<b>+9%</b>	<b>+10%</b>	<b>+12%</b>	<b>+12%</b>	<b>+13%</b>	<b>+12%</b>		- Growth should be rapid given new, more effective drugs

Source: Cowen and Company; PriceRx

## *Valuation Methodology And Risks*

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### **Valuation Methodology**

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#### **Pharmaceuticals/Specialty**

For our valuation methodology, we arrive at fair value utilizing a discounted cash flow (DCF) approach to derive our 12-month price target.

### **Investment Risks**

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#### **Pharmaceuticals/Specialty**

**Risks include:** (1) growing competitive dynamics in the specialty pharmaceuticals space; (2) the ability of management to execute on external growth by successfully acquiring new strategic, accretive products; (3) the ability to grow organically and keep the product pipeline robust; (4) potential regulatory delays, rejections, or failures of pipeline products; (5) economic sensitivity of any self-pay products or weakening consumer demand; (6) domestic or international pricing pressures for marketed products; and (7) failure to execute on new product launches.

#### **Risks To The Price Target**

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Eleven is a development-stage specialty pharmaceutical company and with that carries risk. Failure to successfully develop EBI-005 could result in a significant decrease to our valuation.

# Addendum

## Stocks Mentioned In Important Disclosures

Ticker	Company Name
ACT	Actavis
AGN	Allergan
EBIO	Eleven Biotherapeutics
SHPG	Shire Pharmaceutical

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**Market Perform (2):** The stock is expected to have a total return that falls between the parameters of an Outperform and Underperform over the next 12 months

**Underperform (3):** Stock is expected to achieve a total negative return of at least 10% over the next 12 months

**Assumption:** The expected total return calculation includes anticipated dividend yield

#### Cowen and Company Rating System until May 25, 2013

**Outperform (1):** Stock expected to outperform the S&P 500

**Neutral (2):** Stock expected to perform in line with the S&P 500

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**Assumptions:** Time horizon is 12 months; S&P 500 is flat over forecast period

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**Eleven Biotherapeutics Rating History as of 02/28/2014**

powered by: BlueMatrix



— Closing Price — Target Price

**Actavis Rating History as of 02/28/2014**

powered by: BlueMatrix



— Closing Price — Target Price



### Allergan Rating History as of 02/28/2014

powered by: BlueMatrix



— Closing Price — Target Price

Rating Change - 2/4/2010 - Rating Outperform

### Shire Pharmaceutical Rating History as of 02/28/2014

powered by: BlueMatrix



— Closing Price — Target Price

Initiated Coverage - 6/8/2006 - Outperform Rating

#### Legend for Price Chart:

I = Initiation | 1 = Outperform | 2 = Market Perform | 3 = Underperform | UR = Price Target Under Review | T = Terminated Coverage | \$xx = Price Target | NA = Not Available

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