Human Genome Sciences, Inc. (HGSI)
(Buy)

Date: December 3, 2010

Price (12/3/2010): $25.60

12-Month Price Target: $33.42

52-Week Range: $20.56 – $34.49

Shares Outstanding: 189 Million

Market Cap (MM): $4.7 Billion

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- **BENLYSTA's commercialization in the U.S., Europe and Japan will make HGS increasingly profitable over the next ten years**
- **Long-term patent protection as well as highly sophisticated and expensive manufacturing process for BENLYSTA will deter generic competition throughout U.S., Europe and Japan during the projection period**
- **Drug pipeline is looking strong and is expected to support further revenue growth over the long term**
- **Raxibacumab sales and milestone payments are likely to continue at least until 2015**

SUMMARY

On November 16, 2010, an FDA panel voted 13-2 recommending final approval for BENLYSTA for the treatment of autoantibody-positive patients with active systemic lupus erythematosus (SLE). BENLYSTA is co-developed by Human Genome Sciences, Inc. (HGS) along with GlaxoSmithKline PLC (GSK) and is expected to fill a void where currently no adequate therapy exists in the treatment of SLE.

In June 2010, HGS and GSK began the process of marketing BENLYSTA in the U.S. and Europe and are expected to begin selling BENLYSTA in early 2011. Both HGS and GSK have current capacity to manufacture the drug and meet current demand in these regions.

With respect to the drug pipeline, HGS has three drugs that are in phase II or phase III of clinical trial and these drugs are expected to start generating revenues during the middle-part of the projection period.

COMPANY DESCRIPTION

Human Genome Sciences, Inc. (HGS) is a biopharmaceutical company based in Rockville, Maryland, focused on the development and commercialization of novel therapeutics for unmet medical diseases. The company was originally focused on the sequencing of the most important expressed genes back in 1992, building intellectual property, and developing new drug targets and drugs based on its genetic information and understanding the resulting human gene function.

HGS's pipeline consists of: 1). Internally developed drugs against newly identified targets such as BENLYSTA; 2). drugs developed by GlaxoSmithKline PLC (GSK) based on its 1996 genomics collaboration such as Darapladib; 3). Raxibacumab, a human monoclonal antibody drug that HGS discovered and developed for the treatment of inhalation anthrax; 4) Syncria, licensed to GSK, for treatment of type 2 diabetes; 5) HGS ETR1, oncology drug based on its expertise in the apoptosis, or programmed cell death, pathway.

Of these, the company's primary value driver is BENLYSTA, a humanized monoclonal antibody, partnered with GSK for the treatment of systemic lupus erythematosus (SLE).

Stock performance since inception

Source: Google Finance

Stock performance - Past 52 weeks

Source: Google Finance

BENLYSTA's commercialization and market entry in the U.S., Europe and Japan will propel HGS into profitability

With a near-unanimous vote of approval from the FDA in November 2010, HGS has cleared significant hurdles in the development and marketing of BENLYSTA. BENLYSTA currently stands as the only adequate therapy drug to be used in patients with active systemic lupus erythematosus (SLE) – a form of the lupus disease that involves the internal organs. Existing substitutes of this drug have powerful side-effects and use of such substitutes is likely to taper off especially in the U.S. , Europe and Japan with the introduction of BENLYSTA. With marketing ramping up in the U.S. and Europe, HGS and GSK fully expect to begin selling BENLYSTA in 2011.

Through the co-development and co-commercialization agreement with GSK for BENLYSTA, HGS has already received significant revenues in the form of non-refundable upfront fees, milestone payments as well as reimbursements for research and developments and other expenses as detailed in the valuation section of this report. Both HGS and GSK already have the capacity to meet current demand for BENLYSTA: HGS is able to manufacture BENLYSTA through its existing facilities for distribution in the U.S. GSK will be primarily responsible for manufacturing and selling BENLYSTA outside the U.S. HGS will then be able to share the profits from GSK's sale of the drug internationally.

Long-term patent protection and lack of competition for BENLYSTA will further support top-line growth

The current patents related to BENLYSTA are set to expire in the 2021-2023 period. We believe that this is a significantly positive factor for HGS as it begins to enter into new markets with the

drug. Currently there is a lack of viable substitutes for this drug and we believe that this factor will allow HGS to continue its current premium pricing for the foreseeable future. We also believe that HGS will benefit significantly through GSK's manufacturing capacity and marketing capability as it expands BENLYSTA's market penetration outside the U.S.

In addition, we believe that the patent protection and the expensive process for manufacturing a biotech drug such as BENLYSTA will deter any generic competition

Revenues from Raxibacumab sales are expected to continue as HGS locks in multi-year government contract

Raxibacumab is a human monoclonal antibody drug that HGS discovered and developed for the treatment of inhalation anthrax. Raxibacumab is being developed under a contract entered into in 2006 with the Biomedical Advanced Research and Development Authority (BARDA) of the Office of the Assistant Secretary for Preparedness and Response (ASPR), U.S. Department of Health and Human Services (HHS). It is awaiting FDA approval: HGS received a complete response letter for raxibacumab from FDA in November 2009, requesting additional data demonstrating safety and efficacy.

Raxibacumab represents a new way to address the anthrax threat. While antibiotics can kill the anthrax bacteria, they are not effective against the deadly toxins that the bacteria produce. Raxibacumab is a first-in-class treatment that targets anthrax toxins after they are released by the bacteria into the blood and tissues.

HGS has already recognized significant revenues through this contract with the government. The contract was amended in 2009 and extended for another three-year term over which, HGS would need to deliver 45,000 doses of the drug to the U.S. government, beginning in 2009. We expect that the contract will be further extended once the three-year term expires.

Anthrax is known to be studied and kept in various laboratories around the world. It is not difficult to produce in large quantities, as someone with a master-level education in microbiology would be able to produce it. Inhalation anthrax is much more deadly than anthrax acquired through skin contact and is the form likely to be acquired through dissemination of aerosolized anthrax spores. Even if caught in early stages, mortality from inhalation anthrax is nearly 100%.

While there is another anthrax vaccine has been licensed for use in humans, we do not believe that it will have a competitive impact on revenues through Raxibacumab since Raxibacumab is for use once a patient has already been infected. Moreover, Raxibacumab orders are tied to an existing contract with the U.S. government.

DRUG PIPELINE

HGS also has the following drugs in the later stages of clinical trial:

Syncria

HGS's Syncria, administered once weekly for treatment of type 2 diabetes, entered a large Phase III program in Q1, 2009. Data are expected in late 2011 and 2012. HGS licensed Syncria to GSK in October 2004, and is entitled to fees and milestone payments that could amount to as much as $183 million, some of which has already been received, in addition to royalties on worldwide sales if Syncria is commercialized.

The main objective of Type II diabetes treatment is the reduction of complications through the control of blood glucose level. However, as diabetes typically produces complications over a number of years, it is impractical to require new drugs to show these benefits. As such, a surrogate marker is used. One such marker is the glycosylated haemoglobin (HbA1c) level. Haemoglobin, the oxygen-carrying protein in red blood cells, is glycosylated (has a glucose molecule attached to it) when blood glucose levels are high. As the lifespan of red blood cells is about 120 days, the percentage of HbA1c in the blood is considered a proxy for monitoring abnormal spikes in blood glucose, and hence overall diabetic control over the previous three to four months. In non-diabetics, HbA1c levels are typically less than 6%, whereas in diabetics, they are typically over 8%. Current ADA (American Diabetes Association) guidelines recommend that treatment of diabetes should target HbA1c levels of less than 7%. Syncria aims to reduce the level of HbA1c.

Oncology (HGS ETR1)

HGS is investing strategically to expand and advance its oncology portfolio around its leading expertise in the apoptosis, or programmed cell death, pathway.

HGS ETR1 is currently in Phase 2 trial as a potential treatment of advanced multiple myeloma, non-small cell lung cancer, and hepatocellular cancer. HGS-ETR1 (mapatumumab) targets the TRAIL apoptosis pathway. It blocks the activity of IAP (inhibitor of apoptosis) proteins, thus allowing apoptosis to proceed and causing the cancer cells to die. When IAP proteins are over-expressed in cancer cells, they can help cancer cells resist apoptosis and resume growth and proliferation.

Darapladib

In December 2009, GSK initiated the second Phase 3 clinical trial of darapladib, which was discovered by GSK based on HGS technology, to evaluate whether it can reduce the risk of adverse cardiovascular events such as a heart attack or stroke.

Darapladib, a lipoprotein-associated phospholipase A2 (lp-PLA2) inhibitor, targets lp-PLA2, thought to be an independent risk factor for atherosclerosis and aims, in conjunction with statins, to stabilize plaques in arteries, reducing plaque ruptures which lead to strokes and heart attacks.

Zalbin

The company was in the process of co-developing and co-commercializing Zalbin, a drug designed for the treatment of chronic Hepatitis C. The co-development license agreement was entered into with Novartis. However, in June 2010, the company announced that it had received preliminary written feedback from the FDA regarding the Biologics License Application ("BLA") it filed in November 2009 for ZALBIN indicating FDA's concerns regarding the risk-benefit profile of the drug. Consequently, HGS and Novartis decided to end further development of the drug. HGS then recognized in 2010 the remaining deferred revenues it was paid as part of the agreement with Novartis.

HEALTHCARE BILL IMPACT

The Healthcare Bill passed in March 2010, aims to extend medical insurance to 32 million uninsured people (representing about 13% of currently insured people) by 2014. The addition of 32 million people would directly be beneficial to biotechnology firms who currently have successful drugs in the market. However, HGS's primary drug "BENLYSTA" is expected to come into the market only in 2011. Given this situation, along with the fact that only a fraction of those 32 million people are likely to enter the SLE customer base, we believe BENLYSTA would experience only a negligible change in the demand due to the increase in the number insured people over the next four years. Similarly, raxibacumab, HGS's next drug is unlikely to be impacted by this legislation since it is only delivered to the U.S. government on a contract basis.

The Healthcare Bill is making significant changes to the current insurance practices, including no denial of coverage to people with pre-existing conditions or high risk pool. The Healthcare Bill also makes it mandatory that insurance companies do not deny prescription medications to their members. Under the new healthcare regime, if a doctor prescribes a medication, the patient has a right to get that medication, irrespective of cost to insurance firm, till doctor decides to replace it with another one. This facility should improve the fate of HGS's drug which is unique in its treatment but may be denied by insurance firms due to its high cost.

The Healthcare Bill is bringing new customers to biotech firms, however, it also needs to be partly funded by same firms. Starting in 2011, the "Branded Prescription Drug manufacturers and importers" need to pay 2.3 billion dollars as Excise Tax to U.S government. This amount increases to 4.2 billion dollars (as shown below) till 2018 after which it's a fixed 2.8 billion dollar excise tax on the industry. The aggregate amount would be divided amongst all "Branded Prescription Drug manufacturers and importers" based on their proportion of total sales.

Calendar year	Applicable amount
2011	$2,500,000,000
2012	$3,000,000,000
2013	$3,000,000,000
2014	$3,000,000,000
2015	$3,000,000,000
2016	$3,000,000,000
2017	$3,500,000,000.
2018	$4,200,000,000
2019 and thereafter	$2,800,000,000.[1]

The $2.3 billion may seem significant for the industry, however, when we take this from the overall sales perspective of biotech firms, its impact on biotech firms and HGS in particular is limited. The biotech firms together contribute 37 billion in sales to overall prescription drug sales of $300 billion[2] representing 12% of overall sales. The expected biotech industry sales are likely to hit $95 billion in 2020 and would contribute about 25% of overall Prescription drug sales of $400 billion. Even in 2020, the impact of Excise Tax is likely to be $700 million on overall biotech industry. This amount is significantly less than the new customers likely to get enrolled for these firms. HGS's 2011 projected $248 million sales represent 0.08% of overall Prescription Drug sale and thus would mean additional tax of $2 million.

HGS's valuation takes the firm and industry growth in account while computing the Excise Tax amount.

VALUATION

This section presents the assumptions that drive valuation analysis.

BENLYSTA

The revenue projections for BENLYSTA include the following assumptions:

- The number of Lupus patients in the U.S. has been considered based on CDC information. CDC suggests that there are 322,000 cases of Lupus in the U.S. We also utilized academic research conducted over last 20 to 30 years to verify these rates and the 322,000 number is in line with academic research. We also expect that this drug will only be applicable to approximately 75% of this population since it has not been found

[1] Source : Health Care Bill - H.R. 4872 - Reconciliation Act of 2010, Section 9008 (http://www.opencongress.org/house_reconciliation)

[2] Source: http://www.reuters.com/article/idUSTRE6303CU20100401

to be equally effective in the African American population (approximately 25% of the total U.S. population).
- The number of patients across the globe has also been found to follow similar incidence rates with minor variations in Europe. However, in India and China, the incidence rate is much higher.
- The company has suggested during analyst conferences that the drug would be priced at $20,000 per year per patient. We have not observed media and analyst suggesting this is excessive. We believe GSK would have similar pricing in Europe.
- We do not believe the drug would sell in India/ China at least not in the near future since it is very costly. The option of taking steroids (despite the strong side effects) is likely to be preferable in a country like India and people would most probably choose that option rather than spending $20,000 per year. $20,000 per year is over 10 times per capita GDP of countries like India.

With respect to revenue sharing with GSK, HGS will be receiving 50% of the profit that GSK earns on its sales in Europe and Japan. Based on industry average percentages for expenses and profitability, GSK's profit margin on this drug is estimated to be 30%, which is based on average industry profit margins on Biotech drugs. We apply these percentages while estimating HGS's share of the non-U.S. revenues. The royalties obtained in this manner are used net of COGS and applied to the operating income since the company will not be paying SG&A or R&D on these royalties. This can be seen from the Income Statement & Projections table in the Appendix.

The BENLYSTA patents expire in 2023. We expect the downward price impact after patent expiration to hit the U.S and Western Europe revenue of HGSI in 2024. We expect the revenues from these two regions to go down by approximately 50%, in line with patent expiration impact witnessed in the past in U.S and Western Europe.

The number of Lupus patients is estimated to be 6 million today. This would grow to 8 million at the 1.2% growth rate of world population. The U.S and Western Europe/Japan Market represents only about 10% of current volume. We believe that by 2024, the downward price impact would have opened up sales in rest of the world and BENLYSTA, being the original drug would still be able to command a price premium. BENLYSTA should therefore be able to make up the 50% revenue shortfall by 2024 in U.S and Western Europe market, with additional revenue from rest of the world.

Based on these factors, we project the revenues for BENLYSTA in the following manner:

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
United States										
Patients with Lupus	322,000	324,898	327,822	330,772	333,749	336,753	339,784	342,842	345,928	349,041
Label Drug applicability	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Market Size	241,500	243,674	245,867	248,079	250,312	252,565	254,838	257,132	259,446	261,781
Patients Treated	3%	8%	16%	24%	31%	34%	36%	36%	36%	34%
New Patients	3%	5%	10%	12%	12%	10%	8%	6%	4%	2%
Drop out Patients			2%	4%	6%	7%	6%	6%	4%	3%
Cost	20,000	20,000	20,000	20,000	20,000	20,001	20,002	20,003	20,004	20,005
Revenue (MM)	**145**	**390**	**796**	**1,207**	**1,539**	**1,722**	**1,817**	**1,856**	**1,852**	**1,803**
Europe & Japan										
Patients with Lupus	389,261	389,261	389,261	389,261	389,261	389,261	389,261	389,261	389,261	389,261
Label Drug applicability	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Market Size	291,946	291,946	291,946	291,946	291,946	291,946	291,946	291,946	291,946	291,946
Patients Treated		3%	8%	16%	24%	31%	34%	36%	36%	36%
New Patients		3%	5%	10%	12%	12%	10%	8%	6%	4%
Drop out Patients			2%	4%	6%	7%	6%	6%	4%	3%
Cost	20,000	20,000	20,000	20,000	20,000	20,001	20,002	20,003	20,004	20,005
Revenue (MM)	-	175	467	945	1,420	1,796	1,991	2,082	2,108	2,084
Total	145	565	1,263	2,152	2,960	3,518	3,808	3,939	3,960	3,888
Profit (based on 30% profit margin)	-	53	140	284	426	539	597	625	632	625
HGSI Royalty Income (50% of profit in Europe)	**-**	**26**	**70**	**142**	**213**	**269**	**299**	**312**	**316**	**313**

Raxibacumab

In the first half of 2009 HGS achieved its first product sales and recognized $162.5 million in product sales and manufacturing and development services revenue by delivering 20,001 doses of raxibacumab to the U.S. Strategic National Stockpile (SNS).

Through a contract amendment in 2009, the USG agreed to purchase 45,000 doses of raxibacumab for the SNS, to be delivered over a three-year period, beginning in 2009. The Company expects to receive approximately $142 MM from this order as deliveries are completed, including $17,693 earned and recognized as product revenue during 2009 (all in the fourth quarter). During the nine months ended September 30, 2010 the Company earned and recognized $33.9 MM of revenue from raxibacumab. We estimate revenues from this contract to be 45MM in 2010 and 40MM in 2011 & 2012.

Based on contract renewal patters for the SNS, we expect that HGS would continue to get orders of approximately the same number of doses for the next two four-year periods as it has for the last four-year period. This would amount to a future order of about 135,000 doses, until 2020.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue from 2009 contract	17.7	45	39.65	39.65	53.25	53.25	53.25	53.25	53.25	53.25	53.25	53.25
Revenue from 2006 contract	162											
Total Revenue	179.7	45	39.65	39.65	53.25	53.25	53.25	53.25	53.25	53.25	53.25	53.25

Syncria

We expect that Syncria would be commercialized and start generating revenues from 2014. HGS is also entitled to fees and milestone payments from GlaxoSmithKline that could amount to as much as $174 million from 2010-14.

Syncria belongs to a group of drugs called "long-acting GLP -1 analogues". A number of drug companies are developing such long-acting GLP-1 analogues . These include Eli Lilly/Amylin's Bydureon (submitted), Roche's taspoglutide (Phase III), GlaxoSmithKline's albiglutide (Syncria, Phase III), and Novo Nordisk's semaglutide (Phase II). GLP-1 analogues have about 4% of the total market for diabetes drugs. Assuming that the four major competitors would have one drug each, we estimate that Syncria would capture about 1% of the diabetes market in 2020, starting with about 0.1% in 2014. If Syncria is commercialized, HGS would receive royalties of 8% on its worldwide sales according to the license agreements.

Oncology (HGS ETR1)

Although the market size for the target diseases of HGS ETR1 is approximately 2.0 BB, we do not expect that the company would have commercialized these before next 7 – 8 years. Moreover, the market for products targeting these diseases is highly fragmented, with the market share of different drugs targeting these diseases ranging from 5 to 14 %. We estimate that, if commercialized, the company would capture 10% (close to the average market share of 9.5%) of the market for these diseases. About 60% of Phase 2 drugs get commercialized. Therefore we expect revenues from this drug to be 120MM in 2020, starting in 2017, with 60MM.

Darapladib

HGS will receive a 10% royalty on worldwide sales of darapladib if it is commercialized. HGS is also entitled to receive a milestone payment if darapladib moves through clinical development into registration. Using estimates from Cowen, darapladib sales could be about $150MM in 2013, reaching $450MM in 2015. Our model includes a 10% royalty to HGS from darapladib sales, conditional on its approval and commercialization.

Revenue from Drug Pipeline											
Global Revenue from drug pipeline	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Estimated worldwide market for diabetes drugs	25,410	27,951	30,746	33,821	37,203	40,923	45,015	49,517	54,469	59,915	65,907
Revenue percentage					0.10%	0.20%	0.40%	0.50%	0.60%	0.80%	1.00%
Revenue					37.2	81.8	180.1	247.6	326.8	479.3	659.1
Revenue conditional on approval					27.5	60.6	133.2	183.2	241.8	354.7	487.7
Royalties to HGSI (8%)					2.2	4.8	10.7	14.7	19.3	28.4	39.0
Milestone payments for Syncria	34.8	34.8	34.8	34.8	34.8	0	0	0	0	0	0
Revenue from Oncoloy drugs								60	80	100	120
Revenue from Darapladib				150	300	450	585	702	807.3	888	932
							30%	20%	15%	10%	5%
Royalty earnings to HGSI from Darapladib sales				11	23	34	44	53	61	67	70
Total Revenue from Drug pipeline	**34.8**	**34.8**	**34.8**	**46.1**	**59.5**	**38.6**	**54.5**	**127.3**	**159.9**	**195.0**	**228.9**

COGS

While COGS in 2010 represent approximately 18% of the revenues, we assume that COGS increase from the current level to the industry average of 20% of revenue, by 2011.

SG&A

We expect selling, general and administrative expenses to increase to the industry average of 25% by 2011 as the company expands its sales force to allow for increased marketing of BENLYSTA. This assumption allows the SG&A to gradually increase as sales increase and as the company enters new markets with its drugs.

R&D Expenses

While current R&D expenses are a significant portion of the revenues, we assume that the R&D expenses will attain industry average by 2015 as the company begins to market one or more of its drugs in the pipeline. This assumption therefore allows the R&D expenses to increase until 2015 and then remain relatively stable over the remaining periods.

Interest Expense

The company currently has convertible notes due 2011 and 2012. In the absence of adequate guidance from the company regarding its debt, we expect that the company will continue with its current level of debt until 2015. Following 2015, we linearly reduce the interest expense since we assume that the company will obtain increased ability to retire its debt as revenues from the drug pipeline increase.

Effective tax rate

We assume that the effective tax rate, beginning with 2010, would be at the same level as industry average until 2015. The effective tax rate is then assumed to be 40% - the average of state and federal tax rates.

Capex

Since the company currently has adequate manufacturing capacity, we assume that capex will remain at the same level as the last twelve months until 2012. Since the company is likely to need to satisfy additional demand as it enters new markets by 2013, we raise the capex to the industry average. This allows capex to increase substantially in 2013. The capex is then allowed to decrease linearly to the end of the projection period.

Depreciation & Amortization

We assume that the D&A would reach 100% of capex by 2020.

APPENDIX

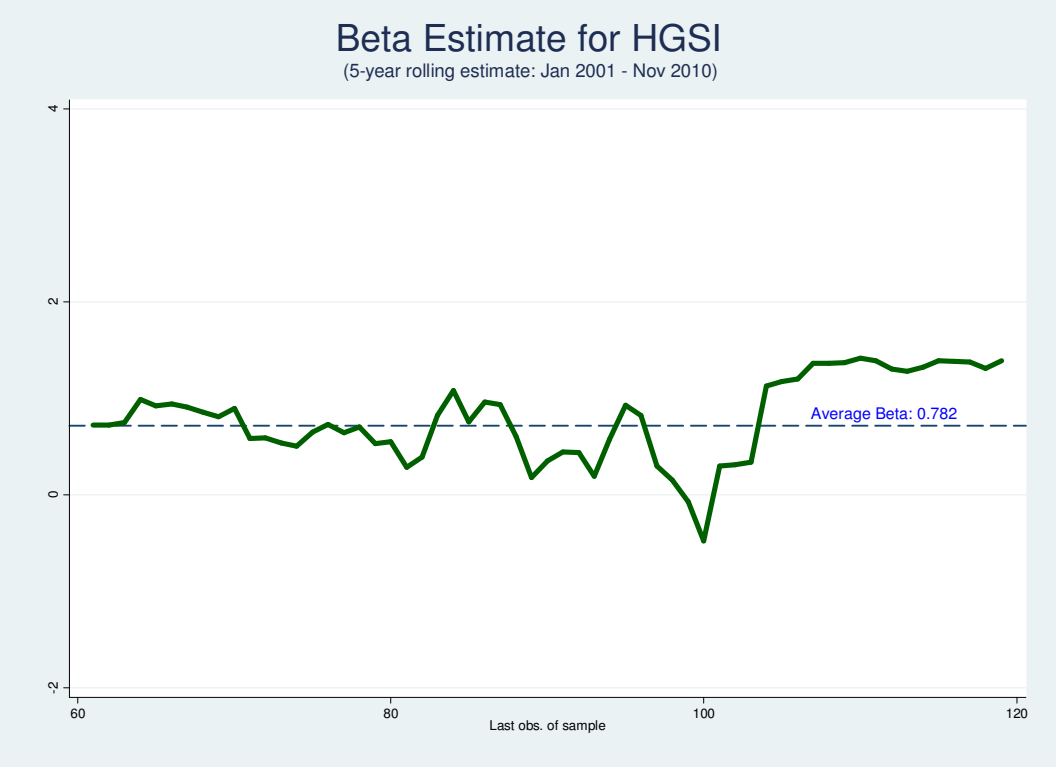
Ratios					
For the Fiscal Period Ending	12 months Dec-31-2006	12 months Dec-31-2007	12 months Dec-31-2008	12 months Dec-31-2009	LTM 12 months Sep-30-2010
Profitability					
Return on Assets %	(13.8%)	(15.5%)	(19.4%)	0.4%	(6.6%)
Return on Capital %	(15.6%)	(19.1%)	(25.0%)	0.5%	(7.3%)
Return on Equity %	(79.6%)	(281.5%)	NM	1.8%	(32.8%)
Return on Common Equity %	(79.6%)	(281.5%)	NM	1.8%	(32.8%)
Asset Turnover					
Total Asset Turnover	0.0x	0.0x	0.1x	0.2x	0.2x
Fixed Asset Turnover	0.1x	0.2x	0.2x	1.0x	0.7x
Accounts Receivable Turnover	0.8x	0.8x	1.5x	9.3x	8.1x
Inventory Turnover	NA	NA	NA	NA	13.0x
Short Term Liquidity					
Current Ratio	4.3x	1.4x	0.6x	4.8x	8.6x
Quick Ratio	4.2x	1.3x	0.5x	4.6x	8.2x
Cash from Ops. to Curr. Liab.	NM	NM	NM	NM	NM
Avg. Days Sales Out.	461.9	449.8	240.4	39.2	44.9
Avg. Days Inventory Out.	NA	NA	NA	NA	28.0
Avg. Days Payable Out.	NA	NA	NA	NA	60.0
Avg. Cash Conversion Cycle	NA	NA	NA	NA	12.9
Long Term Solvency					
Total Debt/Equity	351.3%	NM	NM	79.2%	92.5%
Total Debt/Capital	77.8%	101.6%	125.8%	44.2%	48.1%
LT Debt/Equity	351.3%	NM	NM	79.2%	92.5%
LT Debt/Capital	77.8%	101.6%	125.8%	44.2%	48.1%
Total Liabilities/Total Assets	81.4%	101.3%	119.8%	50.6%	51.4%
Source: Capital IQ					

Income Statement & Projections

For the Fiscal Period Ending	12 months Dec-31-2006	12 months Dec-31-2007	12 months Dec-31-2008	12 months Dec-31-2009	ASSUMPTION		12 months Dec-31-2010	12 months Dec-31-2011	12 months Dec-31-2012	12 months Dec-31-2013	12 months Dec-31-2014	12 months Dec-31-2015	12 months Dec-31-2016	12 months Dec-31-2017	12 months Dec-31-2018	12 months Dec-31-2019	12 months Dec-31-2020
Currency							*USD*	*USD*	*USD*	*USD*	*USD*	*USD*	*USD*	*USD*	*USD*	*USD*	*USD*
Revenues																	
Benalysta	-	-	-	-			***4.8***	***144.9***	***389.9***	***796.0***	***1,207.1***	***1,539.4***	***1,722.3***	***1,817.5***	***1,856.4***	***1,852.2***	***1,803.5***
Zalbin	-	-	-	-			***82.8***	-	-	-	-	-	-	-	-	-	-
Raxibacumab	-	-	-	-			***45.0***	***39.7***	***39.7***	***53.3***	***53.3***	***53.3***	***53.3***	***53.3***	***53.3***	***53.3***	***53.3***
PipeLine Drugs	-	-	-	-			***34.8***	***34.8***	***34.8***	***46.1***	***59.5***	***38.6***	***54.5***	***127.3***	***159.9***	***195.0***	***228.9***
Total Revenue	**25.8**	**41.9**	**48.4**	**275.7**			**167**	**219**	**464**	**895**	**1,320**	**1,631**	**1,830**	**1,998**	**2,070**	**2,100**	**2,086**
Growth		62%	16%	469%			-39%	31%	112%	93%	47%	24%	19.4%	15.2%	10.9%	6.7%	2.5%
COGS	0.0	0.0	0.0	(34.0)			(29.3)	(36.2)	(84.2)	(166.5)	(247.0)	(319.7)	(358.7)	(391.6)	(405.6)	(411.7)	(408.8)
% of Revenue	-	-	-	-	a)	19.60%	18%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Gross Profit	**25.8**	**41.9**	**48.4**	**241.7**			**138.1**	**183.2**	**380.1**	**728.8**	**1,072.8**	**1,311.5**	**1,471.4**	**1,606.4**	**1,664.0**	**1,688.7**	**1,676.9**
SG&A (Excl. D&A)	(23.6)	(33.0)	(11.8)	(13.3)			(39.0)	(54.4)	(115.2)	(222.0)	(327.3)	(404.6)	(453.9)	(495.5)	(513.3)	(520.9)	(517.2)
% of Revenue	92%	79%	24%	5%	b)	24.8%	23%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
% Yr/yr		40%	-64%	13%			193%	39%	112%	93%	47%	24%	12%	9%	4%	1%	-1%
R & D	(209.2)	(246.3)	(243.3)	(173.7)			(171.5)	(188.5)	(322.5)	(474.3)	(481.6)	(326.3)	(366.0)	(399.6)	(413.9)	(420.1)	(417.1)
% of Revenue	812%	588%	502%	63%	c)		102%	86%	69%	53%	36%	20%	20%	20%	20%	20%	20%
Total Operating Exp.	**(242.2)**	**(258.1)**	**(256.6)**	**(225.8)**			**(240.0)**	**(279.3)**	**(522.2)**	**(863.4)**	**(1,056.9)**	**(1,051.7)**	**(1,179.9)**	**(1,288.2)**	**(1,334.3)**	**(1,354.2)**	**(1,344.7)**
% Revenue	941%	617%	530%	82%			143%	127%	112%	96%	80%	64%	64%	64%	64%	64%	64%
HGSI Royalty Inc.from Benlysta (Net of COGS)							0.00	0.00	21.13	56.33	113.99	171.31	216.54	240.10	251.12	254.21	251.36
EBITDA	**(216)**	**(216)**	**(208)**	**50**			**(73)**	**(60)**	**(37)**	**88**	**377**	**751**	**867**	**950**	**986**	**1,000**	**992**
EBITDA Margin	-841%	-517%	-430%	18%			-43%	-27%	-8%	10%	29%	46%	47%	48%	48%	48%	48%
Operating Income (EBIT)	**(236.6)**	**(260.3)**	**(253.5)**	**6.7**			**(93.7)**	**(79.8)**	**(55.4)**	**(19.3)**	**247.3**	**623.0**	**755.8**	**860.2**	**921.8**	**959.3**	**971.5**
EBIT Margin	-919%	-622%	-524%	2%			-56%	-36%	-12%	-2%	19%	38%	41%	43%	45%	46%	47%
Interest Expense	(27.00)	(60.70)	(62.90)	(58.40)	e)		(58.9)	(58.9)	(58.9)	(58.9)	(58.9)	(58.9)	(47.1)	(35.3)	(23.6)	(11.8)	0.0
Interest and Invest. Income	27.13	32.99	23.49	12.73	f)	-11.0%	11.33	10.08	8.97	7.99	7.11	6.33	5.63	5.01	4.46	3.97	3.53
Net Interest Exp.	**0.1**	**(27.7)**	**(39.4)**	**(45.7)**			**(47.6)**	**(48.8)**	**(49.9)**	**(50.9)**	**(51.8)**	**(52.6)**	**(41.5)**	**(30.3)**	**(19.1)**	**(7.8)**	**3.5**
% of Revenue	1%	-66%	-81%	-17%			-28.42%	-22.26%	-10.75%	-5.69%	-3.92%	-3.22%	-2.27%	-1.52%	-0.92%	-0.37%	0.17%
Earnings before Taxes	(236.46)	(288.03)	(292.91)	(38.93)			(141.3)	(128.6)	(105.3)	(70.2)	195.5	570.4	714.3	829.9	902.7	951.5	975.0
Income Tax Expense	0.0	0.0	0.0	(1.3)			0.0	0.0	0.0	0.0	(46.9)	(136.9)	(285.7)	(332.0)	(361.1)	(380.6)	(390.0)
Effective Tax Rate	0.00%	0.00%	0.00%	-3.34%	g	24.00%	24.00%	24.00%	24.00%	24.00%	24.00%	24.00%	40.00%	40.00%	40.00%	40.00%	40.00%
Excise tax Impact							0.0	(2)	(4)	(8)	(12)	(14)	(15)	(19)	(23)	(15)	(15)
Excise tax as % of revenue							0.0%	0.8%	0.9%	0.9%	0.9%	0.9%	0.8%	1.0%	1.1%	0.7%	0.7%
Earnings from Cont. Ops.	**(236.5)**	**(288.0)**	**(292.9)**	**(40.2)**			**(141.3)**	**(130.4)**	**(109.7)**	**(78.4)**	**136.8**	**419.4**	**413.2**	**478.9**	**518.6**	**555.7**	**570.4**
Net Income	**(236.5)**	**(288.0)**	**(292.9)**	**(40.2)**			**(141.3)**	**(130.4)**	**(109.7)**	**(78.4)**	**136.8**	**419.4**	**413.2**	**478.9**	**518.6**	**555.7**	**570.4**
Net Margin	-918%	-688%	-605%	-15%			-84.40%	-59.45%	-23.63%	-8.76%	10.37%	25.71%	22.58%	23.97%	25.06%	26.46%	27.35%
Supplemental Items																	
Capex	(12)	(16)	(10)	(10)	from CF		(9)	(9)	(9)	(54)	(70)	(75)	(71)	(63)	(50)	(36)	(21)
% of Revenue	47%	39%	20%	4%	h)		5%	4%	2%	6%	5%	5%	4%	3%	2%	2%	1%
D&A	(20.1)	(44.0)	(45.3)	(43.2)	from CF		(21)	(20)	(19)	(107)	(130)	(128)	(111)	(90)	(65)	(41)	(21)
% of Capex	165%	272%	467%	432%	i)		243%	229%	214%	200%	186%	171%	157%	143%	129%	114%	100%

Free Cash Flow	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	$26	$42	$48	$276	$167	$219	$464	$895	$1,320	$1,631	$1,830	$1,998	$2,070	$2,100	$2,086
Cost Of Goods Sold	0.0	0.0	0.0	(34.0)	(29.3)	(36.2)	(84.2)	(166.5)	(247.0)	(319.7)	(358.7)	(391.6)	(405.6)	(411.7)	(408.8)
Selling General & Admin Exp.	(23.6)	(33.0)	(11.8)	(13.3)	(39.0)	(54.4)	(115.2)	(222.0)	(327.3)	(404.6)	(453.9)	(495.5)	(513.3)	(520.9)	(517.2)
R & D Exp.	(209.2)	(246.3)	(243.3)	(173.7)	(171.5)	(188.5)	(322.5)	(474.3)	(481.6)	(326.3)	(366.0)	(399.6)	(413.9)	(420.1)	(417.1)
Other Operating Exp.	0.0	0.0	0.0	(0.2)	(0.1)	(0.2)	(0.3)	(0.6)	(1.0)	(1.2)	(1.3)	(1.4)	(1.5)	(1.5)	(1.5)
Operating Exp.	**(242.2)**	**(258.1)**	**(256.6)**	**(225.8)**	**(240.0)**	**(279.3)**	**(522.2)**	**(863.4)**	**(1,056.9)**	**(1,051.7)**	**(1,179.9)**	**(1,288.2)**	**(1,334.3)**	**(1,354.2)**	**(1,344.7)**
EBIT	($237)	($260)	($254)	$7	($94)	($80)	($55)	($19)	$247	$623	$756	$860	$922	$959	$971
EBITDA	(216)	(216)	(208)	50	(73)	(60)	(37)	88	377	751	867	950	986	1,000	992
Interest Gain (Expense)	0	(28)	(39)	(46)	(48)	(49)	(50)	(51)	(52)	(53)	(41)	(30)	(19)	(8)	4
EBT	(216)	(244)	(248)	4	(120)	(109)	(87)	37	325	698	825	920	967	993	996
Income Tax	0	0	0	(1)	0	0	0	0	(47)	(137)	(286)	(332)	(361)	(381)	(390)
Earnings from Cont. Ops.	(236)	(288)	(293)	(40)	(141)	(130)	(110)	(78)	137	419	413	479	519	556	570
Depreciation & Amortization	(20)	(44)	(45)	(43)	21	20	19	107	130	128	111	90	65	41	21
Capex	(12)	(16)	(10)	(10)	(9)	(9)	(9)	(54)	(70)	(75)	(71)	(63)	(50)	(36)	(21)
Changes in working capital	0	(0)	(0)	1	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
Levered FCF	**(269)**	**(348)**	**(348)**	**(93)**	**(129)**	**(120)**	**(100)**	**(25)**	**196**	**472**	**453**	**505**	**532**	**560**	**570**
Interest Expense (Gain)	(0)	28	39	46	48	49	50	51	52	53	41	30	19	8	(4)
Effective Tax Rate	0.00%	0.00%	0.00%	-3.34%	24.00%	24.00%	24.00%	24.00%	24.00%	24.00%	40.00%	40.00%	40.00%	40.00%	40.00%
Debt Tax Shield				**-2**	**11.42**	**11.72**	**11.98**	**12.22**	**12.43**	**12.62**	**16.60**	**12.13**	**7.64**	**3.12**	**0.00**
APV Discount															
Cost of Equity				8.44%	100%	92.22%	85.04%	78.43%	72.32%	66.70%	61.51%	56.72%	52.31%	48.24%	44.48%
10 year treasury rate				2.96%	100%	97.12%	94.33%	91.61%	88.97%	86.41%	83.92%	81.51%	79.16%	76.88%	74.67%
PV of FCF				**1,479**	**(129)**	**(110)**	**(85)**	**(20)**	**142**	**315**	**279**	**287**	**278**	**270**	**254**
PV of DTS				**100**	**11**	**11**	**11**	**11**	**11**	**11**	**14**	**10**	**6**	**2**	**0**
Terminal Value															
Growth Rate				3.0%											3.0%
Terminal FCF				4,802											10,795
Terminal DTS				0											0
				4,802											
Valuation															
Firm Value				6,381											
Net Debt				73											
Equity Value				**6,308**											
Current Market Cap				**4,700**											
Shares outstanding (MM)				189											
Undervaluation (Overvaluation)				**34.23%**											
Target Price				**$33.42**											

Sensitivity Analysis: Market Cap								
		Cost of Equity						
		7.00%	8.00%	8.44%	9.00%	10.00%	11.00%	12.00%
Terminal Growth Rate	1.00%	6,561	5,367	4,949	4,481	3,800	3,263	2,829
	1.50%	7,031	5,680	5,215	4,700	3,958	3,380	2,918
	2.00%	7,594	6,046	5,523	4,950	4,136	3,510	3,015
	2.50%	8,283	6,478	5,882	5,238	4,337	3,656	3,124
	3.00%	9,144	6,996	6,308	5,574	4,568	3,820	3,244
	3.50%	10,251	7,630	6,820	5,972	4,833	4,005	3,378



Cost of Capital Calculation

Ticker	Beta [1]	Debt [2]	Equity [2]	Market Capitalization [2]	Tax Rate [3]	Asset Beta
AMGN	0.432	11.732	23.170	53.675	24%	0.312
GILD	0.396	1.709	6.562	30.308	24%	0.330
CELG	0.635	0.021	4.928	26.795	24%	0.633
GENZ	0.346	1.114	6.475	18.221	24%	0.306
BIIB	0.687	1.080	5.171	13.407	24%	0.593
LIFE	0.750	2.642	4.373	8.710	24%	0.514
VRTX	0.591	0.132	0.827	7.207	24%	0.527
ALXN	0.434	0.004	0.792	5.857	24%	0.432
ILMN	0.530	0.300	1.037	6.250	24%	0.434
HGSI	0.782	0.611	0.692	5.379	24%	0.468
Average	**0.534**	**2.082**	**5.926**	**18.937**	**0.239**	**0.454**
Median	**0.561**	**0.846**	**4.651**	**11.059**	**0.239**	**0.451**

Risk Free Rate	2.96%	10-year Treasury rate
Market Risk Premium	7%	Historical market risk premium
Cost of Equity	**8.44%**	

Sources:

[1] Based on regression of company stock prices on a composite of 5-year NYSE, AMEX & NASDAQ

[2] Capital IQ

[3] Tax rate based on the average historical effective tax rate for the consituents

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