Yale SCHOOL of MANAGEMENT

Rigel Pharmaceuticals

Recommendation: Sell	
Target Price	$ 16.58
Current Price	$ 22.00
Difference	24.6%↓
Market Cap.	$ 531.6mm
52 Wk High	$ 26.86
52 Wk Low	$ 14.52
Shrs. Out.	24.15mm

As of November 25, 2005

- No commercialized products
- Current revenues come entirely from collaborative agreements
- No late-stage pipeline drugs
- Promising clinical studies insufficient to overcome speculative revenue picture
- Blockbuster potential, if any, lies years into the future
- Future stock dilution likely

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MGT 948 – Securities Analysis and Valuation

Please see Important Disclaimer at the end of this report

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Investment Thesis

We are initiating our coverage of Rigel Pharmaceuticals, Inc., at a sell rating. Simply put, the company's potential is wholly speculative at this point. Despite a history of partnerships with large pharma firms, the company has yet to bring a treatment to market. Indeed, the Rigel product furthest along in the approval process, R112, intended to treat allergic rhinitis, is still in Phase II clinical testing and unlikely to reach the market, if at all, for several years.

Rigel has potential, as evidenced by the investments made in the company by large firms like Merck & Co., Janssen Pharmaceutica, and Pfizer.[1] Until Rigel's potential comes closer to concrete results, however, we believe that the company's potential revenue streams are too uncertain to support a market capitalization in the half-billion-dollar range it currently enjoys.

Company Overview[2]

Incorporated in 1996, Rigel Pharmaceuticals, Inc., is a "clinical stage drug development company that discovers and develops novel, small-molecule drugs for the treatment of inflammatory diseases, cancer and viral diseases." The company currently has 151 employees. Rigel has an announced goal of beginning clinical trials of one new drug for a significant indication per year. The company met this goal in 2002, 2003 and 2004, and it anticipates filing an IND (investigational new drug application) for an additional candidate by the end of this year.

Rigel's research focuses on the signaling pathways between cells and related areas. Because such signaling is involved in the development and progression of many diseases, the company's research, if successful, has the potential to lead to important new treatments for humans and animals. Currently, however, the company does not have any products beyond Phase II of the U.S. Food and Drug Administration (FDA) approval process.

Rigel completed its initial public offering in November 2000. It has closed additional rounds of financing in January 2002, June 2003, February 2004 and July 2005, in the form of secondary public stock offerings. The company has significant accumulated losses and had yet to turn a profit. Management does not expect to achieve profitability for at least several years. Therefore, although the company has nearly $152mm in cash on hand after the Serono agreement, additional capital will likely be necessary, as the company has incurred losses of $37mm to $56mm over the last three fiscal years.

To date, Rigel has operated largely in collaboration with larger pharmaceutical firms. Generally, these firms have provided initial payments when a collaborative agreement is

[1] We note that some of these large firms have let their collaborative agreements with Rigel expire, after they achieved no commercial success.
[2] Source: company reports, SEC filings, website and information sheets.

established, together with research-support funds, potential payments for achieving certain milestones (usually relating to research or FDA approval) and royalty payments, should the collaboration result in finished-product sales. For example, in 1998, Rigel entered into a collaborative arrangement with Janssen Pharmaceutica N.V. of Belgium (a division of Johnson & Johnson). The agreement called for a $1mm payment to Rigel within 10 days of contract execution and quarterly payments totaling $2.5mm per year to support Rigel's research efforts. In addition, concerning potential substances developed in collaboration, the contract specified certain milestone payments; for example, upon the enrollment of the fifth patient in a Phase II clinical trial of a product coming out of the collaboration, Janssen would pay Rigel $2mm. Finally, should the same collaborative developments led to commercialized products, the agreement called for royalties to Rigel of 4-6% of net sales.

As with all pharmaceuticals, any new drugs Rigel attempts to bring to market must follow an extensive process supervised by governmental agencies. The process in the United States is generally as follows (similar processes are used in other countries):

- Preclinical Trials – These trials evaluate a potential drug's chemistry, its biological activities and the results of animal studies to determine the safety and efficacy of the drug. These results are submitted to the FDA to seek approval to run human tests in the clinical phases.
- Phase I – These are small trials, usually with healthy human volunteers, to determine human safety of the proposed drug.
- Phase II – These are preliminary trials with patients who have the medical condition the drug is being proposed to treat. This phase involves determining the initial effectiveness of the drug and evaluating proper dosages, as well as additional safety tests.
- Phase III – Phase II involves large patient trials that determine the statistical efficacy of the drug compared to the efficacies of existing drugs on the market; this phase also includes further safety studies.
- FDA Approval – After successfully completing Phase III trials, a drug manufacturer submits the drug to the FDA for approval in treating one or more different diseases. The drug maker may submit requests to use the drug to treat additional conditions in the future. The FDA approves 70-90% of all drugs that have successfully completed the Phase III tests.[3]

The FDA continues to monitor approved drugs and requires drug manufacturers to submit regular reports concerning the safety and side effects of drugs on the market. The average length of time needed to bring a drug to market from its preclinical inception is fourteen years.

All of Rigel's revenue this year is from collaborative contract arrangements, in which Rigel receives up-front and milestone-related payments from its partners. In addition,

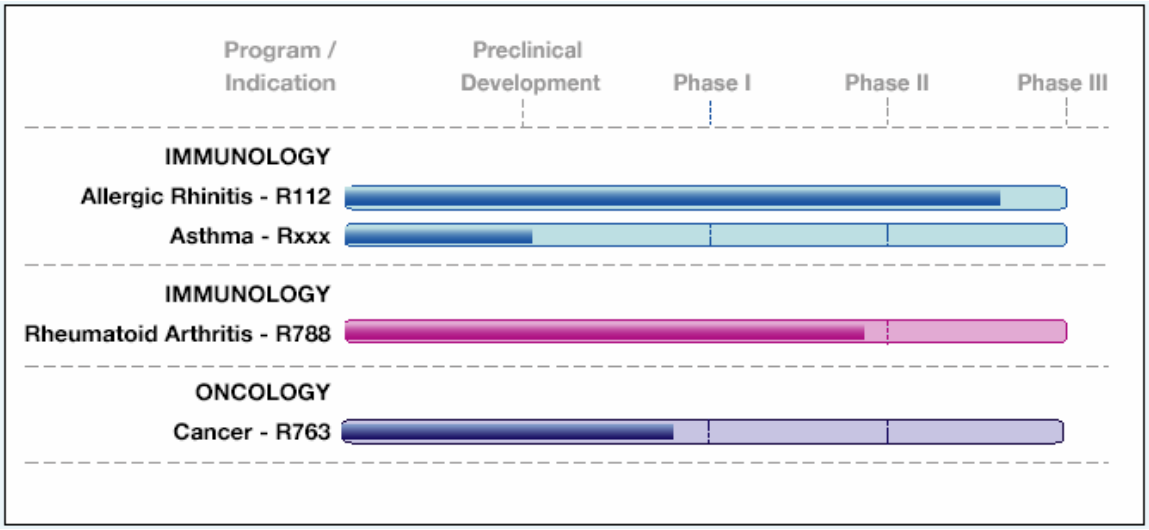
[3] Thomson Centerwatch: Centerwatch Clinical Trials Listing Service. (http://www.centerwatch.com/patient/backgrnd.html)

Rigel partners absorb some of Rigel's research and development costs, generally calculated on a cost-per-FTE basis, according to how many employees are devoted to a given project. In the future, Rigel hopes to receive royalty revenue from commercial sales of products it currently has under development.

Royalty revenues from Rigel's drugs, if products are eventually brought to market, will face risk from existing market players and potential entrants, both brand name manufacturers and generic competitors. Patent protection is essential for non-generic pharmaceutical companies like Rigel. Rigel is a relatively young company, so none of its drugs have patents that are close to expiring. Notably, some of Rigel's intellectual property is licensed from Stanford University, but Rigel has been granted exclusive license rights.

Product Pipeline

As noted above, none of Rigel's potential treatments has progressed beyond Phase II of the FDA approval process. The following chart presents an overview of where the company's products stand in the FDA process.



According to the National Institutes of Health and the FDA Center for Drug Evaluation and Research, the various clinical phases have the following profiles[4]:

[4] http://www.mayoclinic.com/health/clinical-trials/DI00033

Phase	Number of participants	Length of study	What researchers are studying	Success rate
Phase I	20-80	Several months	Safety	70 percent
Phase II	100-300	As long as two years	Effectiveness	33 percent
Phase III	1,000-3,000	One-four years	Safety, effectiveness and proper dosage	25-30 percent

In addition, post-Phase-IV approval takes, on average, about a year, but it can take as long as several years.[5]

Given that R112 is currently in the midst of Phase II, therefore, it is unlikely that Rigel will realize significant revenues from drug sales before approximately 2009. It could be significantly longer than that before the company enjoys a product revenue stream.

R112

R112 is a treatment for allergic rhinitis. Allergic rhinitis is a reaction to allergens that produces histamines in humans, resulting in symptoms such as sneezing, congestion, runny nose, and itchy nose, throat, eyes and ears.[6] Initial Phase II results for R112 have been encouraging. In the first study:

> R112 reduced certain symptoms of allergic rhinitis in a statistically significant manner compared to placebo, had a favorable safety profile and had a rapid onset of action in symptom improvement. There were no significant drug-related adverse events reported in the trial, and adverse event frequencies were indistinguishable from placebo. As early as the 30 to 45 minute time interval after dosing, R112 showed a significant improvement in symptom scores over placebo and demonstrated a rapid onset of action in symptom improvement. Furthermore, these beneficial effects lasted throughout the entire measurement period until the end of the park day. In particular, symptoms most closely associated with chronic nasal congestion (e.g., stuffy nose) were dramatically improved with R112 over placebo.[7]

Pfizer, Inc., has collaborated with Rigel on the development of R112 and has certain negotiation rates concerning the drug, but Rigel is not precluded from partnering with another major pharma firm concerning R112. Should clinical trials – and ultimately the FDA approval process – continue to exhibit success, Rigel could be in a strong position

[5] Id.
[6] The Centers for Chronic Nasal and Sinus Dysfunction: http://www.nasal.net/allergy/rhinitis.htm.
[7] Rigel 3rd quarter 2005 10-Q.

to negotiate an advantageous royalty arrangement for the drug. Direct medical costs for the treatment of allergies were estimated at $4.5bn in 2001.[8] However, this drug category already has significant competition from some of the most heavily promoted and well known consumer medications in existence, including Allegra, Claritin/Clarinex and Zyrtec.

Pipeline competition includes NLA Nasal Spray from Biolipox, presently in Phase II trials[9]and rEV131 from Evolutec, also in Phase II.[10]

R406/788

R406 is a Syk kinase inhibitor intended for the treatment of rheumatoid arthritis. R788 is a solid dose version of the medication. The drug is in Phase I trials that, to date, seem to be demonstrating its safety. Based on average FDA approval-pipeline data, Rigel cannot expect to realize sales revenue from R406/788 for at least five years. As of 2002, the medication costs associated with rheumatoid arthritis were estimated at $2.4bn per year.[11] With this particular drug, the company has indicated it wishes to pursue the marketing on its own and not involve a large pharma.

Potential rivals in the development pipeline include Avandia and compounds 274150, 681323 and 856553 from GlaxoSmithKline, all currently in Phase II trials[12]; and c-4462 and c-5997 from Merck, both in Phase I trials.[13]

R763

A part of Rigel's aurora kinase inhibition program, targeting cancer cell proliferation, R763 is in Phase I clinical trials. Rigel has a collaborative agreement with Serono S.A., a Swiss biotechnology company, under which Serono has rights to commercialize R763 and other results of Rigel's aurora kinase inhibitor research. Under the terms of the agreement, Rigel will receive from Serono $10mm in license fees and a $15mm investment at a premium to Rigel's stock price. The agreement also calls for milestone and royalty payments. Additionally, the company has collaboration agreements with Merck and Daiichi related to its oncology drugs.

Cancer treatment, according to the National Cancer Institute, cost $41.2bn as of 1995.[14] The specific forms of cancer for which aurora kinase inhibitors appear promising (breast, bladder, cervical, colorectal, head/neck, lung, pancreatic and prostate) comprised $25.9bn

[8] Source: National Pharmaceutical Council (http://www.npcnow.org/resources/PDFs/CL_Allergies.pdf).
[9] http://www.biolipox.se/eng/projektportfolj.asp
[10] http://www.evolutec.co.uk/rev131.htm
[11] Source: Arthritis Foundation and National Pharmaceutical Council (http://www.npcnow.org/resources/PDFs/CL_Arthritis.pdf).
[12] http://www.gsk.com/financial/pp_pipeline_standard.htm
[13] http://www.merck.com/finance/annualreport/ar2003/product_pipeline/
[14] http://progressreport.cancer.gov/doc.asp?pid=1&did=21&chid=13&coid=33&mid=vpco.

in treatment costs in 1998 (in 1996 dollars), translating to about $32bn in today's dollars.[15]

Competition in the development of cancer treatments is fierce. For example, "In 2001 the pharmaceutical industry pipeline contained 402 new cancer medicines . . . ."[16] More specifically, other firms are developing kinase inhibitors to combat cancer, including Onyx/Bayer's Nexavar (in Phase II and III trials for different indications)[17] and Pfizer's Sutent, now in Phase III development[18].

Important Risks

Rigel faces a number of risk factors. Most important among these risk factors is the possibility that the company will not develop marketable products – or at least will not develop them in time to keep the company a going concern. Contributing to this danger is the related risk that its partners, who provide all of Rigel's revenue, will end their collaborations, if, for example, clinical trials do not produce encouraging results.

Rigel's revenue from partnerships is insufficient to cover costs, and therefore the firm will need to raise additional capital to cover years of operations before revenues sufficient to cover expenses can be expected. In the first nine months of 2005, Rigel received $10.5mm in revenue from partners. In the same period, the company's costs were $48.3mm. Costs have the potential to increase greatly, as the company hopes to progress to the larger and more expensive trials required in Phase III.

Given the uncertain revenue stream, Rigel is unlikely to be able to raise money by issuing debt. Instead, the company will probably have to issue additional stock, as it has done nearly annually – four times since its IPO in 2000. This presents the possibility of significant dilution, which is only exacerbated by the company's options overhang of $27.7mm. Rigel might turn to convertible debt to raise money to cover operating expenses, but convertibles present dilutive consequences, as well.

As essentially an R&D operation, Rigel must constantly achieve research progress. But with only 151 employees, Rigel does not have the depth or breadth of research capabilities of its large competitors. The goal of filing one IND application per year might prove overambitious.

Given the long time to market for Rigel's products, it faces the possibility that other, equally or more effective methods of treatment for the diseases it is targeting emerge in the interim. Many pharmaceutical and biotech companies are researching a variety of

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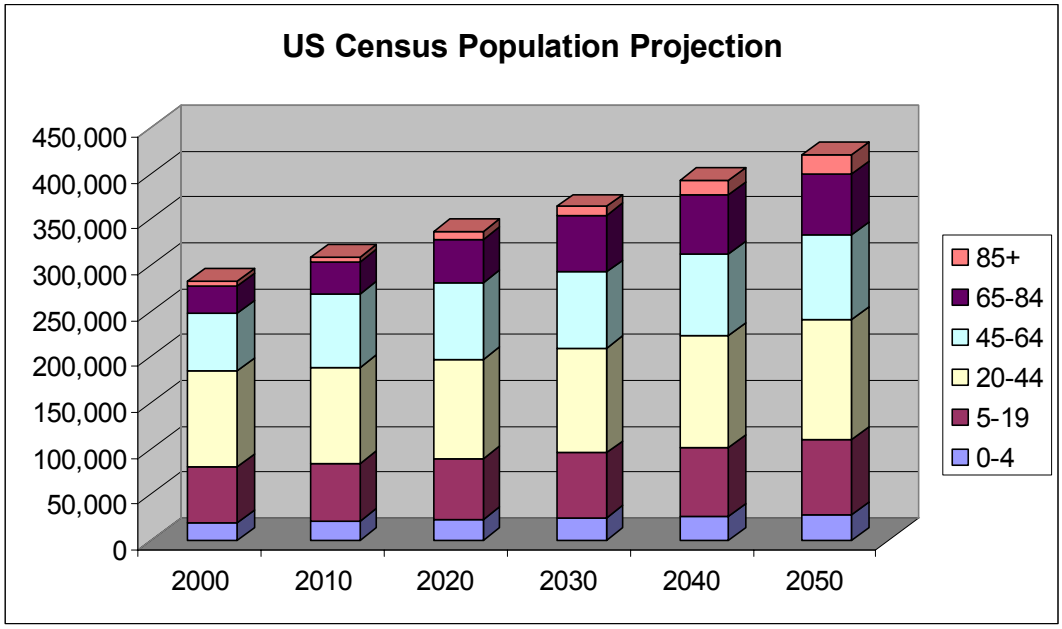
[15] Sources: id.; Serono website (http://www.serono.com/company/index.jsp?major=0); October 25, 2005 Rigel/Serono press release.
[16] Lehman, Bruce, "The Pharmaceutical Industry and the Patent System," 2003, http://www.earthinstitute.columbia.edu/cgsd/documents/lehman.pdf
[17] http://www.onyx-pharm.com/wt/page/products
[18] http://www.pfizer.com/pfizer/are/investors_releases/2005pr/mn_2005_0720.jsp

approaches to treat, in particular, allergies, arthritis and cancer, Rigel's most promising areas of research.

Demographics

Ultimately, revenues for Rigel will come from individual patients utilizing the company's drugs. The larger the population, the more people there are to buy Rigel's potential products. As is the case with most pharmaceutical company's, we expect that the majority of Rigel's sales (if any) will come from the US, Japan and Europe, the largest drug markets. The US population is expected to grow at around 0.9% for the next decade, slowing somewhat after that to 0.7% or 0.8% through 2050.[19] Japan and Europe are expected to grow even more slowly, if at all.[20] It would be fair to assume very limited total population growth, which by itself would therefore have little to no impact on earnings for Rigel. Other areas of the world are growing at a much greater pace, but they represent such a small portion of the overall market for drugs targeting the diseases Rigel is addressing that the growth is inconsequential.



Source: U.S. Census Bureau, 2004, "U.S. Interim Projections by Age, Sex, Race, and Hispanic Origin," http://www.census.gov/ipc/www/usinterimproj/

The changing demographics of the population, however, represent a much bigger potential boost for Rigel. From 2000 to 2010 in the US, the population 45 years old and older was forecast to increase by nearly 24 million, from 97 million to 121 million, while the population under 45 was expected to increase by only 3 million.[21] As of 2000, the

[19] U.S. Census Bureau, 2004, "U.S. Interim Projections by Age, Sex, Race, and Hispanic Origin," (http://www.census.gov/ipc/www/usinterimproj/)
[20] "Economic Intelligence Unit – Country Data", (http://countrydata.bvdep.com/cgi/template.dll?product=101&user=ipaddress)
[21] U.S. Census Bureau, 2004.

average per capita amount spent on prescription drugs for those over 65 was more than $1,100. For those under 65 it was only $500. The difference will only have increased as life expectancy continues to increase and people need to take a larger number of drugs as they age.[22] For Rigel, this trend is even more pronounced, because the older people become, the more likely they will be to have arthritis and cancer. Since two of its three major pipeline drugs targets cancer or arthritis, aging populations present increasing potential for Rigel product revenues.

Discounted Cash Flow Analysis

We performed a valuation on the company using a discounted cash-flow analysis. Based on the assumptions of our valuation, we see that the stock is, perhaps, fairly priced if Rigel will not need to issue any additional equity. We see this as an unlikely event. They recently received approval from the SEC to issue an additional $200mm in equity and debt. As mentioned before, the company is unlikely to issue debt due to the uncertain revenue streams. Rigel currently has $152mm in cash and marketable securities after the Serono partnership. Per our projections, that cash will be expended in three years. This seems plausible since prior to the additional $25mm from Serono, management claimed the $127mm in cash and equivalents would meet cash needs for at least 18 months. The claim of three years takes the cash position down to around zero, so presumably additional capital will be needed prior to three years. The timing of the additional equity issuance is not terribly important, except to say that it will happen before the company begins to generate free cash flow. They will need an additional $137mm to fund operations before they become profitable and generate cash from operations, per our calculations. We have very conservatively estimated that they will only issue $160mm to cover this deficit, keeping $23mm in cash available. Yet this drops the projected price per share from $21.57, a hold, to $16.58, a sell. Our timeline for profitability of the company appears reasonable. The biotech industry has been described as taking 15 to 20 years from incorporation to profitability for a biotech company.[23] As Rigel was incorporated in 1996, assuming profitability in 2012 after sixteen years seems appropriate.

We chose not to do a comparable company analysis as part of our valuation because of the wide range of companies in the biotech industry. The large companies have reached a steady state and operate with reasonable operating and net margins, and revenue growth can be estimated with a fair amount of certainty. But most firms have not yet reached this state and are operating with losses. It would be a poor method of valuation to try to value a company based on the relative losses of other companies in different stages of the path to profitability. For that reason, steady state comparables are only used as a sanity check in evaluating the margins arrived at in the DCF model.

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[22] Source: Center for Financing, Access, and Cost Trends, AHRQ, Medical Expenditure Panel Survey - Household Component, 1997-2000 (US Dept. of Health and Human Services)

[23] "Europe's Biotech Woes," ScienceJobs.Com, May 24, 2003.

Assumptions

Debt

Rigel has very little long-term debt. The company has very uncertain revenue streams, which naturally results in little debt and high equity. As of 9/30/05 there was $2.0mm of capital lease obligations associated with equipment additions. This included equal parts short and long-term obligations. Per the company, the interest rate on these obligations was between 9.5% and 9.9%. For the purposes of our valuation, and to be conservative in our sell recommendation, we used 9.5% as the cost of debt.

These debt levels are typical of small research pharmas and biotechnology companies. The typical debt to total capital in the biotechnology sector is a mere 3.8%.[24] In the pharma industry, the typical drug company doesn't take on any significant levels of debt until it reaches $10+bn in market cap. At a market cap of $531mm and long-term debt of $1mm, Rigel has just 0.2% D/D+E. Even Genentech, with a market cap of $100bn and varied revenue streams, only has about 2% debt to total capital. Management has stated that they are not expecting to significantly speed up the number of drugs developed in the foreseeable future. So for the purpose of the DCF valuation, debt has been assumed to remain at its current level, meaning it will have next to no impact on the valuation. Unlevering and levering the value of the debt has no noticeable impact of the Beta of Rigel.

Beta

We estimated Beta utilizing a regression of excess Rigel returns and excess market returns for the 48 months from the November 2000 IPO through December 2004. We calculated Beta to be 0.07. As mentioned above, the unlevered Beta is essentially unchanged since the level of debt for the company is so small. This Beta of 0.07 is significantly smaller than the industry unlevered Beta of 1.21 for pharmas or 1.25 for biotechs.[25]

There are a couple of different reasons why the Beta is so dissimilar for Rigel compared to industry averages. The first is that the company is simply a start up whose entire price is based on pure speculation. This speculation is intricately connected to any news concerning drugs in the pipeline or new collaborations. Speculation is a part of all stock price movement, but most stocks also follow the general movement of the market in the

[24] Source: Prof. Damodaran, NYU Stern School of Business (http://pages.stern.nyu.edu/~adamodar/pc/fcfeginzu.xls)
[25] Source: Prof. Damodaran, NYU Stern School of Business (http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html)

short and medium term. Rigel's assumed cash flows are all coming in the long-term and are not really affected by market conditions.

We decided that using a Beta of 0.07 would create far too much value for the company. For that reason we decided the best course of action would be to use the pharma industry Beta from Professor Damodaran of 1.21 in calculating WACC. This is slightly more conservative than using the biotech Beta of 1.25. Using this higher Beta will also be a more accurate way of calculating revenue values far in the future assuming the company becomes established and makes consistent profits. That scenario would mean more diverse revenue streams and a large part of its revenues would be dependent on royalties, which would tie the Beta much more strongly to those of Rigel's large pharma collaborators.

We feel using 1.21 for the Beta also has the benefit of balancing two potential concerns. The first is that the Beta is too high since there is no correlation to the market. For that reason this might be an attractive stock to investors for diversification purposes. That offsets the fact that this is, in our estimation, a purely speculative stock. Most stocks of this nature have Betas significantly higher than 1.21. Using a Beta of 1.21 in some ways takes both of these concerns into account by taking a median approach. Using a Beta as low as 0.07 creates a significant Buy for the stock. Using a Beta that is substantially higher makes this an obvious Sell. The stock has been event-driven historically (rising or falling on news of drug development progress), but if it is to mature and produce significant revenues, we think it should increasingly reflect the firm's industry beta.

Tax Rate

Rigel has still not achieved profitability and has paid no taxes to date. Per the Rigel 3Q05 10-Q, management expects the company will continue to sustain losses for at least the next several years. In addition, the losses could grow with potential new R&D expenses that arrive before revenue is received or recognized. At an investor conference in November, the CEO James Gower stated that revenues from collaborations do not cover the simple cost of operations. One can reasonably assume that the company will be unable to achieve profitability until it receives substantial revenues from royalties. In our projections, the company finally attains profitability in 2012. We assume that no taxes will be paid until 2015 since the tax loss carry-forwards will be so large. At that point taxes are steadily increased to reach a tax rate of 38%, which occurs in 2019.

Revenue Growth Rates

The revenues of the company are derived from the specific collaborations that are currently in place. This is calculated from estimations of revenues based on the few partnership agreements for Rigel we have access to and assuming that other partnership agreements would contain milestone payments and royalty levels that are similar.

The partnership agreements that are publicly available and disclose numeric information regarding milestone payments and royalty amounts are the agreements with Janssen Pharmaceutica in 1998, Novartis in 1999 and Pfizer in 1999. The agreements typically include approximately 4% royalties for a period of ten years, with different factors raising or lowering that percentage. This is in line with an industry expert's claim that initial research that is partnered out to a large firm will bring in 5% or less in royalties if it is relinquished before phase III trials and 12% or less if done after phase III trials.[26] There was also a research funding provision for $250K per full time employee assigned to the project at Rigel. These three agreements allowed for 10 FTE's, or $2.5mm per year. There were also milestone payments for the various stages of development for the drugs. These included an average of $500k for each drug that succeeded in the pre-clinical trials, around $1mm for each drug selected by the collaborator to be used in clinical trials, $1mm for successful completion of phase I trials, and $2mm for starting phase III testing. Finally there was a $4-5mm payment if a drug was approved for use in a major country. These numbers came from agreements that were several years old, so in an effort to estimate possible current values of these payments we have multiplied the 1998 and 1999 values by 1.06 per year for five years to account for yearly industry growth of 6%.

In judging the likelihood of achieving certain clinical milestones, we based our approval rates on the assumption that 70% of drugs starting phase I trials will continue to phase II, 50% of drugs beginning phase II will move to phase III and 70% of drugs in phase III will be submitted for regulatory approval.[27] At that point 80-85% will be approved by the FDA. The whole process means that only 20% of drugs beginning the clinical trials will receive marketing approval.[28] Regarding the time frame of the payments made, we are using estimates of three years from when a collaboration is formed before it leaves pre-clinical trials. The phase I trails are very short, usually less than a year. Phase II trials are approximately two years long and phase III trials are estimated at two years, although that often varies from one to four years. The FDA approval process is estimated at one year.

There are also initial upfront payments. Rigel lists the total combination of cash and stock purchases as the upfront payment, but from an investor's standpoint, the stock purchase is dilutive. In our model we are ignoring the dilutive effects of the increase in stock, assuming the company will eventually see a return on the additional equity, but we are also not including the stock purchase cash as cash flow to be used as free cash flow for the investors. The most recent deals have seen $10mm in cash and $15mm in stock purchases. Going forward we are increasing initial and milestone payments by 6% a year before reaching a steady growth rate of 3% in 2016. This will allow initial milestone and research payments to grow with the industry.

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[26] Blaney, Betsy. "Testing: 1, 2, 3"; The University of Texas Southwestern Medical Center at Dallas. (http://www.swmed.edu/home_pages/publish/magazine/testing.html)
[27] Thomson Centerwatch: Centerwatch Clinical Trials Listing Service. (http://www.centerwatch.com/patient/backgrnd.html)
[28] "Clinical Trials: A Chance to Try Evolving Therapies", MayoClinic.com. (http://www.mayoclinic.com/health/clinical-trials/DI00033)

Specific assumptions used in the DCF calculations include royalty payments of 10% for R112. We increased this as Rigel seems intent on doing phase III trials, which would increase its royalty percentage. But they are also openly searching for a large collaborator right now, so we have not increased that amount all the way to 12%. In addition, we are assuming it is likely, although not guaranteed that the drug will make it through its most recent phase II trial, the results of which should be reported in the last week of November or the first week in December. The CEO said that there was still risk that the drug would not perform better than a placebo while the traditional steroid medication would, which would derail the drug's potential revenues until modifications to the formula have been made.

Regarding R406/788, management has said that it would prefer to market this compound independently, although it would still have to outsource the manufacturing of the drug to a third party. In the revenue projections we are assuming a net profit of 12%, which is lower than the pharma average of 16%. We have used this value since Rigel has no experience in bringing a drug to market. This is used as an ongoing average for the twenty years of the DCF model to smooth out potentially lower returns earlier and higher returns later. We are also giving Rigel 15% of the $2.4bn market. These revenues are subject to the same probability of completing the FDA approval process, which in this case gives the drug a 30% chance since it has made it through the phase I trials.

Oncology revenues are comprised of three agreements with Merck, Serono and Daiichi. We have assumed very strong revenues, totaling $2bn, meaning that each partner will market one drug with revenues approaching blockbuster status. The research and milestone payments from the oncology drugs already exist and should grow in the coming year because milestone payments will be made, research revenues from Merck and Serono will grow, and upfront payments are amortized over two years.

Upon FDA approval, each of the drugs reaches maximum market share after four years, then grow at 3% in the next three years. At that point the drugs are assumed to lose patent protection and revenues are quickly decreased.

The new revenues are comprised of milestone, research and royalty revenues, assumed to be an average of R112, R406/788 and the oncology drugs. As there is no sure way to predict the potential or types of future drug candidates, this seemed the safest way to approximate future revenues from unknown drug candidates.

Operating expenses are grown quickly in the next few years to account for the onset of phase III trials and assumed additional pipeline drugs. This accounts for the initiation of drugs into the latter stages of clinical trials while also assuming new drugs, an average of one a year, will be added into the early stages of the clinical process. We discussed growing expenses in future years more slowly to account for a decrease in expenses if a drug fails to make it through a trial stage. Ultimately we decided a more accurate estimation would not place any substantial weight on this argument. The company is committed to bringing one new drug into the research pipeline each year, ultimately averaging one drug a year going into the FDA approval process. If a drug is rejected or it

fails to meet certain requirements to successfully pass through a phase in the trials, we project that Rigel will bring another one into the pipeline to replace it. This would keep expenses at more constant levels once there are enough drugs in the pipeline.

The projected revenues and expenses result in gradually rising net margins, eventually reaching a high of 40% in 2015. After that time net margin gradually decreases to a steady state of 31% which occurs after revenues stop increasing at a rate greater than the terminal value. This seems reasonable since the largest companies in the biotechnology industry average net margins of 29%. These companies seem a better comparison, since they have achieved a steady state. Other smaller companies in the industry have an extremely wide range of margins, with most companies with similar market caps still experiencing losses. The margins for Rigel are projected slightly higher since the company does not bring drugs to market. Once the clinical research is completed with a drug, all revenues associated with it come without any further cost. So while revenues will not grow to the same level as those seen by big pharmas and other companies bringing all of their drugs to market, expenses should also remain much lower.

Our projections trend toward and ultimately arrive at a terminal growth rate of 3%, based on historical GDP growth rates. Expense growth reaches this steady growth state in 2011. At that point we are projecting the company will have a stable level of drugs in the pipeline and assumed expense growth simply mirrors that of the general economy.

Market Risk Premium

We used a conservative MRP of 5%, although we also performed a sensitivity analysis to evaluate the effect of adjusting this rate.

Risk Free Rate

We have decided to use the short-term Saint Louis Treasury rate of 4.18% as the risk free rate. The reason for the short-term risk free rate is twofold. The first is that the company enters into agreements that are guaranteed for only two years. Even though the full process of bringing a drug to market may be much longer, the process could stop at any point. Secondly, using a higher risk free rate would result in a lower stock price and since we are recommending a sell, we are trying to be as conservative as possible.

Basis for Recommendation

The starting point of the recommendation is the closing price of $22.00 from 11/25/05. When compared to the results of our DCF analysis, this is reasonable so long as there is no additional share dilution. Based upon the seven additional years of losses, it appears capital will need to be raised to cover operating expenses and growth. When this is factored into our valuation, we must consider Rigel overvalued.

Discounted Cash Flow Model

Proforma financial projections for RIGL

		Rf=	4.2%	1-mo. Treas. (St. Louis Fed)						beta	1.21	tax rate	38.00%	MRP:	5.0%						
	debt=	9.50%	equity=	10.23%	WACC=	10.23%			terminal growth	3.0%				E/(D+E):	1.00						
Y/end 31 Dec (US$m	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
R112 Revenue	4.25	10.30	12.82	6.69	9.60	19.20	33.60	48.00	49.44	50.92	52.45	26.23	15.74	9.44	5.66	0.00	0.00	0.00	0.00	0.00	0.00
Milestone Payments	0.00	0.00	7.52	6.69	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	0.00	0.00
Royalties	0.00	0.00	0.00	0.00	9.60	19.20	33.60	48.00	49.44	50.92	52.45	26.23	15.74	9.44	5.66	0.00	0.00	0.00	0.00	0.00	0.00
R406/788 Op. Prof.	0.00	0.00	0.00	0.00	0.00	6.26	12.90	19.92	27.36	28.18	29.03	29.90	14.95	8.97	5.38	3.23	0.00	0.00	0.00	0.00	0.00
Oncology Revenues	14.69	24.00	6.50	1.59	2.79	0.00	4.78	9.84	15.20	20.88	21.50	22.15	22.81	11.41	6.84	4.11	2.46	0.00	0.00	0.00	0.00
Milestone Payments	5.69	14.00	1.50	1.59	2.79	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	0.00
Research Payments	9.00	10.00	5.00	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	0.00	0.00	0.00	0.00
Royalties	0.00	0.00	0.00	0.00	0.00	0.00	4.78	9.84	15.20	20.88	21.50	22.15	22.81	11.41	6.84	4.11	2.46	0.00	0.00	0.00	0.00
Existing Revenues	18.94	34.30	19.32	8.28	12.39	25.46	51.27	77.76	92.00	99.98	102.98	78.27	53.50	29.82	17.89	7.34	2.46	0.00	0.00	0.00	0.00
New Revenues																					
Milestone & Research			28.21	29.91	31.70	33.60	35.62	37.76	40.02	42.42	44.97	46.32	47.71	49.14	50.61	52.13	53.70	55.31	56.97	58.68	60.44
Royalties			0.00	0.00	0.00	0.00	0.00	7.09	21.70	45.94	80.36	116.81	155.36	196.13	220.07	237.50	251.13	262.56	270.44	278.55	286.91
Total Revenue	18.94	34.30	47.54	38.19	44.09	59.06	86.89	122.61	153.72	188.35	228.31	241.40	256.57	275.09	288.57	296.97	307.29	317.87	327.40	337.22	347.34
% change		*81.1%*	*38.6%*	*-19.7%*	*15.4%*	*34.0%*	*47.1%*	*41.1%*	*25.4%*	*22.5%*	*21.2%*	*5.7%*	*6.3%*	*7.2%*	*4.9%*	*2.9%*	*3.5%*	*3.4%*	*3.0%*	*3.0%*	*3.0%*
Op. Expenses	64.40	75.55	87.60	95.85	104.60	110.88	114.21	117.63	121.16	124.80	128.54	132.40	136.37	140.46	144.67	149.01	153.48	158.09	162.83	167.71	172.75
% change		*17.3%*	*15.9%*	*9.4%*	*9.1%*	*6.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*
Interest Income (Expe	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
WC	(2.40)	(1.00)	0.00	1.00	1.03	1.06	1.09	1.13	1.16	1.19	1.23	1.27	1.30	1.34	1.38	1.43	1.47	1.51	1.56	1.60	1.65
EBIT (operating inc)	(45.46)	(41.25)	(40.06)	(57.66)	(60.51)	(51.81)	(27.31)	4.97	32.56	63.55	99.77	109.00	120.20	134.63	143.90	147.96	153.80	159.78	164.57	169.51	174.59
Taxes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(10.08)	(16.50)	(24.24)	(33.91)	(43.47)	(52.13)	(58.83)	(61.10)	(62.92)	(64.79)	(66.73)
Tax Rate	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.10*	*0.15*	*0.20*	*0.25*	*0.30*	*0.35*	*0.38*	*0.38*	*0.38*	*0.38*	*0.38*
after-tax EBIT or NOI	(43.46)	(40.25)	(39.06)	(56.66)	(59.51)	(50.81)	(26.31)	5.97	33.56	64.55	90.70	93.50	96.96	101.72	101.43	96.82	95.98	99.68	102.65	105.72	108.87
Adjustments																					
+ Depreciation & amc	0.91	0.80	0.84	0.88	0.93	0.97	1.02	1.07	1.13	1.18	1.24	1.30	1.34	1.38	1.42	1.47	1.51	1.56	1.60	1.65	1.70
- Changes in WC		(1.40)	(1.00)	(1.00)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)
- Capex	(0.58)	(1.10)	(1.17)	(1.24)	(1.31)	(1.39)	(1.47)	(1.56)	(1.65)	(1.75)	(1.86)	(1.91)	(1.97)	(2.03)	(2.09)	(2.15)	(2.22)	(2.29)	(2.35)	(2.42)	(2.50)
FCF	(43.13)	(41.95)	(40.39)	(58.01)	(59.93)	(51.26)	(26.80)	5.45	33.00	63.95	90.04	92.85	96.29	101.03	100.72	96.09	95.23	98.91	101.86	104.90	108.02
Present value factor	1.00	1.10	1.22	1.34	1.48	1.63	1.79	1.98	2.18	2.40	2.65	2.92	3.22	3.55	3.91	4.31	4.75	5.24	5.77	6.36	7.01
Present value of FCF	(43.13)	(38.06)	(33.24)	(43.32)	(40.59)	(31.50)	(14.94)	2.76	15.14	26.62	34.00	31.81	29.93	28.49	25.76	22.30	20.05	18.89	17.65	16.49	15.40

next year's FCF	111.26
terminal value	1,539.23
PV of terminal value	219.49
PV of D+E (=sum of PV of annual FCF + terminal value)	522.02
PV of E	520.98
# of shares	24.15
Price Per Share at Current # of Shares	**21.57**
Expected Share Issuance from Equity Offering in	7.27
Total # of Shares	31.42
Price Per Share at Projected # of Shares	**16.58**

Sensitivity Analysis

Beta, Risk-free Rate Sensitivity											
$16.58	3.4%	3.6%	3.8%	4.0%	4.2%	4.4%	4.6%	4.8%	5.0%	5.2%	5.4%
0.75	$35.46	33.38	31.49	29.76	28.18	26.73	25.39	24.15	23.00	21.93	20.94
0.80	32.89	31.04	29.36	27.81	26.38	25.07	23.85	22.73	21.68	20.70	19.79
0.85	30.61	28.96	27.44	26.05	24.76	23.56	22.46	21.43	20.47	19.57	18.73
0.90	28.57	27.08	25.71	24.45	23.28	22.19	21.18	20.24	19.36	18.53	17.76
0.95	26.73	25.39	24.15	23.00	21.93	20.94	20.01	19.15	18.33	17.57	16.85
1.00	25.07	23.85	22.73	21.68	20.70	19.79	18.94	18.14	17.39	16.68	16.02
1.05	23.56	22.46	21.43	20.47	19.57	18.73	17.95	17.21	16.51	15.86	15.24
1.10	22.19	21.18	20.24	19.36	18.53	17.76	17.03	16.34	15.70	15.09	14.52
1.15	20.94	20.01	19.15	18.33	17.57	16.85	16.18	15.54	14.94	14.38	13.84
1.20	19.79	18.94	18.14	17.39	16.68	16.02	15.39	14.80	14.24	13.71	13.21
1.25	18.73	17.95	17.21	16.51	15.86	15.24	14.66	14.11	13.58	13.09	12.62
1.30	17.76	17.03	16.34	15.70	15.09	14.52	13.97	13.46	12.97	12.50	12.06
1.35	16.85	16.18	15.54	14.94	14.38	13.84	13.33	12.85	12.39	11.96	11.54
1.40	16.02	15.39	14.80	14.24	13.71	13.21	12.73	12.28	11.85	11.44	11.05

Beta, MRP Sensitivity											
$16.58	4.00%	4.25%	4.50%	4.75%	5.00%	5.25%	5.50%	5.75%	6.00%	6.25%	6.50%
0.75	$35.14	33.21	31.45	29.83	28.33	26.96	25.68	24.50	23.39	22.36	21.40
0.80	33.09	31.22	29.52	27.96	26.52	25.20	23.97	22.84	21.78	20.80	19.88
0.85	31.22	29.42	27.77	26.26	24.88	23.61	22.43	21.34	20.33	19.39	18.51
0.90	29.52	27.77	26.18	24.73	23.39	22.17	21.04	19.99	19.02	18.12	17.28
0.95	27.96	26.26	24.73	23.32	22.04	20.86	19.77	18.76	17.83	16.97	16.16
1.00	26.52	24.88	23.39	22.04	20.80	19.66	18.61	17.64	16.75	15.92	15.15
1.05	25.20	23.61	22.17	20.86	19.66	18.56	17.55	16.62	15.76	14.97	14.23
1.10	23.97	22.43	21.04	19.77	18.61	17.55	16.58	15.68	14.86	14.09	13.38
1.15	22.84	21.34	19.99	18.76	17.64	16.62	15.68	14.82	14.03	13.29	12.61
1.20	21.78	20.33	19.02	17.83	16.75	15.76	14.86	14.03	13.26	12.55	11.89
1.25	20.80	19.39	18.12	16.97	15.92	14.97	14.09	13.29	12.55	11.87	11.24
1.30	19.88	18.51	17.28	16.16	15.15	14.23	13.38	12.61	11.89	11.24	10.63
1.35	19.02	17.69	16.50	15.41	14.43	13.54	12.72	11.97	11.29	10.65	10.07
1.40	18.22	16.92	15.76	14.71	13.76	12.90	12.11	11.38	10.72	10.11	9.54

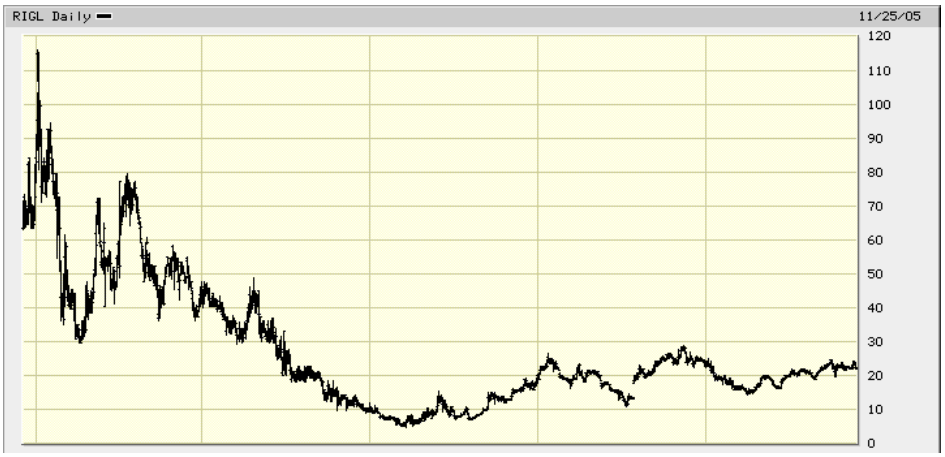
Risk-free Rate Sensitivity	
	$16.58
2.00%	27.44
2.20%	26.05
2.40%	24.76
2.60%	23.56
2.80%	22.46
3.00%	21.43
3.20%	20.47
3.40%	19.57
3.60%	18.73
3.80%	17.95
4.00%	17.21
4.20%	16.51
4.40%	15.86
4.60%	15.24
4.80%	14.66
5.00%	14.11
5.20%	13.58
5.40%	13.09
5.60%	12.62
5.80%	12.17
6.00%	11.75

Beta Sensitivity	
	$ 16.58
0.800	26.52
0.825	25.68
0.850	24.88
0.875	24.12
0.900	23.39
0.925	22.70
0.950	22.04
0.975	21.40
1.000	20.80
1.025	20.22
1.050	19.66
1.075	19.12
1.100	18.61
1.125	18.12
1.150	17.64
1.175	17.19
1.200	16.75
1.225	16.33
1.250	15.92

MRP Sensitivity	
	$ 16.58
3.0%	29.28
3.5%	24.98
4.0%	21.58
4.5%	18.83
5.0%	16.58
5.5%	14.70
6.0%	13.11
6.5%	11.76
7.0%	10.59
7.5%	9.58
8.0%	8.70

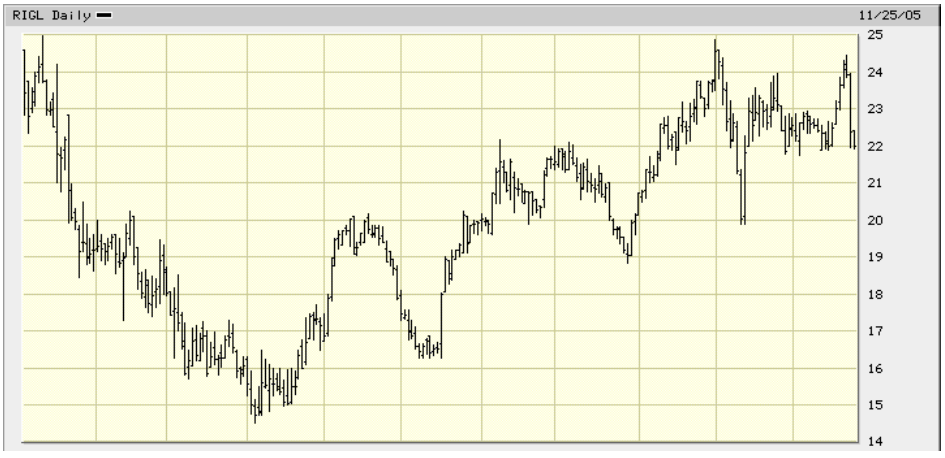
Appendix A: Stock-Price Charts

Since IPO



Last Two Years

Year to Date



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