How Attractive is Chimerix?

Intellectual Property Analysis of Chimerix, Inc.

June 10, 2015

While Chimerix's fully owned patent portfolio is fairly small, a number of licensing agreements have allowed the company to develop beyond its own proprietary technology. Combining in-house and licensed patents gives Chimerix a strong exclusivity position if its CMX001 and CMX157 candidates pass through clinical trials. With no glaring prior art problems and strong third-party interest in its technology, the market may be overweighting Chimerix's IP risk. M·CAM believes the company's IP risk is lower than industry average, which should allow for a clean product launch and make Chimerix an attractive acquisition target for Gilead, Novartis, and other large pharma players.

Chimerix currently has two antiviral compounds in clinical trials with a third in the discovery phase. To protect its advancements, Chimerix owns nine U.S. patents and associated international equivalents dating back to 1994 with expiration dates extending to 2034. Seven of these patents were applied for by Chimerix itself, while the two oldest appear to have been purchased from the family trust of Dr. Karl Hostetler, the lead creator of CMX001 while he was at the University of California, Santa Barbara. Chimerix has also exclusively licensed six patents from the UCSB which round out the core portfolio needed to protect its three compounds. The company claims to have 135 patents and applications licensed from academic institutions but all patent numbers have been omitted from public licensing documents. Analysis of Chimerix's IP position would benefit from a full disclosure of the terms of current licensing agreements.

The good news is, with its publicly disclosed portfolio, Chimerix appears to have fairly comprehensive coverage for its current candidates. Each studied use of the compounds is covered by multiple patents in the current portfolio. Of the trials underway, AdVise, the use of CMX001 to treat adenovirus (AdV), appears to have the weakest patent protection, as only two of Chimerix's patents specifically claim the treatment AdV. Apart from this, the only other concern for the portfolio is limited geographic coverage. Based on the patents owned by and publicly licensed to Chimerix, exclusivity for the current pipeline would only extended to the U.S., Canada, and Europe.

M·CAM conducted an analysis of all prior and subsequent patents and applications relevant to the Chimerix pipeline. While it is clear that Chimerix is not the first to attack viral infections using prodrugs, it does not appear to be infringing any patents with its current compounds. Players like Gilead, Roche, University of North Carolina, and Vical all hold significant volumes of patents which predate much of the Chimerix portfolio and are aimed at attacking the same viral infections. However, none of these parties have claimed the same chemistry used by Chimerix and so do not represent a significant prior art risk.

There are a number of players which have closed-in on Chimerix's technology more recently. A few universities, Cagliari in Italy, Montpellier 2 in France, and UNC, have been actively developing their own parallel compounds and may represent future research or licensing prospects. Gilead and Novartis have been actively patenting similar antivirals but neither have oral drugs in pipeline that would compete with Chimerix. This could indicate that these two are early frontrunners for an acquisition of Chimerix or part of its pipeline if FDA approval is achieved.

Analysis

Innovation α™

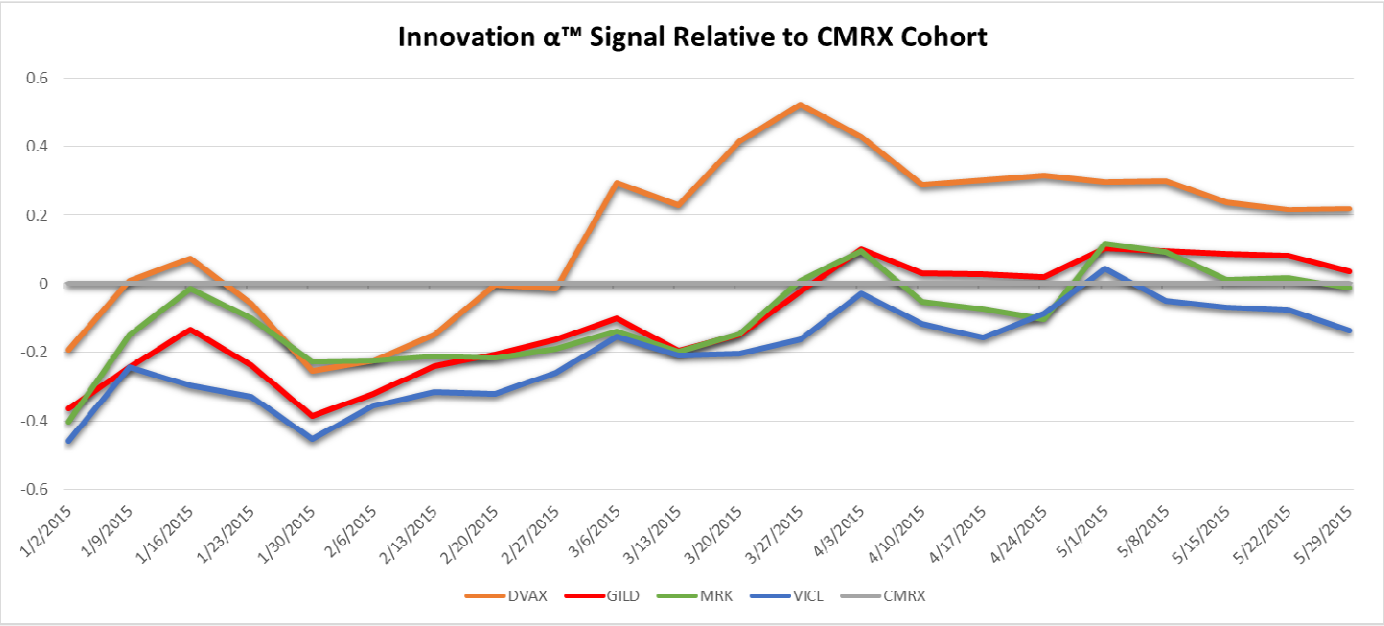
M·CAM's Innovation α™ algorithm is a statistical process which measures qualitative "best" and "worst" proprietary assets and their use by a company and then predicts the equity price premium or discount associated therewith across all competitors. This analysis provides an absolute qualitative and quantitative measure of each individual company's innovation and management thereof. It also provides a relative score of how one company's performance is likely to compare with others with whom it cooperates or competes. The measured difference between better and worse performers is Innovation α.

Company	Symbol	Ranking 5/29/151	Price 6/5/15	52-Week Hi-Lo	Mkt. Cap ($B)	EPS	P/E
Dynavax Technologies Corp.	DVAX	1	21.86	13.10 - 26.89	0.64	-3.89	N/A
Gilead Sciences Inc.	GILD	2	113.96	78.50 - 116.83	167.48	8.77	12.99
Chimerix, Inc.	CMRX	3	42.01	19.06 - 43.42	1.74	-1.94	N/A
Merck & Co. Inc.	MRK	4	58.99	52.49 - 63.62	166.66	3.85	15.33
Vical Incorporated	VICL	5	0.97	0.85 - 1.39	0.09	-0.19	N/A

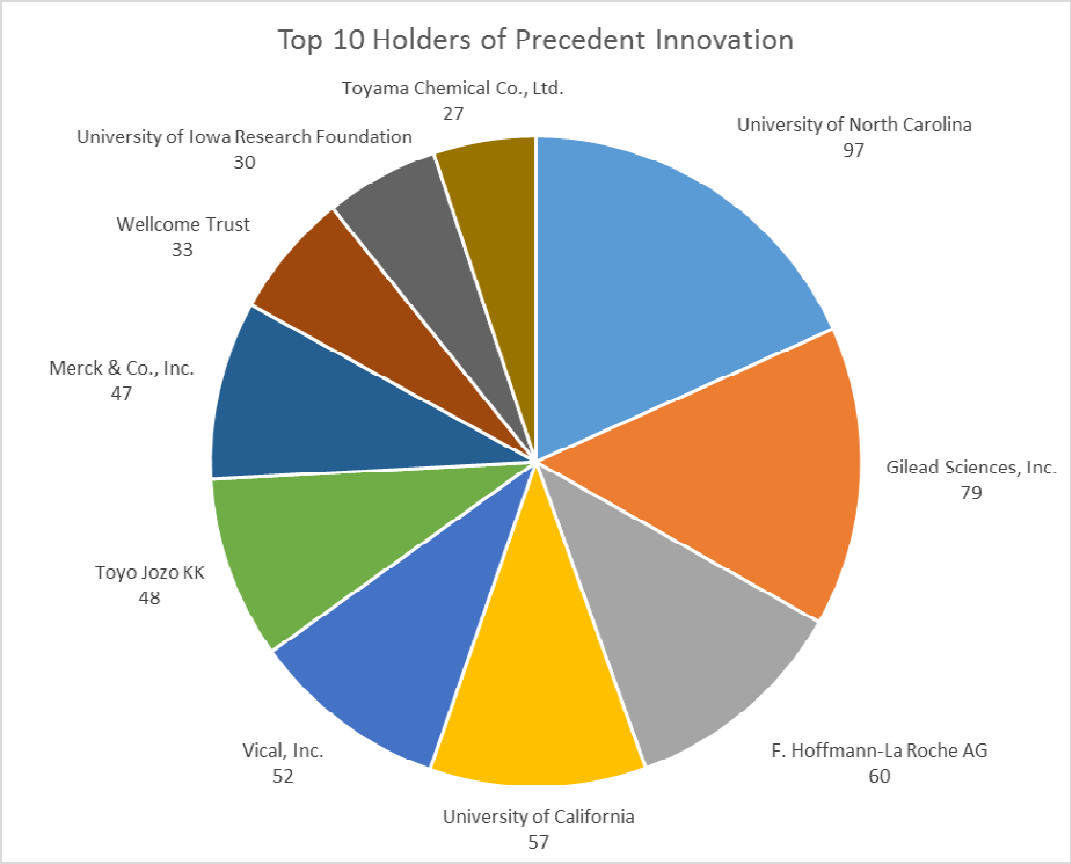
[1]M·CAM's cohort ranking is based on our proprietary Innovation α™ methodology and is used to inform investment decisions within industry and

The above table shows the U.S. traded companies which most closely track with Chimerix's patent portfolio. While none of these companies represent any direct risk to Chimerix's patent position, they all have current or pipeline products which would compete with Chimerix in the market. The Innovation α ranking indicates that Dynavax, Gilead, and Chimerix hold strong positions in this cohort and are expected to outperform Merck and Vical in the coming quarter.

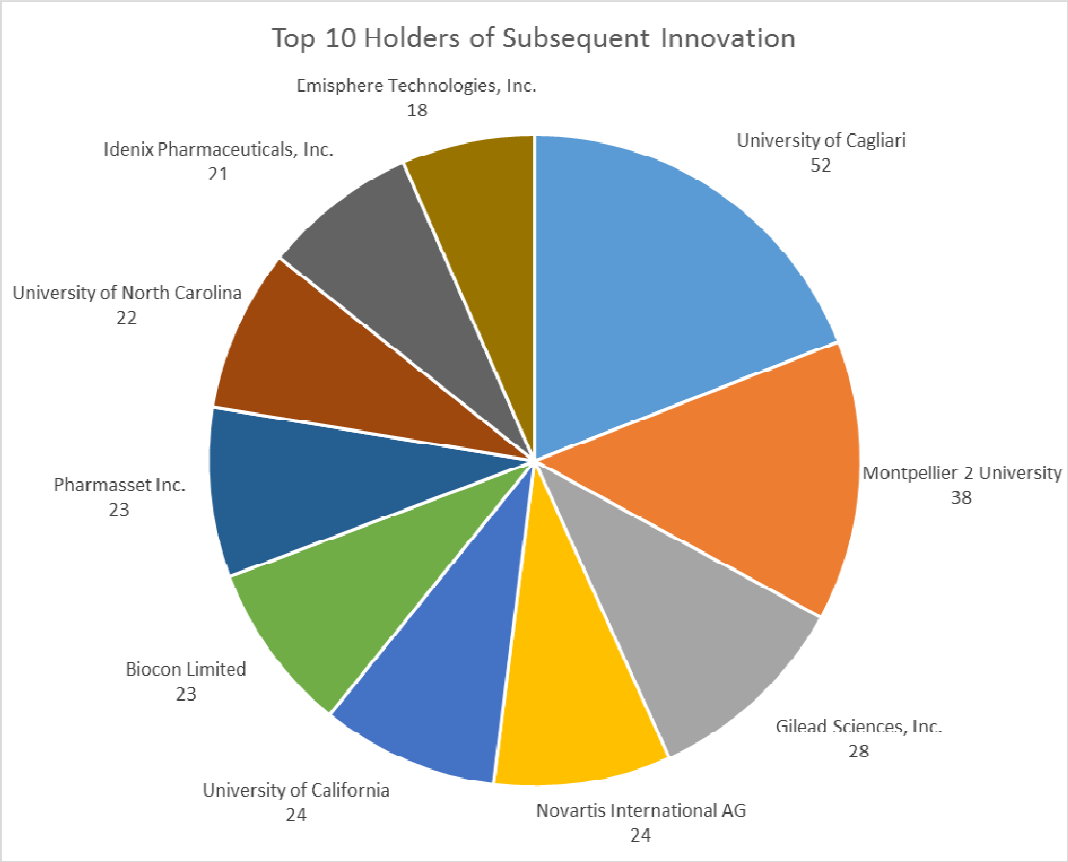
The chart below shows how each component of the Chimerix cohort has scored over the last six months. Chimerix is represented by the x-axis and any company with a positive score is expected to outperform Chimerix in the following three months. Using this data three months ago, we would have expected Dynavax to outperform the rest of the cohort into June.



Principal Market Participants



The above precedent patent holders represent potential risks for Chimerix's patent portfolio and business. These parties hold patents which predate parts of the Chimerix portfolio and therefore may be sources of licensing or infringement demands. The University of California is, unsurprisingly, a significant player in the patent space around Chimerix's technology. This is evidence that the license to UCSB patents gives Chimerix a strong base on which to develop its products. Gilead also holds a large number of patents, many of which are expired. These patents largely deal with original and derivative uses of cidofovir, which Chimerix held a license to until 2010, when its patent exclusivity expired. The most worrying names in this chart are Merck, Vical, and Hoffmann-La Roche. Merck and Vical are pursuing anti-CMV drugs themselves, while Roche already markets Valcyte, an oral CMV treatment. These are certainly competition risks but none of these drugs overlap with Chimerix's chemistry and therefore these companies should not be able to block any of Chimerix's current compounds.



The above subsequent patent holders represent potential monetization targets for the Chimerix portfolio. These are the companies who should be most interested in licensing or acquiring Chimerix's patents or business. The universities here represent potential future licensors to Chimerix as business expands. Unsurprisingly Gilead is present here as well. Their consistent interest in this technology suggests that they may be a high likelihood acquirer of Chimerix if candidates pass through trials and are approved for commercialization. Gilead currently markets a generic, injectable form of cidofovir and should be interested in regaining proprietary pricing with the purchase of Chimerix or part of its pipeline. To a lesser extent, Novartis could also be a potential acquirer after their CMV vaccine candidate failed to make it to market.

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For a more detailed examination of the patents mentioned in this report, please contact us at patentlyobvious@m-cam.com**.**

M·CAM's Patent Glossary

Aligned Sector: The business sector in which the product(s) resulting from the patent(s) is currently or intended to be sold.

Applicant: The person or corporation that applies for a patent with the intent to use, manufacture or license the technology of the invention; under U.S. law, except in special situations, the applicant(s) must be the inventor(s).

Application: Complete papers submitted to the U. S. Patent and Trademark Office seeking a patent including oath, specification, claims, and drawings. This usually does not signify a Provisional Patent Application, but only a regular patent application.

Art: The established practice and public knowledge within a given field of technology. This also identifies a process or method used to produce a useful result. A term used in consideration of the problem of patentable novelty encompassing all that is known prior to the filing date of the application in the particular field of the invention.

Assignee: The person(s) or corporate body to whom the law grants or vests a patent right. This refers to the person or corporate entity that is identified as the receiver of an assignment.

Business Method Patent: A patent that controls the way a business process is undertaken. The issuance of these patents by the United States Patent and Trademark Office (USPTO) is new and controversial, since many allege that it is unfair to allow a patent on a way of doing business.

Citation: This may include patents or journal articles that the applicant or examiner deems relevant to a current application. A reference to legal authorities or a prior art documentation are examples of a citation.

Claim: The language in a patent application that defines the legal scope of the patent. Most patents have numerous claims. This is typically the single most important section in the application.

Concurrent Art: Concurrent art occurs when related patent applications are being examined by the USPTO at the same time. It is difficult for any company or inventor to know, at the time they file for a patent, whether a "related" patent application exists.

Filing Date: The date when a properly prepared application reaches the patent office in complete form.

Innovation Cycle: A description of the commercialization timeframe for the intellectual property.

Innovation Space: M·CAM's representation of the innovation(s) that occur before, during, and after the pending period of the subject patent. The innovation space is the first place to look for patents that are closely related to the subject patent and that may impact the defensibility of the subject patent or create opportunities for patent licensing.

Issue Date: Not to be confused with the filing date, which is the date the patent application was physically received by the U.S. Patent and Trademark Office. This is the date on which the patent actually issues.

Non-Aligned Sector: Any sector in which the patent can be used or sold, other than the sector for which the patent or resultant product was invented or intended.

Pod: A group of patents owned by a company that should be treated as a single unit of innovation (e.g., a certain group of patents that comprise a single product or multiple related products).

Prior Art: Any relevant patent that was issued before the patent being analyzed. If this previous patent was specifically mentioned in the new patent's application, the previous patent is referred to as "cited prior art". If it was NOT mentioned, then that previous patent is referred to as "uncited prior art".

Subsequent Art: Any patent that has a filing date with the USPTO that is after the issuance date of the subject patent. This subsequent art patent may or may not have cited (see "Citation" above) the subject patent. As subsequent art represents more recent innovation than the subject patent, it has great potential to shrink the market opportunity for the subject patent.

A Brief Primer on the Patent System

In recent years, the importance of patents and intellectual property rights as an important variable in the marketplace has come to the forefront of the public consciousness as world leaders declare their country's lead in the innovation race. Damaging intellectual property litigation is becoming increasingly common across all industries. This is exacerbated when patent rights are granted for non-novel ideas. A vast amount of precedent innovation is unconsidered by patent-granting authorities in the creation of new IP rights. Patent granting authorities including the United States Patent and Trademark Office (USPTO), European Patent Office (EPO), Japanese Patent Office (JPO), Chinese State Intellectual Property Office (SIPO), Korean Intellectual Property Office (KIPO) and many others are constrained by the use of patent classification systems which are routinely circumvented by patent applicants.

There is a two-way social contract underlying the patent system. In the United States, patent terms are generally limited to 20 years from the date of application. By statutory intention, once a patent has expired, the patent holder loses the right to exclude others from fully utilizing any innovation described in the patent. A large number of patents enter the public domain when they are "abandoned" – when owners discontinue paying patent maintenance fees. Patents also only provide an exclusionary right in the country for which the patent is filed. As demonstrated by the Global Innovation Commons[1] (G.I.C.), using intellectual property available in the public domain eliminates the need to pay licensing fees on those innovations in countries where the patent was never registered, or worldwide, if abandoned.

Patently Obvious® is a weekly report focusing on select groups of patents in order to increase transparency in markets, addressing information asymmetries, and providing a more level playing field for all parties.

[1] http://www.globalinnovationcommons.org/