

# Gilead goes upstream in cancer

By Lauren Martz, Staff Writer

**Gilead Sciences Inc.**'s foray back into the cancer space has been marked by a trio of acquisitions of biotechs with clinical stage cancer therapeutics that hit targets in new pathways.<sup>1</sup> Now, the company wants to add a focus on the earlier stages of discovery by joining efforts to tease out the genetic basis of many cancers. To do so, Gilead last week partnered with **Yale School of Medicine** to gain access to the university's expertise in tumor profiling and genetics.

Although Gilead is saying little about its oncology strategy, the overarching theme of both its acquisitions and the Yale deal is targeted molecules that act on new pathways.

The company will provide \$10 million in annual research funding to Yale for at least 4 years, with the option to extend the collaboration for an additional 6 years.

"The government is now very restricted in supplying large grants, so no one can get this kind of money anymore. This is a great opportunity to get the research done and to move the science toward commercial development," said Joseph Schlessinger, chair of the Department of Pharmacology at Yale.

Under the deal, researchers from both organizations will work to identify previously unknown cancer-driving genes and develop targeted therapeutics for a variety of solid tumors and hematological malignancies.

Gilead has first right of refusal to license resulting discoveries.

"The research projects will involve sequencing the DNA from tumor samples to identify cancer-specific genetic mutations, differentiating between tumor-driving mutations and those that are simply passenger mutations and developing drugs against the most promising drivers," Schlessinger told *SciBX*.

He added that Yale's tumor-profiling capabilities are unique compared with those of other universities because "we have a very robust sequencing core facility run by Rick Lifton."

Richard Lifton is chair of the Department of Genetics at Yale.

Schlessinger added: "All tumor sample preparation, sequencing and target analysis will be done here at Yale. We will have a joint drug steering committee to determine which targets to pursue and against which cancers based on the sequencing data, and once we start actually developing drugs, most of that work will occur at Gilead. We will be working as a joint effort throughout the process—the idea is to create one team that does everything from taking and analyzing tumor samples to developing and testing new drugs with a straight development path."

Schlessinger, who is director of the program, cofounded cancer players **Plexxikon Inc.**, **Sugen Inc.** and **Kolltan Pharmaceuticals Inc.** Sugen is now part of **Pfizer Inc.**, and Plexxikon is being acquired by **Daiichi Sankyo Co. Ltd.** Kolltan is developing receptor tyrosine kinase inhibitors to treat cancer.

"Gilead was drawn to Yale, which has a team of researchers with proven expertise in tumor profiling and genetics. These researchers have made tremendous strides in delineating mechanisms that underlie a variety of cancers," said Gilead spokesperson Nathan Kaiser. "This expertise will be critical as we seek to increase the understanding of the genetic basis of cancer."

"We are starting to sequence different types of tumors looking for different drivers, and we already have quite a lot of data," Schlessinger told *SciBX*.

He said advances in exome sequencing technology have made possible the university's comprehensive search approach to target identification. The exome is the protein coding region of the genome.

"With the **Illumina Inc.** sequencing platform, you can now sequence the entire exome of a tumor for \$2,000. This offers a great opportunity to find cancer drivers and is the reason that this deal is able to come about now. Just a year or two ago, this type of sequencing was quite expensive," said Schlessinger.

Lifton will lead the tumor sequencing efforts.

## Wanted: targets

Schlessinger said that because Gilead is a new player in cancer research, the biotech will need to start identifying potential targets and lead compounds. He said Yale has the right resources to help meet those goals.

Kaiser added that the Yale deal "is focused on identification of novel molecular targets and serves to strengthen our discovery capabilities in the area of oncology. Gilead will also continue to pursue programs acquired through the recent acquisitions of Calistoga, Arresto and CGI."

According to Schlessinger, this particular research will give preference to identifying new targets rather than focusing specifically on the pathways targeted by the company's acquired cancer compounds, "but credible known targets will not be ignored."

Gilead's acquisition of CGI Pharmaceuticals Inc. for an undisclosed sum last June marked its reentry into cancer, a space Gilead exited in 2001 when it sold off a portfolio of liposomal chemotherapeutics. The CGI deal gave Gilead a library of Syk tyrosine kinase (SYK) inhibitors.

In December, the company acquired Arresto BioSciences Inc. for \$225 million. That deal added allosteric inhibitors of extracellular matrix enzymes, including AB0024. The mAb against lysyl oxidase-like 2 (LOXL2) is in Phase I testing to treat advanced solid tumors and idiopathic pulmonary fibrosis.

In February, Gilead acquired Calistoga Pharmaceuticals Inc. for \$375 million. Calistoga's CAL-101, a small molecule phosphoinositide 3-kinase- $\delta$  (PI3K $\delta$ ) inhibitor, is in Phase II testing for

indolent non-Hodgkin's lymphoma (NHL) and chronic lymphocytic leukemia (CLL).

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#### REFERENCES

1. Flanagan, M. *BioCentury* 19(10), A9–A10; Feb. 28, 2011

#### COMPANIES AND INSTITUTIONS MENTIONED

**Daiichi Sankyo Co. Ltd.** (Tokyo:4568; Osaka:4568), Tokyo, Japan  
**Gilead Sciences Inc.** (NASDAQ:GILD), Foster City, Calif.  
**Illumina Inc.** (NASDAQ:ILMN), San Diego, Calif.  
**Kolltan Pharmaceuticals Inc.**, New Haven, Conn.  
**Pfizer Inc.** (NYSE:PFE), New York, N.Y.  
**Plexikon Inc.**, Berkeley, Calif.  
**Sugen Inc.** (NASDAQ:SUGN), South San Francisco, Calif.  
**Yale School of Medicine**, New Haven, Conn.