



BioPartnering North America 2010
**GlaxoSmithKline's Center of Excellence for External Drug
Discovery (CEEDD)**

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GSK's Center of Excellence for External Drug Discovery (CEEDD)

The CEEDD considers itself a pioneer in the quest to find new medicines, going to great lengths to actively seek out and collaborate with world-class biotechnology companies

- Formed in 2005, the CEEDD was the first team in GSK R&D to be truly externally focused (with no internal programs to manage), working across all therapeutic areas, as it was tasked to form multi-program, risk/reward-sharing alliances
- The CEEDD (Center of Excellence for External Drug Discovery) was formed as further validation of GSK's strategy to create small, independent and accountable R&D teams
- In essence, the CEEDD is virtualizing a portion of the GSK pipeline; namely, from target to clinical proof of concept, by forming multiple risk-sharing/reward-sharing alliances
- GSK has 10 such alliances and seeks to create others, starting at any point in the development path - from target identification to clinical proof of concept

Overview of ChemoCentryx, Inc.



Business Overview

- Focused on orally-administered small molecule therapeutics that target the chemokine and chemo-attractant systems in order to treat autoimmune diseases, inflammatory disorders and cancer

Pipeline Overview

Product	Preclinical	Phase I	Phase II	Phase III
<i>Traficet</i> Crohn's Disease	[Progress bar]			
CCX354 Rheumatoid Arthritis	[Progress bar]			
<i>Traficet</i> Ulcerative Colitis	[Progress bar]			
CCX025 Gastrointestinal Disorders	[Progress bar]			
CCX140 Type II Diabetes	[Progress bar]			
CCX140 Vasular Restenosis	[Progress bar]			
CCX168 Vasculitis	[Progress bar]			
CCX168 Macular Degeneration	[Progress bar]			

Deal with GlaxoSmithKline

- August 2006:** Struck worldwide alliance to discover and develop drugs targeting four chemokine and chemoattractant receptors for treatment of various inflammatory disorders, including *Traficet-EN* for inflammatory bowel disease (IBD).

 - Upfront: \$63.5M cash and equity
 - ChemoCentryx will receive research funding
 - Milestone payments up to \$1.5B, across six product options on the four targets
 - Double-digit royalties on product sales
 - Upon an IPO by ChemoCentryx, GSK may invest in ChemoCentryx's common stock
 - ChemoCentryx retain option to co-develop and to co-promote *Traficet-EN* in IBD to certain specialists in the US
- ChemoCentryx responsible for development through proof of concept, at which point GSK will have exclusive options to license each product on a worldwide basis
- January 2010:** GSK exercised its worldwide option on *Traficet-EN*. The option also encompasses two further identified backup compounds

 - ChemoCentryx to receive an option exercise fee of \$35M

Source: Company Sources, Medtrack

Overview of Ligand Pharmaceuticals, Inc.



Business Overview

- A royalty-driven biotechnology company with research and development programs focused on proprietary work in the field of gene transcription
- Collaboration partners include GSK, Pfizer, BMS, Merck, Celgene, Cephalon, and King Pharma

Select Pipeline Overview

Product	Preclinical	Phase I	Phase II	Phase III	NDA	Marketed
Promacta Idiopathic Thrombocytopenic Purpura						
Fablyn Postmenopausal Osteoporosis						
Viviant Postmenopausal Osteoporosis						
Aprela Menopausal Symptoms / Postmenopausal Osteoporosis						
Promacta Idiopathic Thrombocytopenic Purpura / Thrombocytopenia						
Aplindore Parkinson's Disease / Restless Leg Syndrome						
MK2295 Pain						
Promacta Chemo-induced Side Effects						
PS433540 Diabetic Neuropathy / Hypertension						
PS540446 Atherosclerosis / Psoriasis / Rheumatoid Arthritis						

Deal with GlaxoSmithKline

- **March 2006:** Pharmacoepia (acquired by Ligand), and GSK announced a new drug discovery and development alliance
 - Pharmacoepia to discover and develop candidates to clinical proof of concept; GSK will have exclusive options to continue development
 - Pharmacoepia will retain rights to programs for which GSK does not exercise its option.
 - Upfront cash payment of \$15M
 - Each drug development program pursued under the alliance will be subject to success-based milestone payments totaling up to \$83M
 - Double-digit royalty on sales
 - GSK also receives warrants to purchase Pharmacoepia stock at a 25% premium to the trailing 30-day closing price average at the commencement of the alliance
- **September 2009:** Announced amendment to a March 2006 research agreement with GSK
 - Agreed to accelerate the timing of a \$0.5M payment to Ligand
 - Ligand and GSK agreed to waive exclusivity on two biological targets
 - Ligand will gain full rights to certain targets and back-up compounds associated with the drug-screening collaboration

Source: Company Sources, Medtrack

Overview of OncoMed Pharmaceuticals, Inc.



Business Overview

- Focused on developing monoclonal antibodies that target the biologic pathways critical to tumor initiating cells (cancer stem cells)
- Cancer stem cells differ from normal stem cells because they have accumulated oncogenic mutations that result in the loss of normal limitations on growth. These differences can be exploited to develop therapies that selectively target tumor initiating cells and not normal stem cells
- OncoMed has a portfolio of active antibodies that target biologic pathways critical for survival of tumor initiating cells

Pipeline Overview

Product	Preclinical	Phase I	Phase II
OMP21M18 Solid Tumors			

- OMP-21M18 is a monoclonal antibody that blocks Delta-like ligand 4 (DLL4) signaling to reduce tumor growth by reducing cancer stem cell frequency and by disrupting angiogenesis

Deal with GlaxoSmithKline

- **December 2007:** Announced alliance to discover and develop novel antibody therapeutics to target cancer stem cells
- Alliance provides GSK with an option to license four product candidates directed at multiple cancer stem cell targets from OncoMed's library
 - Undisclosed upfront payment comprised of cash as well as an equity investment
 - Eligible to earn milestone payments up to \$1.4B
 - Double-digit royalties on all product sales.
 - GSK has an option to invest in a future IPO by OncoMed
- Alliance includes OncoMed's lead antibody product candidate, OMP-21M18, a monoclonal antibody in Phase I studies for solid tumors
- OncoMed will develop products through clinical proof of concept across multiple indications; GSK will have an exclusive option to license and continue development
- OncoMed retains the option to participate in development and commercialization of OMP-21M18 on pre-agreed terms

Source: Company Sources, Medtrack

CEEDD Alliances Summary

The CEEDD has 10 existing alliances [out of 18 started] and will do others, starting at any point in the development path - from preclinical target identification to clinical proof of concept

Initiation Date	Company	Market Cap ⁽¹⁾	Product / Technology	Therapeutic Field	Upfront	Deal Size
<i>Figures in US\$, M</i>						
8/24/06	ChemoCentryx	Private	Traficet-EN and 3 other drugs targeting chemokine and chemoattractant receptors	Inflammatory disorders	64	1,564
6/23/09	Chroma Therapeutics	Private	4 Macrophage-targeted compounds technology	Inflammatory disorders, including RA	NA	> 1,000
6/2/09	Concert Pharmaceutical	Private	3 Deuterium-containing medicines including CTP-518 in Phase I for HIV	HIV, renal disease and undisclosed	35	>1,000
3/30/06	Ligand	217	Small molecule therapeutics focused on gene transcription	Undisclosed	15	83 ⁽²⁾
12/19/03	NeuroSearch	437	Research programs within ion channels	CNS including depression, anxiety and schizophrenia	58	140 ⁽²⁾
12/10/07	OncoMed	Private	4 products targeting cancer stem cells (including lead Phase I asset)	Cancer	NA	1,400
10/13/09	Prosensa	Private	4 RNA modulating therapeutics	Duchenne muscular dystrophy	25	680
10/22/03	Ranbaxy	4,624	Ranbaxy drug discovery	Asthma, metabolic, anti-fungal and urology	NA	> 100 ⁽²⁾
7/27/07	Targacept	571	NNR Therapeutics including Lead Phase II asset for pain	CNS (pain, smoking cessation, obesity, addiction, and Parkinson's)	35	1,500
3/31/04	Theravance	861	Multivalent drugs	Antibiotic, respiratory, urinary incontinence and gastrointestinal	129	NA

(1) Market cap as of January 19, 2009 close

(2) Payment per optioned program

Source: Company Sources, Medtrack