CRYSTALGENOMICS, INC.
OVERVIEW

March 2012
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  1. Corporate overview
  2. Platform Technology

Ⅱ. R&D Pipeline
  1. Next Generation NSAID (CG100649)
  2. Antibiotic for MRSA (CG400549)
  3. Anti-Cancer Therapeutic (CG200745)

Ⅲ. Accomplishments

Ⅳ. Partnerships

Ⅴ. Investment Proposal
CrystalGenomics, Inc. is a clinical stage biopharmaceutical company with structural chemoproteomics-based platform technology, involved in discovery and development of novel pharmaceuticals in unmet medical need areas.

I - 1. Corporate Overview

Vision

To eventually become a fully integrated biopharmaceutical company with a significant domestic market share and expand globally through collaborations and partnerships

History

2000.07  Founded
2003.09  Publication on Nature Article and Cover based on Platform Technology
2006.01  IPO on KOSDAQ
2006.10  Opened US Subsidiary, CG Pharmaceuticals, Inc. for Clinical Development

Key Projects

Next Generation NSAID, CG100649 for Osteoarthritis (in Phase IIb)
Novel Antibiotic Candidate for MRSA Infection, CG400549 (Phase IIa Ready)
Molecular-Targeted Cancer Therapeutic, CG200745 (in Phase I)

Upcoming Milestones

CG100649: To Form Strategic Alliance or Co-development and Initiate Phase III Study
CG400549: To Complete Phase IIa Study
CG200745: To Initiate Phase Ib / II Studies
Integration of *in vitro* experiments and *in silico* technology enables the company to streamline the drug discovery process from gene to drug.

**Structure Determination (SPS™)**
- Target Selection
- Synchrotron, NMR

**Lead Discovery (SCP™)**
- SCP™ Library
- SCP™ Screening
- Virtual Screening
- SCP™ NMR
- *In vitro* Assay

**Lead Optimization and Candidate Selection (SDF™)**
- Drug Design & MediChem
  - *SDF™* X-ray
  - *SDF™* Informatics
  - Parallel Synthesis
- Biological Evaluations
- *In vitro* Assays
- Cellular Assays
- *In vitro* DMPK
- *In vivo* Evaluation
- DMPK
- Toxicology
- Pharmacology
- IND-enabling Tox (CRO in EU, USA)

**Pre-clinical Candidate**
CrystalGenomics was the first group to solve complex crystal structure of PDE5 using SPS™ approach: *Nature* 425, 98-102 (2003).
Structural Chemoproteomics-based Drug Discovery (Master Scaffold-based Drug Discovery)

- Structures of proteins in a family
- Master scaffolds for the protein family
- Highly active & selective ligands

Design of master scaffolds for a protein family

Optimization of master scaffolds
Research Options for Structural Proteomics

Chemogenomics

Korea-based CrystalGenomics is exploring structural chemoproteomics. “It is similar to proteomics, but has a different concept,” says Seonggu Ro, Ph.D., v.p. technology. “Structural chemoproteomics focuses not on the protein structure but on the protein/chemical interaction.”

In this field, target proteins are sorted into their gene families using sequence homology. Structural analysis yields the folding patterns of the protein family and the structural information of the active sites or the interaction sites. Virtual screening then identifies master scaffolds that are chemical motifs to recognize the common structure of the active sites.

“We have already identified many master scaffolds for several protein families, including kinases, phospho-esterases, and peroxisome proliferator activated receptors,” Dr. Ro says. “To discover drug candidates with high activity and selectivity to a specific target protein, CrystalGenomics has optimized these scaffolds on the basis of the structural chemoproteomic studies of the corresponding protein family.”

CrystalGenomics also provides services in the area of x-ray crystallography for protein/ligand complexes and lead generation.

According to Joe Ferrara, Ph.D., v.p. product marketing and CSO, “We will use the technology completely to provide a full vertical integration for tools to solve protein structures,” thus expanding Rigaku/MSC’s capabilities in the areas of instrumentation “from crystallization of proteins all the way to refined structures.”

This summer, Rigaku/MSC will install the first AGENT (Automated Genuity Enabling Numerical Targets), which currently automates two, and within two years up to eight, ACTOR (Automated Crystal Transport, Orientation and Retrieval) detector systems simultaneously with an ACTOR robot.

In its fourth year, the program is developing tools for the expression, purification, and crystallization of G-protein coupled receptors (GPCRs).

The crystallography platform is being developed with three academic teams, but “the details are confidential at this stage,” according to Kenneth Lundstrom, Ph.D., CSO.

In the first phase of the project, “We studied 100 GPCRs in three expression systems,” which resulted in “high expression levels of about 5-10 mg/L, for approximately 60 GPCRs,” Dr. Lundstrom says. Typically, expression levels for membrane proteins have been...
## R&D Pipeline

<table>
<thead>
<tr>
<th>Area</th>
<th>Candidate</th>
<th>Indication</th>
<th>Target</th>
<th>Candidate Selection</th>
<th>Pre-Clinical</th>
<th>Ph I</th>
<th>Ph IIa</th>
<th>Ph IIb</th>
</tr>
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<tbody>
<tr>
<td>Next Gen. NSAID</td>
<td>1CG100649</td>
<td>Osteoarthritis</td>
<td>COX-2 &amp; CA</td>
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<tr>
<td>Antibiotic</td>
<td>1CG400549</td>
<td>MRSA</td>
<td>FabI</td>
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<tr>
<td>Cancer</td>
<td>2CG200745</td>
<td>Solid tumors</td>
<td>HDAC</td>
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<td>Cancer</td>
<td>1CG203306</td>
<td>Solid tumors</td>
<td>cMet-KDR Aurora</td>
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<tr>
<td>Cancer</td>
<td>-</td>
<td>Cancer</td>
<td>cMet-EGFR</td>
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<td>Inflammation</td>
<td>-</td>
<td>Rheumatoid-arthritis</td>
<td>Syk</td>
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<tr>
<td>Inflammation</td>
<td>-</td>
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<td>BTK</td>
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1. First-in-Class
2. Best-in-Class
* Partnered with National Cancer Center of Korea
Next Generation NSAID, CG100649

(First-in-Class NSAID with Tissue-Specific Activity)
CG100649 is the first and only tissue selective, once-a-day osteoarthritis drug with a dual mode of action that specifically targets affected joints to relieve pain and restores mobility, while simultaneously preserving the integrity and safety of the gastrointestinal (GI) and cardiovascular (CV) systems.
First-in-Class, Novel NSAID for osteoarthritis, to potentially overcome cardiovascular (CV) and gastrointestinal (GI) side effects of existing NSAIDs and has potential to surpass Pfizer’s $2.5 billion drug, Celebrex®

- Global market for arthritis drugs was USD 50B, of which $17.5B consisted of coxib drugs & NSAIDs but existing therapies have CV and GI issues¹
- 16,344 deaths and 545,452 hospital admissions from GI bleeding in 2006 and heavy NSAID usage partially to blame²
- Celebrex® (Pfizer) - 2008 global sales was USD 2.5B and USD 30M sales in Korea with double digit CAGR (2010)
- Next generation NSAID such as CG100649 that can provide both high efficacy and low side effects, is likely to capture significant portion of the market

¹IMS Top Line Industry Data (2009)
²Statistical Brief #65 Healthcare Cost and Utilization Project Jan. 2009 Agency for Healthcare Research & Quality, Rockville, MD
A dual inhibitor of COX-2 and human CA (carbonic anhydrase), does not inhibit COX-2 in CA-rich tissues (CV & GI systems) but it fully inhibits COX-2 in CA-deficient tissues (inflamed joints).

Vulnerable Tissues
(Whole Blood, Blood Vessels, GI Tract, Kidney)

CA >> COX-2 ➔ Preferred binding to CA

OA Target Tissues
(Inflamed Joints [OA, RA])

CA << COX-2 ➔ Preferred binding to COX-2

Limited side effects

Good efficacy

CA

COX-2

CG100649
There has been and will continue to be a high demand for a next generation NSAID that can provide high level of efficacy without the “usual” CV and/or GI side effects associated with both traditional NSAIDs and COX-2 inhibitor drugs on the market today.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Drug Products</th>
<th>Characteristics</th>
<th>Efficacy</th>
<th>GI Risk</th>
<th>CV Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional NSAIDs</td>
<td>Traditional NSAIDs:Naproxen, ibuprofen, Diclofenac</td>
<td>- Low selectivity - 2–4 times/day (75–2,400 mg/day)</td>
<td>Moderate or high</td>
<td>Very high</td>
<td>Moderate or high</td>
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<td></td>
<td>Vimovo (Pozen, AstraZeneca)</td>
<td>- Naproxen + Esomeprazole - Twice/day - FDA warning for long-term use - Sales volume is small.</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
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<tr>
<td>COX-2 Inhibitors</td>
<td>Celecoxib (Celebrex: Pfizer)</td>
<td>- Sales in 2010 was US$2,374MM - Once or twice/day (200–400 mg/day)</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
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<td></td>
<td>Etoricoxib (Arcoxia: Merck)</td>
<td>- Sales in 2010 was $398M in EU - Not approved in the US - Once/day (30–120 mg/day)</td>
<td>High</td>
<td>Low</td>
<td>High</td>
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<tr>
<td>Tissue Specific COX-2 Inhibitor</td>
<td>CG100649</td>
<td>- ‘Tissue specific’ COX-2 inhibitor - Once/day (2 mg/day)</td>
<td>High</td>
<td>None observed to date</td>
<td>None observed to date</td>
</tr>
</tbody>
</table>
Significantly higher efficacy in OA vs. all other selective or non-selective NSAIDs

Unique mechanism of ‘Tissue Selectivity’ - COX-2 inhibition at inflamed joints, but sequestered from GI and CV tissues where it would create safety concerns

The only new NSAID with potentially improved CV and GI safety and greater efficacy as a single agent

After 7 completed clinical trials and over 400 subjects thus far, no changes in blood pressure observed and excellent overall safety profile

Currently, the only once a day moderate pain drug in development

Would benefit 2 million patients in US suffering from GI side effects from usage of non-selective NSAIDs and many more in the rest of the world
### Milestones

<table>
<thead>
<tr>
<th>Milestones</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td>Phase IIb</td>
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<td>Phase III</td>
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<td>NDA file</td>
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<tr>
<td>Approval</td>
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**Development Strategy**

**CURRENT STAGE:** Phase IIb Study being wrapped up

**LOCALLY:** Independently conduct Ph III study thru approval and commercialization

**WORLDWIDE:** Either straight licensing or co-development with pharma partner(s), either global or regional basis
Introduction to

(Other Clinical Programs)
First-in-Class, novel antibiotic that has demonstrated excellent efficacy against MRSA, “Superbug” strains and, demonstrated superior efficacy over existing blockbuster drugs including Pfizer’s $1.2 billion drug, Zyvox®

- MRSA killed 19,000 people in US, more than HIV (2005)

- ‘Europe 'losing' superbugs battle” - Over 25,000 people die in the EU every year of bacterial infections that are able to outsmart even the newest antibiotics (BBC News April 2011)

- Zyvox® (Pfizer) – Global sales of USD 1.2B (2010) & USD 4M in Korea w/ 20%+ CAGR (2009)

- Cubicin® (Cubist) – Global sales of USD 600M (2010) at 51.7% CAGR

- CG400549 is potentially first-in-class antibiotic to treat MRSA and other multidrug resistant bacterial strains.

- Phase 2a ready in the US
Being developed as a potentially best-in-class drug with superior efficacy and safety profiles than other HDAC inhibitors on the market or in development

- CG200745 is a Histone deacetylase (HDAC) inhibitor being developed to combat various tumor types

- “There is growing evidence that HDACs are important agents for cancer therapy, and HDAC inhibitors bear great potential as anticancer drugs.”

- POTENTIALLY BEST-IN-CLASS
  Based on preclinical and interim Ph 1 clinical data thus far, CG200745 is projected to have superior PK profile over other HDAC inhibitors (both approved & in development) as it has high level of exposure even at low doses

- SUPERB EFFICACY observed from the single dose Ph 1 study - Positive responses of “Stable Disease” (SD) / 6 out of 10 patients so far and ALL in solid tumor patients

- Ph 1 Multiple Dose Study in progress

1 Histone Deacetylases: Transcriptional Regulation and Other Cellular Functions (Cancer Drug Discovery and Development), 2006
Accomplishments & Partnerships

(Emerging Biopharmaceutical Company)
2010: SCRIP AWARDS
(One of 5 finalists for the Best Company in an Emerging Market Award)

2010: BioSpectrum Asia’s Emerging Company of the Year Award

2009: BioSpectrum’s 2009 Asia’s Fastest Growing 50 Companies
(CrystalGenomics ranked 6th out of 50 companies with fastest growth rates)

2008: Award for the Best Partnership
(BioSingapore, a non-profit organization representing the biomedical industry in Singapore)

2008: Red Herring 2008 Top 100 Asia Company
(CrystalGenomics was only one recipient in biotech area.)
## III. Recent Fund Raisings - USD 20 Million

**Replenishment of cash reserves to fully support development of therapeutic programs**

<table>
<thead>
<tr>
<th>Date</th>
<th>Fund Details</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td><strong>1. December 6, 2011</strong></td>
<td>KDB Capital Corp. Bonds KRW 10 Billion</td>
<td>KDB Capital is a subsidiary of KDB Financial Group, a major financial institutions in Korea</td>
</tr>
<tr>
<td><strong>2. December 22, 2011</strong></td>
<td>Tube Investment Corp. Bonds KRW 10 Billion</td>
<td>Tube Investment is a local investment firm that specializes in sectors of Information Technology (IT), Biotechnology (BT), and Nanotechnology (NT)</td>
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<tr>
<td><strong>3. January 13, 2012</strong></td>
<td>KSLSF  Equity Financing KRW 3 Billion USD 100M</td>
<td>KSLSF is a Government backed life science fund with private LPs and Hanwha VC &amp; Oxford Bioscience as two GPs</td>
</tr>
</tbody>
</table>

*CG Raised total of KRW 23 Billion (approx. USD 20 Million) since last December*
IV. Former & Current Alliance Partners

- AstraZeneca
- OXFORD BIOSCIENCE PARTNERS
- Hanwha Venture Capital
- ProQuest Investments
- Bausch & Lomb
- AMOREPACIFIC
- Daewoong Pharmaceutical
- KRICT (Korea Research Institute of Chemical Technology)
- KRB
- KIST
- ASAN Medical Center
- CARNA BIOSCIENCES
- OncoTherapy Science, Inc.
- SBI Biotech
- DAIICHI SANKYO
- KISSEI PHARMACEUTICAL CO., LTD.
- National OncoVenture
- Hanmi Pharmaceutical Co.
V. Investment Proposal

Market Cap: KRW 153,110 MM (≈ USD 136 MM)
(Ticker Symbol: CRYSTAL [083790] – KOSDAQ (as of Mar. 20, 2012)

http://eng.krx.co.kr/por_eng/m2/m2_1/m2_1_3/JHPENG02001_03.jsp?isu_cd=A083790
Thank You!