Teaser Memorandum

JW CHOONGWAE PHARMA CORPORATION

Global development of CWP232291,
a novel cancer drug targeting Wnt/beta-catenin signaling

Executive Summary

□ For the last 60 years ever since its foundation in 1945, on the basis of its founding sprit of "respect for life" and "pioneering spirit".

□ Based on leading competitiveness in the prescription drug market, Choongwae has built up strong sales network across the country and superior pipelines in I.V- solutions, antibiotic, cardiovascular, gastrointestinal, nephrology/antianaemic, anticancer and neuropsychiatry. And now, it is pioneering the rapidly growing new field such as diabetes and so on.

□ Moreover, Choongwae is making efforts to provide medical equipments, various self modification products and OTC products satisfying the requirements for prevention and diagnosis of diseases.

□ Also, Choongwae has diligently opened up itself to the overseas market with competitive APIs (Active Pharmaceutical Ingredients) and finished products developed on a basis of our creative technologies. Especially, the anti-fungal agents such as Ketoconazole and Itraconazole are lively being exported to developed countries such as EU, Japan with their acquisition of EU CoS.

□ Choongwae successfully developed the next generation antibiotics Imipenem in 2004. it is expected to substitute 20 billion won worth of imported antibiotics, and, along with antifungals and cephalosporins, it will be one of the core products in opening the era of 100 million dollar exportation.

□ Choongwae's global business is expanding not only to the export of bulk pharmaceuticals and finished products, but also to licensing-out of technical know- hows and patents.

Industry Sector :
medicine and medical supplies

Therapeutic Target :
cancer, acute myeloid leukemia

State of Development :
Stage for entry of clinical trial

Key Technology Highlights

□ The development importance of CWP232291

- First-in-Class Wnt targeted anticancer
- The the world's first drug CWP232291 (CWP231A), low molecular weight composition anti-cancer drug, blocking Wnt / beta catenin signal transduction path.

□ The therapeutics of the acute myelocytic leukemia

- Presently, all non-clinical toxicities, pharmacological potency, drugstuff movement (ADME), preparation, and biomarker test about the CWP232291 were successfully completed. And for clinical trial drug production is completed in the overseas GMP CMO.
- Pre-IND meeting with US FDA, that was successfully terminated in the early November, 2010. And FDA IND approval in U.S. against the blood cancer patient in October 2011.

JW Pharmaceutical

IP Owner Summary

□ CEO: Kyung Ha, Lee
□ Foundation: August 8, 1945
□ Number of Employees: 1,343
□ Paid-in capital: 23.7 Billion Won
□ Office address:
698, Shindaebang-dong, Dongjak-gu, Seoul, Rep of KOREA

Market Feasibility

□ Domestic and global market size :
Targeted cancer therapies market (ref. Datamonitor)
- Domestic market: $ 450M in 2015(1.5% of global market size)
- Global market: $ 30,000M in 2015

□ Domestic and global market opportunity (competitors and competing product) :
Competitors who are manufacturing acute myeloid leukemia are as follows.
- Global competitors : J&J(Mylotarg), pfizer(farnesyl), Novartis(Gleevec)

Trend & Partnership

□ Future outlook and trends related to technology :
The acute myelocytic leukemia therapeutics

□ Technology Transfer and commercialization conditions :
The global pharmaceutical company and strategic alliance. It contracts in order to secure the right to the goods production in the licensing out.
The termination of the successful clinical test is needed.

□ Type of business relationship sought (including licensing availability) :
Technology transactions, licensing, technical cooperation and joint research

Technology Overview

■ Technology Platform

□ The generation of the acute myelocytic leukemia and treatment

○ The generation situation of the acute myelocytic leukemia

- As to the leukemia onset frequency of the major countries in the world, the ratio which the onset frequency of the acute myelocytic leukemia occupies is 30% or greater. About two times extent generation rate is higher than the chronic myelogenous leukemia, that is the indication of the gleevec.
- In the case of the Domestic of a country, 1,541 leukemia patient died in 2008. And, In 2000, showing the increasing rate of 12% in comparison to 1,371 people for as much as 8 years.

○ The therapeutics of the acute myelocytic leukemia

- The primary aim of the leukemia treatment reaches utterly the complete remission.
- Presently, there is the Ara-C(Cytarabine), daunorubicin or idarubicin as the cell toxic anti-cancer medicine, much used leukemia treatment drug. However, as to these, even when accompanying the serious side effect, the five-year survival rate of the patients is about 30-40%. Therefore, the necessity of the development of new medicine in which the side effect is small and which increases the survival rate is urgently needed.
- In the case of the gleevec, that is the representative drug of the mark anti-cancer drug, it is the drug suppressing the activated kinase activity due to the mutation of the Bcr / Abl protein. Particularly, the effect in the acute myelocytic leukemia, at all, the none there is nearly no effect in the other indication the remarkable anticancer effect is shown in the chronic myelogenous leukemia (CML) patient and basal cell carcinoma (GIST).

■ Background and unmet needs

□ Wnt/beta-catenin signaling and pothological physiology of cancer

○ In the mid 1980's, in the research of the Wnt protein discovered for the first time, it was clarified that over activation of the Wnt signal transmission is very important in the birth of the various cancer, includings the colorectal cancer.

○ As to the onset of the various cancers, it is reported that abnormal activation of the Wnt signal transduction system is related with and the cyclin D1, cMyc, survivin as Wnt associated gene, and It is reported to play the role of being important in the outbreak of cancer(fig. 1).

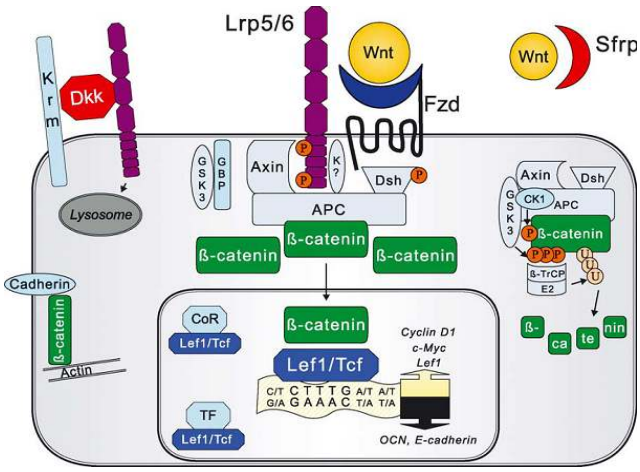


Fig. 1. Wnt signaling system

□ **Diseases for which medicine is efficacious of cancer drug targeting Wnt/beta-catenin signaling**

○ Wnt/beta-catenin signaling and acute myeloid leukemia

- In 61% of the acute myelocytic leukemia patient, over of the Wnt signal transmission and activation were discovered(Leukemia, 2006, 20, 1211).

○ Wnt/beta-catenin signaling and other cancer

Table 1. The abnormal activation ratio of Wnt/beta-catenin signaling in cancer patient organization

Cancer	Wnt abnormal activation ratio	Assay	Reference
colorectal cancer	80-85%	APC Mutation	Science (1997) 275:1784
acute myelocyte leukemia	61-100%	WB	Leukemia (2006), 20, 1211
lung cancer	75%	WB(Dvl3)	Oncogene (2003)22:7218
stomach[gastric] cancer	40-60%	APC Mutation	(in differentiated types)
liver cancer	78%	Immunohistochemistry	World J Gastr. (2005) 11:2398
pancreatic cancer	39%	Immunohistochemistry	Human Path. (2006), 37:212
prostate cancer	36%	Immunohistochemistry	Int J Can (2005)113:415
cancer of the esophagus	59%	Immunohistochemistry	Int J Can (2005)113:981
breast cancer	13%	WB	EJC (2000) 242:248
multiple myeloma	75-100%	PCR	Ai Zheng (2007) 26:1010
ovarian cancer	27%	Immunohistochemistry	J Path (2004) 204:268

■ Discovery and Achievements

○ The the world's first drug CWP232291 (CWP231A), low molecular weight composition anti-cancer drug, blocking Wnt / beta catenin signal transduction path.

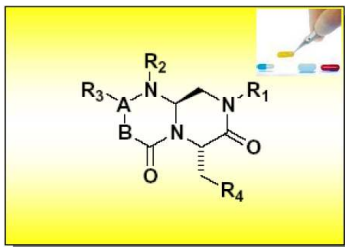
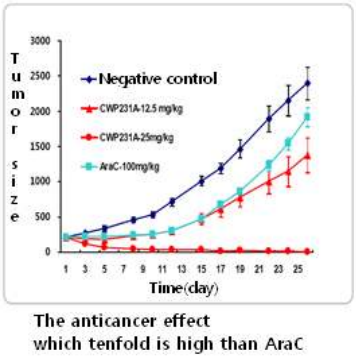


Fig2. The core framework of the CWP232291 drug



The anticancer effect which tenfold is high than AraC

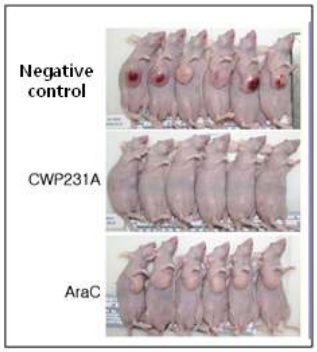


Fig. 3. The Ara-C and CWP231A (CWP232291) anticancer effect in the leucosis model

- Presently, all non-clinical toxicities, pharmacological potency, drugstuff movement (ADME), preparation, and biomarker test about the CWP232291 were successfully completed. And for clinical trial drug production is completed in the overseas GMP CMO.
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○ The development importance of CWP232291

- First-in-Class Wnt targeted anticancer

Table 2. A representative kind of predetermined molecular target anti-cancer drug and indication

Division	Pharmacophore target	Product	Indication
Signal transduction inhibitor	BCR-ABL	Gleevec	leukemia
	HER@	Herceptin	breast cancer
	EGFR	Iressa, Erbitux	lung cancer, colorectal cancer
	Wnt	nothing	colorectal cancer, leukemia, etc.
Angiogenesis Inhibitor	VEGFR, PDGFR	Avastin, Sutene, Nexavar, Greenstatin, etc.	colorectal cancer, kidney cancer
Immunotherapy	CD20	Rituxan	lymphoma
apoptosis derivative s	26S protase	Velcade	multiple myeloma

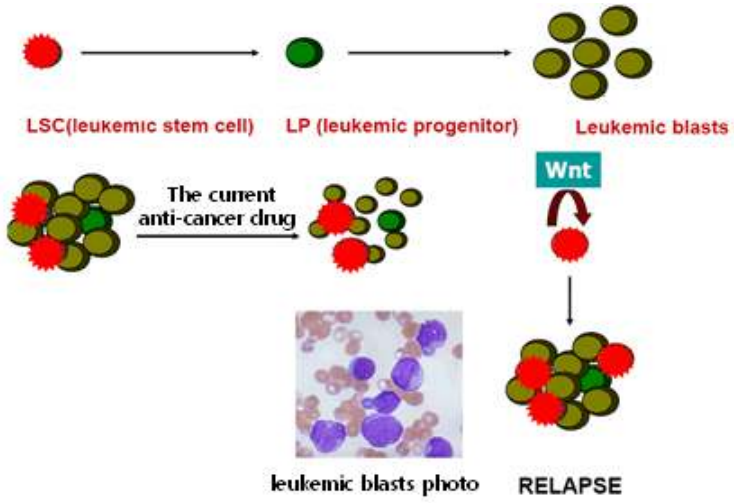

Fig. 4. The role of the Wnt in the playback of the leukemia stem cell which is important in the leukemia recurrence

○ The Wnt restraint drugs development current state

Table 3. The Wnt signal transmission suppression anticancer drug development current state

	Target	Development, Inc.	Indication	Note
Antibody drug	Wnt Receptor, Fzd	Genentech	Cancer	acts on the upper signal
	Fzd Receptor	OncoMed	Cancer	acts on the upper signal(cooperation research with Bayer)
Low molecular weight drug	β-catenin	JW CHOONGWAE PHARMA CORPORATION	leukemia, multiple myeloma, lymphoma, colorectal cancer, etc.	acts on the sub-signal
	Tcf/β-cat Interaction	novartis, pfizer	Cancer	bad medicamentosa
	β-catenin degradation	Avalon	colorectal cancer, multiple myeloma, CML	research initial step
	Fzd-Dvl Interaction	Genentech, St. Jude hospital	lung cancer, colorectal cancer	acts on the upper signal, low activity
	BLC9/β-cat Interaction	Genetics	colorectal cancer	research initial step

○ the leukemia treatment trend of research (the other target drug excluded Wnt)

. IY5511 is undergoing research for the treatment of chronic myeloid leukemia, develop by Ilyang Pharm.

. Zamyl is undergoing research for the treatment of acute myeloid leukemia, develop by Protein Design Labs Inc.

. CEP-701 is undergoing research for the treatment of acute myeloid leukemia, develop by Cephalon.

Patents and Publications

Country	Appln. No.	Status	Description
Europe	EP14442350	Granted	Reverse-turn mimetics and method relating thereto
Korea	KR10-0910307	Granted	Reverse-turn mimetics and method relating thereto
US	US12/682,881	pending	Novel compounds of reverse turn mimetics and the use thereof (2)
Korea	KR2010-7010576	pending	Novel compounds of reverse turn mimetics and the use thereof (2)
US	US12/738,066	pending	Novel compounds of reverse turn mimetics and the use thereof (3)
Korea	KR2010-7010575	pending	Novel compounds of reverse turn mimetics and the use thereof (3)
US	US7671054	Granted	Reverse-turn mimetics and method relating thereto
WIPO	PCT/KR10/002306	pending	Novel compounds of reverse -turn mimetics, method for manufacturing the same and use thereof
US	US12/759,854	pending	Novel compounds of reverse -turn mimetics, method for manufacturing the same and use thereof

Contact Point

KHIDI (Korea Health Industry Development Institute) is currently receiving inquiries from interested parties in this transaction. If you are interested, please contact any of the KHIDI professionals below :

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