

## Current Status of RI-Biomics Center and Human Resource Training Program for Fostering RI-Biomics Professionals

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### 1. Introduction

RI-Biomics Center which is as large as 3000 m<sup>2</sup> in terms of gross floor area has been built from 2009 to 2012 with KRW 18 billion government funds and opened on May 9, 2013. RI-Biomics Center is a facility dedicated to improving the quality of life by developing advanced radioisotope application researches from basic sciences to the pharmaceutical industry.



RI-Biomics Center which is as large as 3,000 m<sup>2</sup> in terms of gross floor area has been built from 2009 to 2012 with KRW 18 billion government funds and opened on May 9, 2013. RI-Biomics Center is a facility dedicated to improving the quality of life by developing advanced radioisotope application researches from basic biological sciences to the pharmaceutical industry.

RI-Biomics is a state-of-the-art radiation fusion technology for evaluating in-vivo dynamics such as absorption, distribution, metabolism and excretion (ADME) of new drug candidates and biomaterials using radioisotope (RI), and quantitative evaluation of their efficacy via molecular imaging techniques and animal models. The RI-Biomics center is the sole comprehensive research and experiment complex in Korea that can simultaneously perform the radio-synthesis of drug candidate with radioisotope, analysis, and molecular imaging evaluation with animal model. Molecular imaging techniques, including nuclear imaging (SPECT and PET), near-infrared fluorescent (NIRF) imaging, and magnetic resonance imaging (MRI), are the cutting-edge technologies for evaluating drug candidates. Since they allow in vivo real-time imaging of the diseased site, monitoring the biodistribution of drug and determining the optimal therapeutic efficacy following treatments, we have integrated RI-ADME and molecular imaging to provide useful information for drug evaluation and to accelerate the development of new drugs and biomaterials.

Herein we present the current status of RI-Biomics center and human resource training program for fostering RI-Biomics professionals

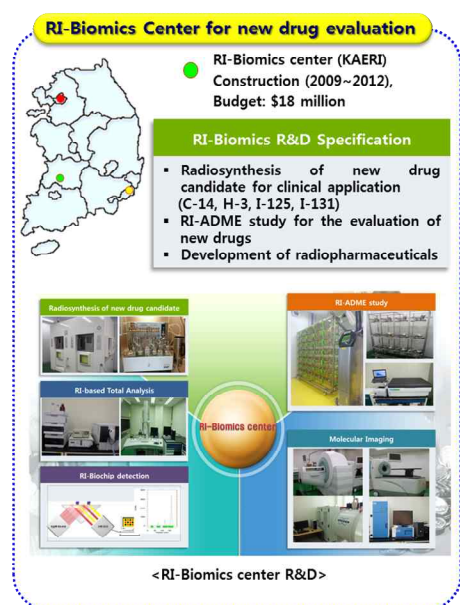
Summary	<b>Definition of RI-Biomics</b>
	• A state-of-the-art radiation fusion technology for evaluating in-vivo dynamics such as absorption, distribution, metabolism and excretion (RI-ADME) of new drugs and biomaterials using radioisotope (RI) and quantitative evaluation of their efficacy
	<b>Current Status of RI-Biomics Center</b>
	• RI-Biomics center is the sole comprehensive research and experiment complex in Korea that designed to support the development of new drugs and materials it has been carrying out researches in the following key fields.
	• Development of radio-labeled compound synthesis and radiopharmaceuticals
	• In vitro and in vivo evaluation of new drug candidates and biomaterials via RI-ADME and molecular imaging

### 2. Methods and Results

#### 2.1 Current Status of RI-Biomics Center

The center is the sole comprehensive research and experiment complex in Korea that gathers facilities analyzing general radioactive materials, animal testing and evaluation facilities using RI, in one place to carry out RI-Biomics researches which apply the characteristics of RI to biomics, and in order to accelerate the development of new drugs and materials it has been carrying out researches in the following key fields.

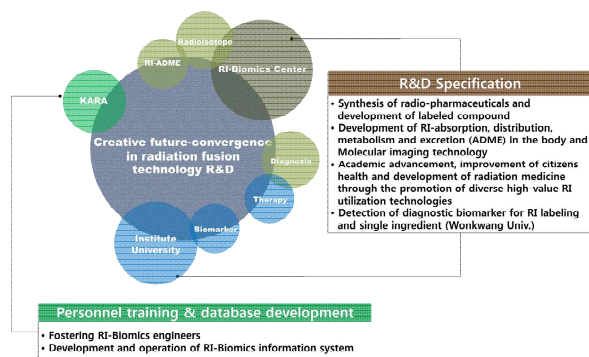
- Radio-pharmaceuticals synthesis and labeled compound development
- Development of RI-ADME in the body and image assessment technology



## 2.2 Prospects of RI-Biomics Technology and fostering RI-Biomics professionals

For developing new drugs and materials, it is necessary to evaluate drug safety, adequate dose, drug effect period and so on, and in order to do the above it is essential to evaluate quantitative distribution in the body and drug effect using animal testing. Therefore, it is expected that RI-Biomics technology will contribute to reducing the cost of researches and of developing new drugs, and accelerating development of new drugs and materials by innovatively heightening the efficiency to select candidate drugs and enhancing reliability of researches.

In the future, it is expected that RI-Biomics Center and Korean Association for Radiation Application will significantly contribute to developing RI-Biomics technology in Korea through vitalizing researches and training of specializing personnel, and the operation of technology & information system.



## 3. Conclusions

The RI-Biomics center was established with total investment of 18 million \$ during four years from 2009 to 2012 in order to develop a comprehensive analyzing system using RI for new drug development as an axis for national growth in the next generation. The RI-Biomics center has labeling synthesis facility for the radio-synthesis of drug candidate with radioisotope such as Tc-99m, I-125, I-131, F-18, H-3 and C-14 using hot cell. It also includes RI-general analysis facilities, such as Radio-HPLC, LC/MS, GC/MS, gamma counter that can analyzing the radio-synthesized materials, and animal image analysis facilities that developed small animal imaging equipment such as SPECT/PET/CT, 7T MRI, in-vivo optical imaging system and others. In order to achieve the system to verify safety and effectiveness of the new drugs using RI, it is necessary to establish a human resource training program for fostering RI-Biomics professionals in the following key fields; (1) Radio-pharmaceuticals synthesis and labeled compound development, (2) Development of RI-ADME in the living object and image assessment technology. Personnel training program that carries out theoretical education and practical training in the field related to

RI-Biomics in parallel is being conducted. Internship training for university students has been administered twice already while educational program for the existing professionals in the RI-Biomics field has been carried out during the summer of 2013~2017. The human resource training program for combination of RI-ADME and different molecular imaging techniques can offer synergistic advantages to facilitate understanding RI-ADME and fostering RI-ADME professionals.

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