RENOVATE is a Global Network of scientists and institutions covering all disciplines necessary for Boron Neutron Capture Therapy (BNCT)

RISE

Research and Innovation Staff Exchange

The RENOVATE consortium has submitted a large proposal in the frame of the the EU Commission's RISE program

What is RISE ???

Marie Skłodowska-Curie Actions

Innovative Training Networks (ITN)

- For Early Stage Researchers

Individual Fellowships (IF)

- For Experienced Researchers

Research and Innovation Staff Exchange (RISE)

- Exchange visits (secondments) of staff

Co-funding of programmes (COFUND)

- For regional, national, international doctoral or fellowship programmes

RISE Overview

UKRO UK RESEARCH OFFICE

- RISE funds short-term exchanges of personnel between academic, industrial and commercial organisations throughout the world.
- It helps people develop their knowledge, skills and careers, while building links between organisations working in different sectors of the economy, including universities, research institutes and SMEs.
- Project implemented through the **secondment of staff** for a period between 1 and 12 months
- The maximum size and duration is 540 person months over 4 years

Who can Participate?

Who is eligible for funding?

- All countries and nationalities can participate in RISE
- All institutions fulfilling the requirements of the Horizon 2020 Rules for Participation can participate in RISE
- EU member states, associated countries and third countries eligible for EU funding
- Third countries not eligible for EU funding (specific funding eligibility criteria)

Academic sector:

- Public /private higher education establishments awarding academic degrees
- Public /private non-profit research organisations whose primary mission is to pursue research
- International European interest organisations (e.g. CERN, EMBL)

Non-academic sector:

- Any entity not included in the academic sector
- *For example: large companies, SMEs, NGOs, museums, hospitals and international organisations (e.g. UN, WHO)*

RISE is a popular Programme in Japan

(2014 - 2020)

Japan's MSCA Performance in H2020

Action	Number of Participations of JP organisations*		EU contribution (in EUR million) to JP organisations	Number Of Projects	JP researchers involved	Researchers going to JP organisations
COFUND	2	*(2)*	N/A	2	16	0
IF	9	*(9)*	N/A	9	41	9
ITN	21	*(20)*	0.05	17	12	1
RISE	74	*(74)*	N/A	52	118	649
Total:	**106**	*(105)***	**0.05**	**80**	**187**	**659**

Main reason for the Japanese commitment (52): **easy to participate** (International review ➔ 25% success, **average submission number: 2.x)**

As a TC (Third- Country) JAPANese institution ➔

** A Fact sheet (1/2 page)

** PIC: Participant Indentification Code ➔ 5mn

** Letter of Commitment – To be signed by the partner Institution representative

RENOVATE (RISE)

Pr. Dr. med. Wolfgang SAUERWEIN

RENOVATING BNCT

"Promoting efficient treatments cancers deemed incurable through the use of:

**** normalized clinical protocols,**
**** improved boron carriers and**
**** hospital-based accelerators"**

Therapy Boron Neutron Capture
RENOVATE
A Global Network

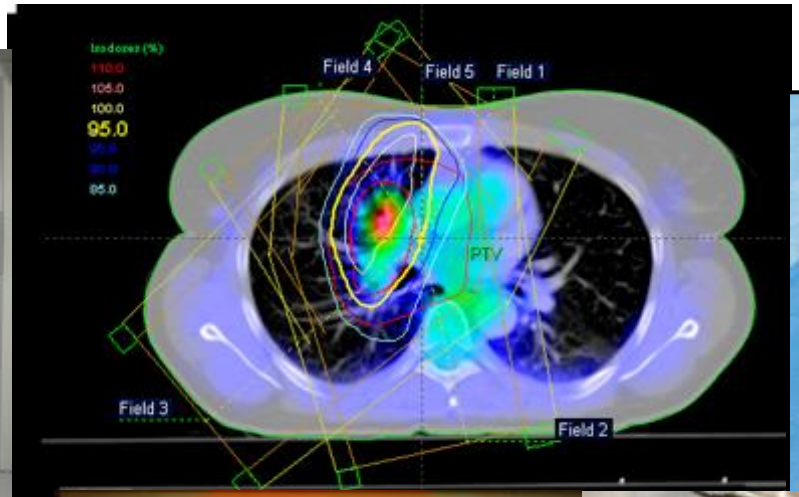
European Commission

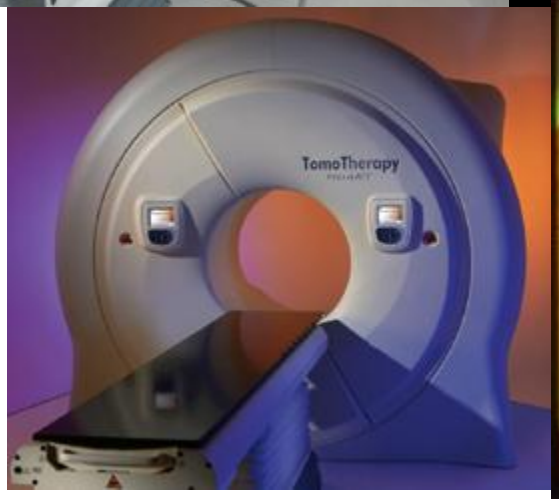
Submission dead-line: **April-28th**

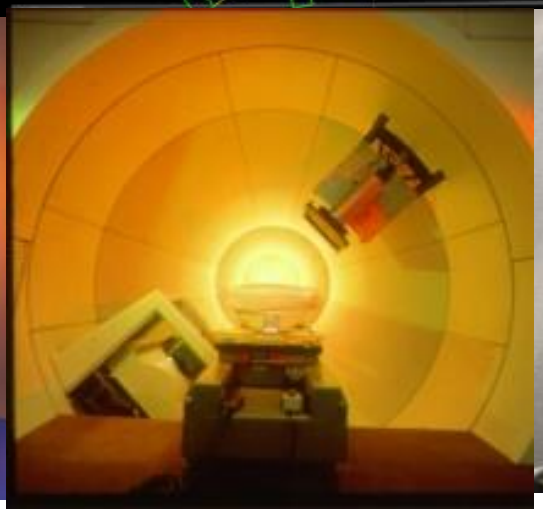
Okayama University (岡山大学)

Why do we need BNCT?

Modern advanced radiotherapy techniques allow a highly precise dose distribution to a defined volume





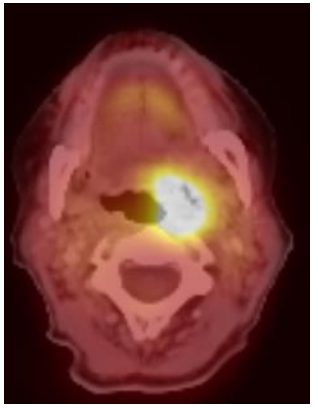


Inherent Problems with All Current Radiation Therapy Techniques

1) Treatment is delivered to a volume of tissue
   Normal tissue in target volume is dammaged

3) Image guidance techniques are not perfect
   Target volume will vary according to the imaging modalities

4) Physicians define the target volume
   Target volume will vary with physician



A different approach is necessary: “Disease Targeted Therapy”

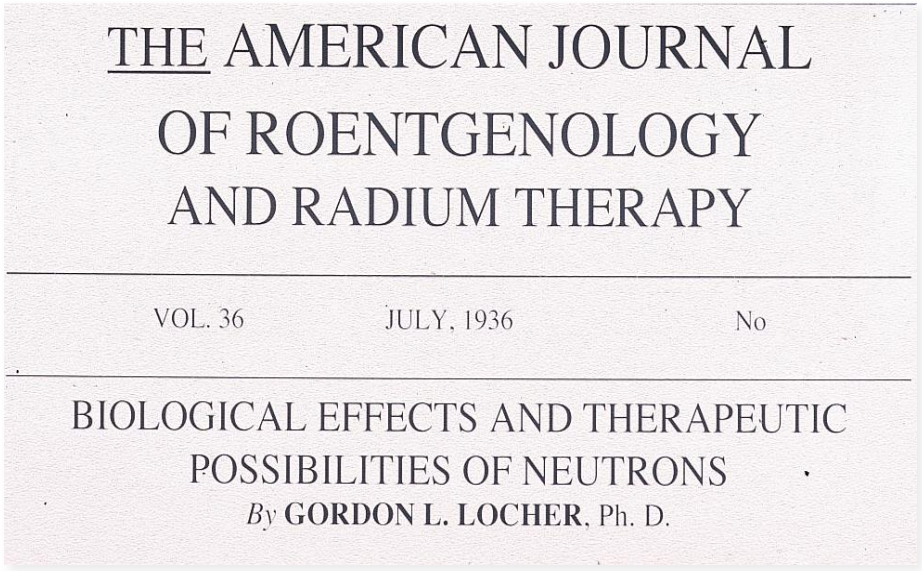
The target volume is determined and labeled at the biological level and not depending from the treating clinician

The treatment is designed to damage only cancer cells wherever they are, sparing normal cells even in the immediate proximity to the tumor.

Boron Neutron Capture Therapy (BNCT)

Is the Prototype of such disease targeted Therapy

Targeting of single tumor cells by a ^{10}B-compound
Selective destruction by high LET irradiation



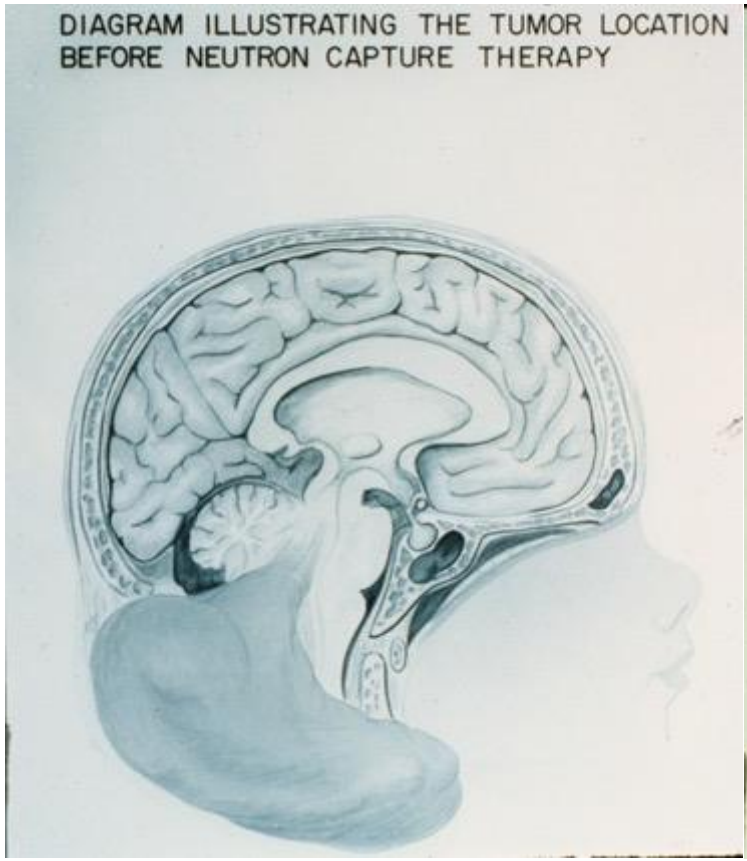
THE AMERICAN JOURNAL
OF ROENTGENOLOGY
AND RADIUM THERAPY

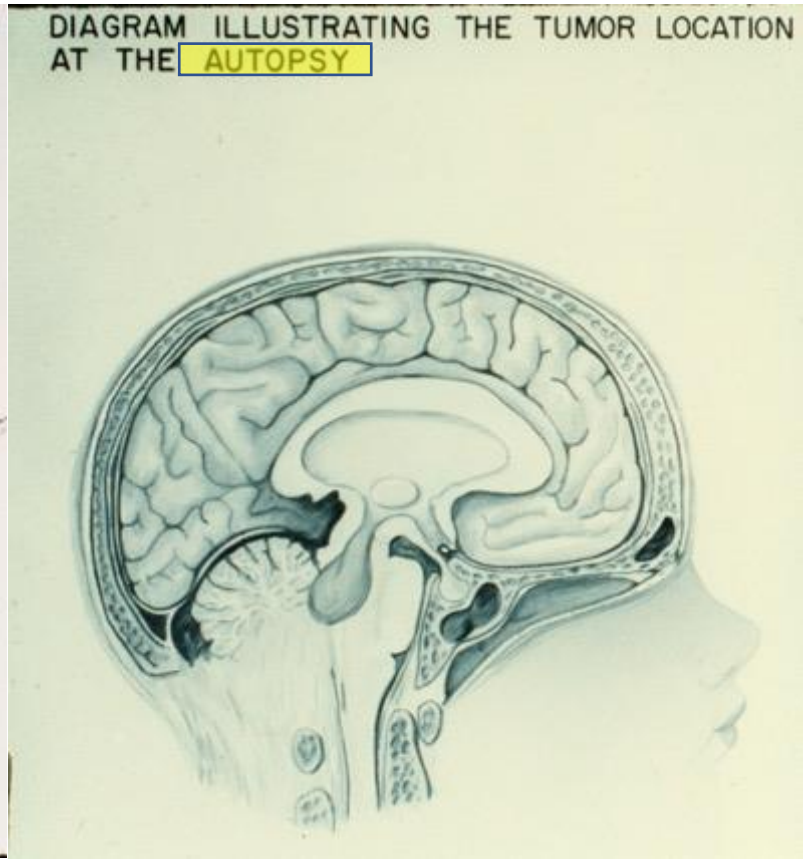
VOL. 36 JULY, 1936 No

BIOLOGICAL EFFECTS AND THERAPEUTIC
POSSIBILITIES OF NEUTRONS

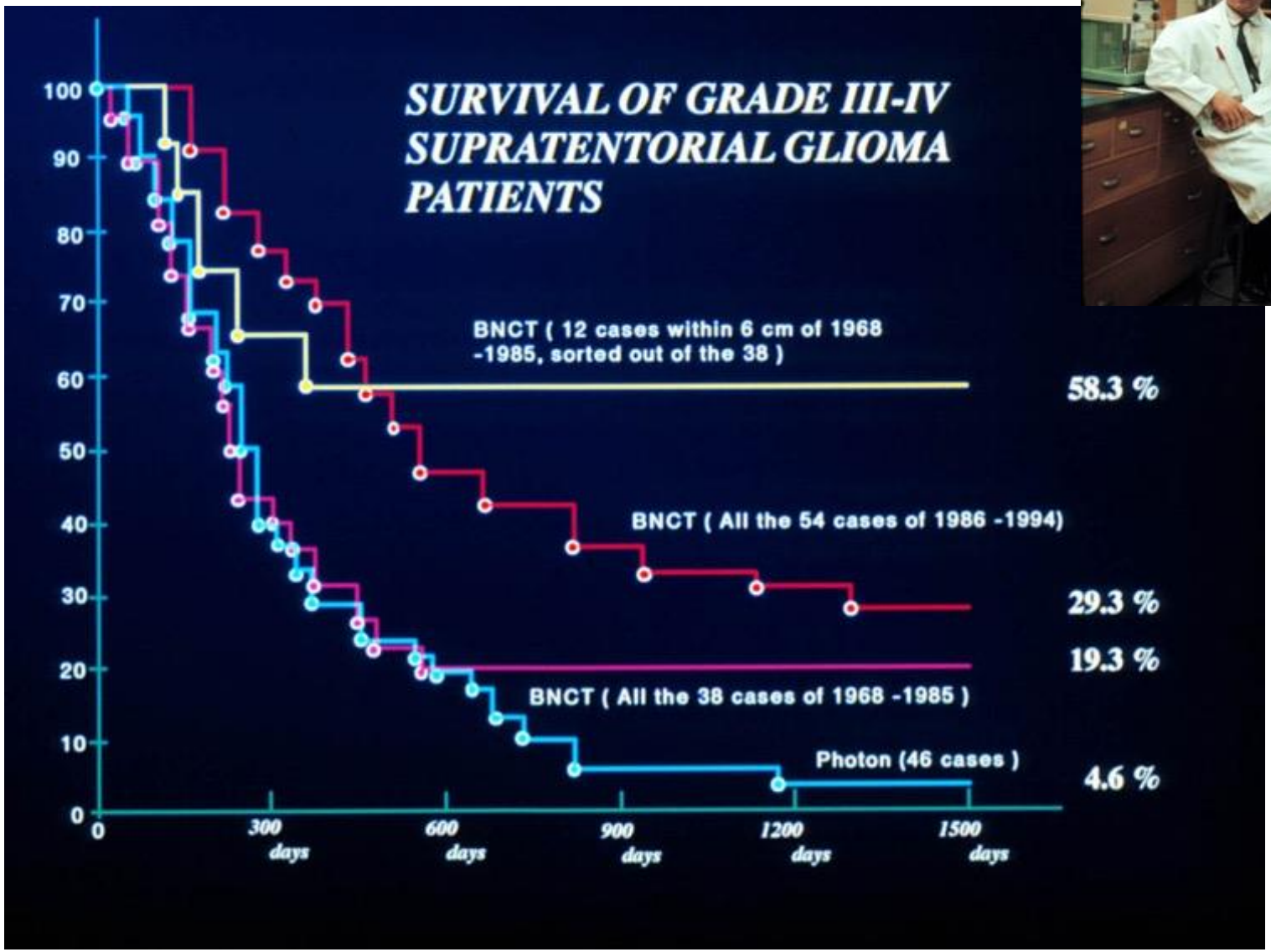
By **GORDON L. LOCHER**, Ph. D.

BNCT – the fifties: a disaster





BNCT “exciting” results in the ninetees



Hatanaka 1996

In Japan
large BNCT clinical experience
however without systematic developments

In Europe
few clinical expertise
some strong basic research activities

RENOVATE was intended as bridge between EU and Japan

Other countries have joined

Motivations

The appearance of accelerator-based neutron sources in hospitals

- creates the possibility to perform clinical trials and hence to prove the superiority of BNCT in comparison with conventional radiation therapy
- creates a potential market for new boron compounds
- creates the opportunity of exciting interdisciplinary research
- creates an occasion to continue with methods developed in the past for BNCT
- creates an improved competitiveness of European institutions in the field of innovative oncology

Our Aim

Our aim is to establish preclinical research for the development of better boron compounds in Europe, to develop neutron dosimetry on a high level and to introduce BNCT into European hospitals through defined research projects and close exchange with our colleagues in Japan, hence offering a more efficient treatment for patients suffering from cancers deemed incurable

Objectives

- Establishing BNCT in Europe (and the US)
  - By exchanging information and staff
  - By implementing joint research projects
  - By bringing patients to Japan for treatment

- Supporting BNCT clinical activities in Japan
  - By exchanging information and staff
  - By implementing joint research projects
  - By bringing patients to Japan for treatment

RENOVATE Consortium

RENOVATE is coordinated by DGBNCT – Essen – Germany

DGBNCT

Deutsche Gesellschaft für
Bor-Neutroneneinfangtherapie e.V.

European Commission

RENOVATE is a **multidisciplinary**, **world-wide** project

The partners

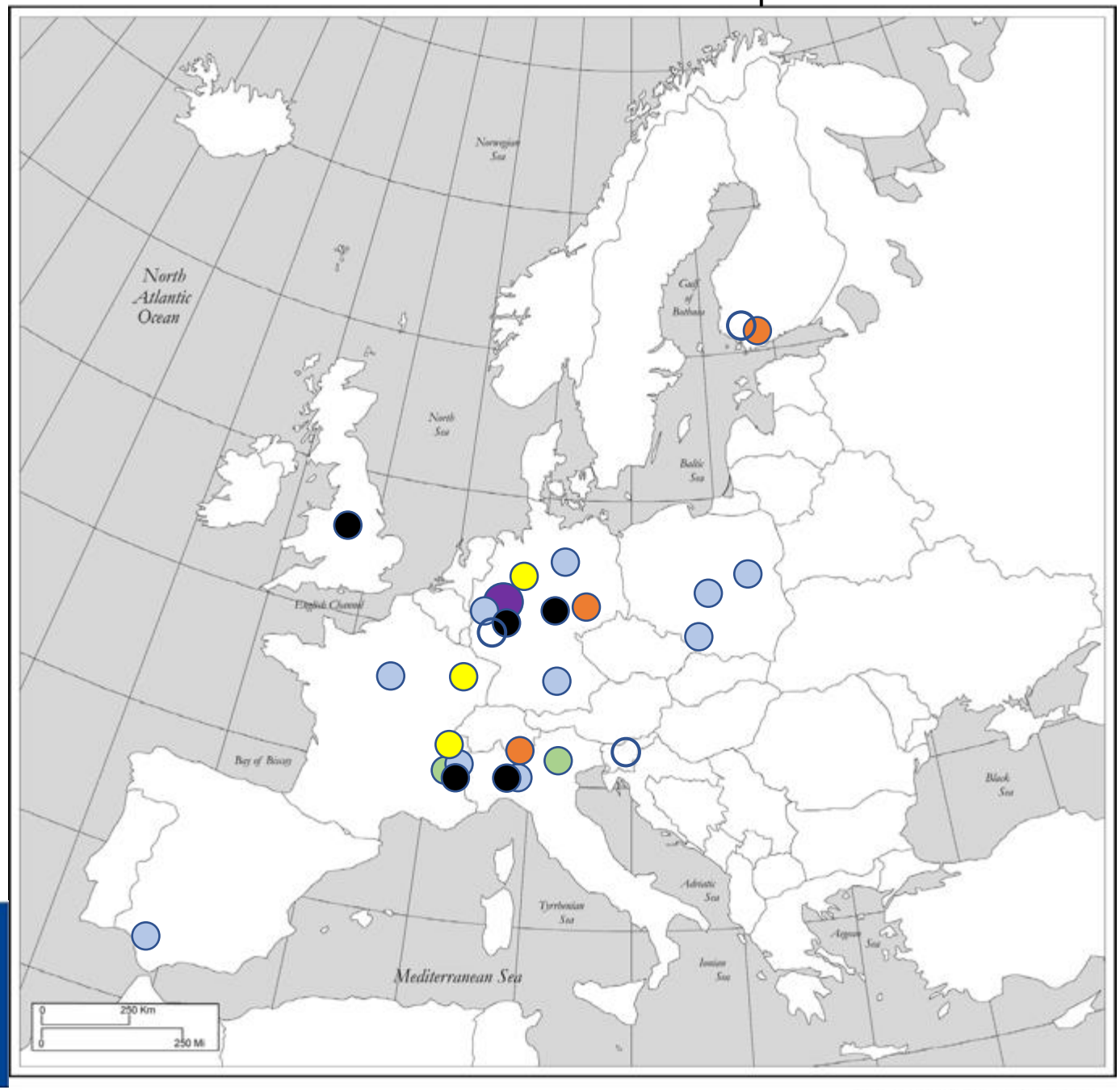
- Total number 43
- Industry 3
- Academia 38
- Others 2

Chemistry and early testing	8
Biology	4
Boron Imaging	4
Physics	17
Medical	12
Others	1

RENOVATE consortium: world-wide

EUROPE

RENOVATE consortium - Europe



Coordination Europe

Imaging

Biology

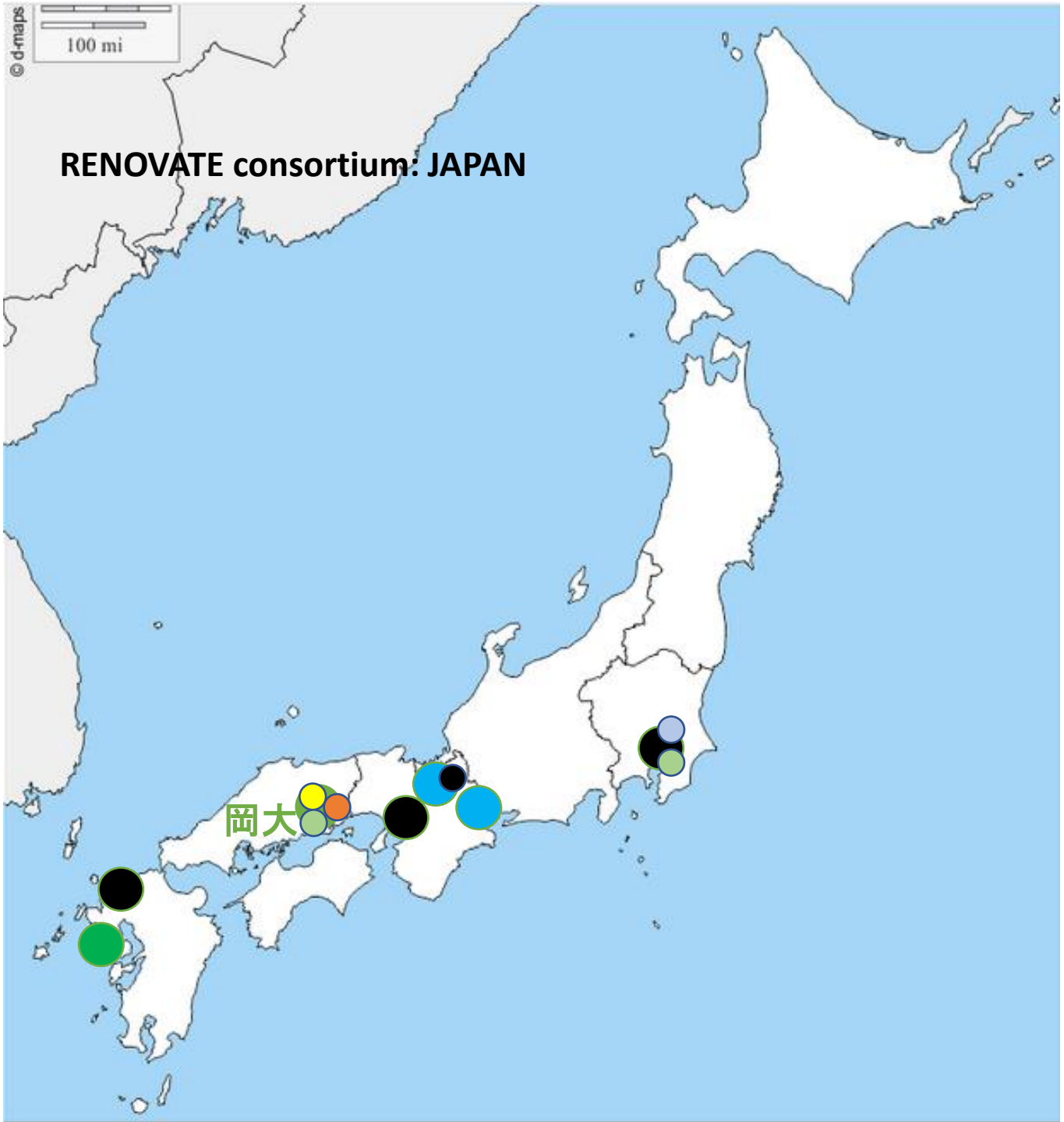
Chemistry

Physics

Medical

Industry

Produced by the Cartographic Research Lab
University of Alabama



List of Japanese Partners

- Okayama University
- NCCH
- Kyoto University
- Nagoya University
- Osaka Medical College
- Nagasaki University
- HIMAT Foundation

Imaging

Biology

Chemistry

Physics

Medical

RENOVATE consortium: JAPAN

Okayama University

- Neutron Therapy Research Center

  preclinical testing

- OMIC
  (Prof. Eiji Matsuura)

  Imaging

- Research Core for Interdisciplinary Sciences
  (Prof. Yuta Nisina)

  new boron compounds

Topics for collaboration

1. Preparing epithermal neutron sources for preclinical experiments in Europe
2. Exchanging / Exploring the potential of a range of innovative molecules for boron transport into tumor cells -- Preclinical testing
3. Developing standards for prescribing and reporting doses in BNCT and for measuring boron concentration and distribution in biological materials
4. Establishing the possibility for treating patients from foreign countries at Japanese BNCT hospitals as long as there is no sufficient capacity in Europe/US - Main Objective: set-up a clinical trial protocol
5. Preparing installing accelerator-based neutron sources into EU hospitals
6. Verification imaging of the delivered dose through prompt gamma imaging
7. By organizing summer schools and workshops, main achievements of the BNCT-RSE project will be disseminated around the world

Biopsies

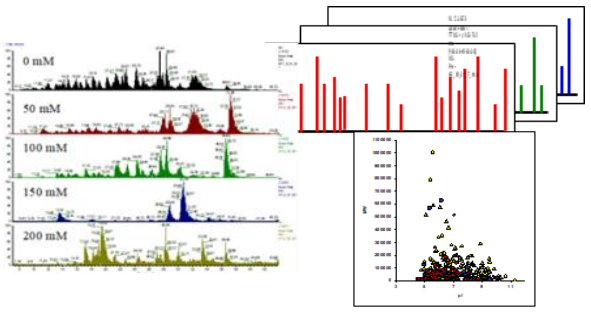
Deparaffization

Homogeneization

Biofluids

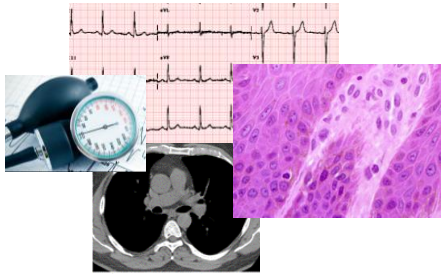
Exosomes

Proteomics raw data



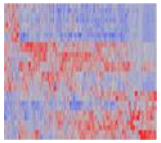
Proteomics results allowed

Clinical Data



Comparison

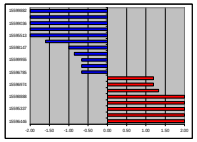
good stratification



matched to clinical

+

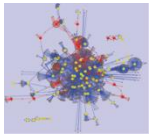
differial proteins



known & new biomarkers

+

pathways



mechanisms

Personalized Medicine

- Biomarkers for early diagnosis and predictive of therapy effect
- Disease- and therapy-related pathways (endotypes)

10 Work-packages

Dosimeter and Neutron Field Characterization

- Leader: CNRS (Daniel Santos)

Irradiation Sources

- Leader: University Pavia (Saverio Altieri)

Boron Compounds (design and synthesis)

- Leader: University of Leipzig (Evamarie Hey-Hawkins)

Radiobiology and preclinical testing

- Leader: University of Grenoble (Lucie Sancey)

Cinical trial protocol

- Leader: University Jena (Andrea Wittig)

in-vivo (verification) Imaging

- Leader: University of Birmingham (Stuart Green)

in-vitro Boron imaging

- Leader: University of Reims (Jean Michel)

Standards

- Leader: DGBNCT (Wolfgang Sauerwein)

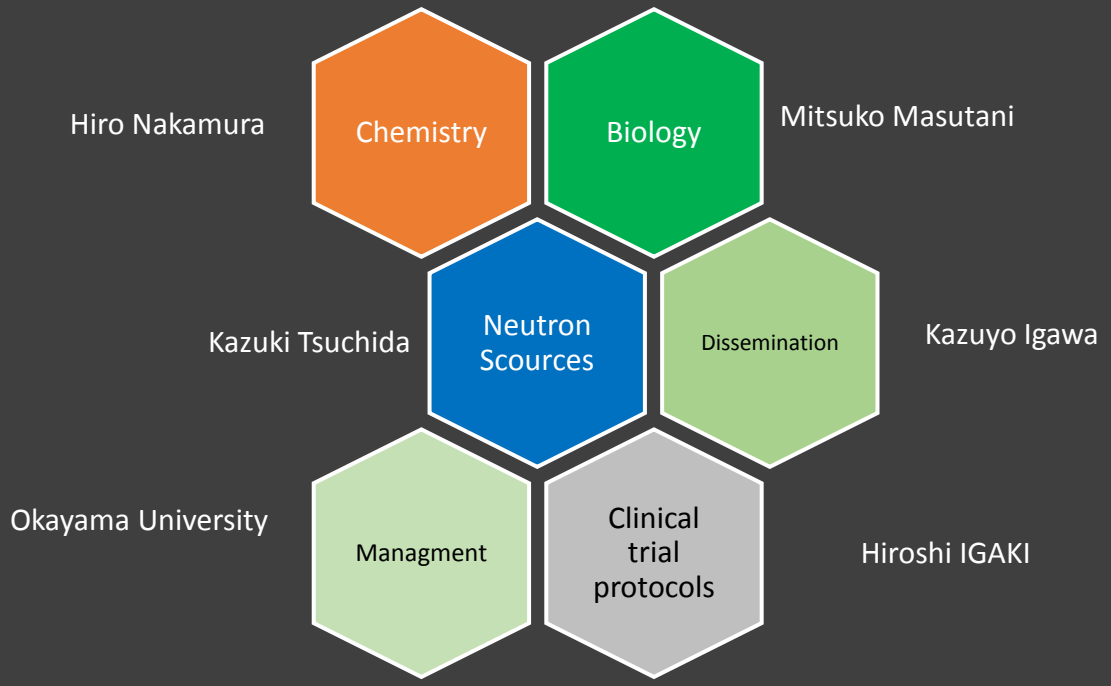
Dissemination

- Leader: Steering Committee

Management

- Leader: DGBNCT (Wolfgang Sauerwein)

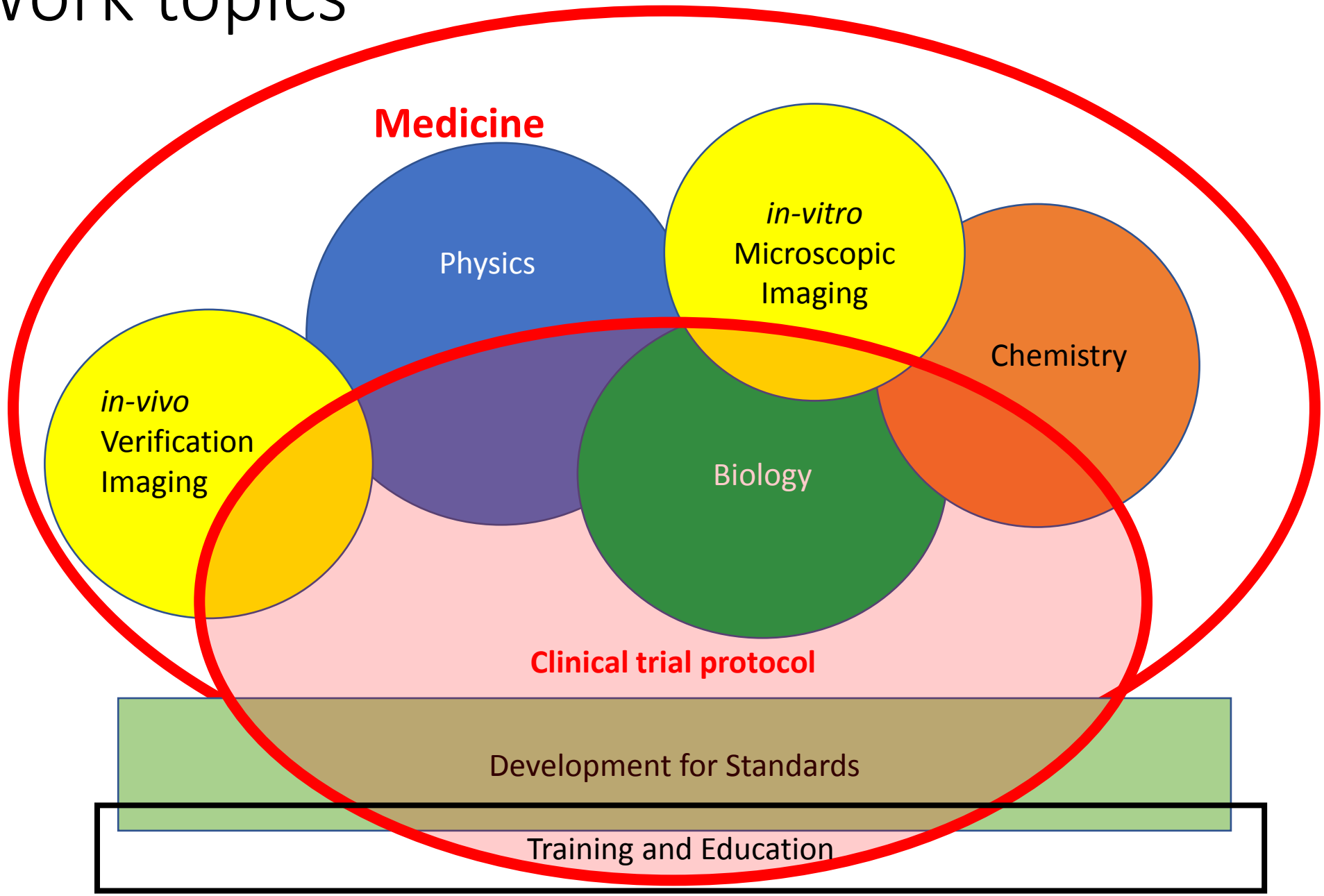
Close collaboration through Japanese deputies



Management and Administration

	Project Coordinator	DGBNCT (Wolfgang Sauerwein)
	Deputy	Okayama University (Bernard Chenevier)
	Administration	Okayama University (Emi Saito)
	Intellectual property rights	Okayama University (Kazumi Sagayama)
	Internal communication	University of Sevilla (Marcin Balcerzyk)
	Coordination of Partners from Industry	Birgit Wortmann
	Organizing exchange of clinicians with Japan	National Cancer Center Hospital (Hiroshi Igaki)

Work topics


Medicine
Physics
in-vitro
Microscopic
Imaging
Chemistry
in-vivo
Verification
Imaging
Biology
Clinical trial protocol
Development for Standards
Training and Education

RENOVATE: benefit for partners

No direct support for developed TC (Third Country) partners USA, Japan and Russia

Indirect support but ….. **Substantial benefit**

Opportunities to cooperate with top-level scientists for BNCT

A consortium membership that will help to apply for further Research Grants

Cheap labour via staff exchange

Access to technologies that are not available on site

Promotion of the institution through increased visibility (RENOVATE Web page…)

Increased number of co-authored papers – International (high-impact) journals

Increased international influence by preparing new standards

Promotion of industrial partners

Regular structured exchange via workshops and summer schools

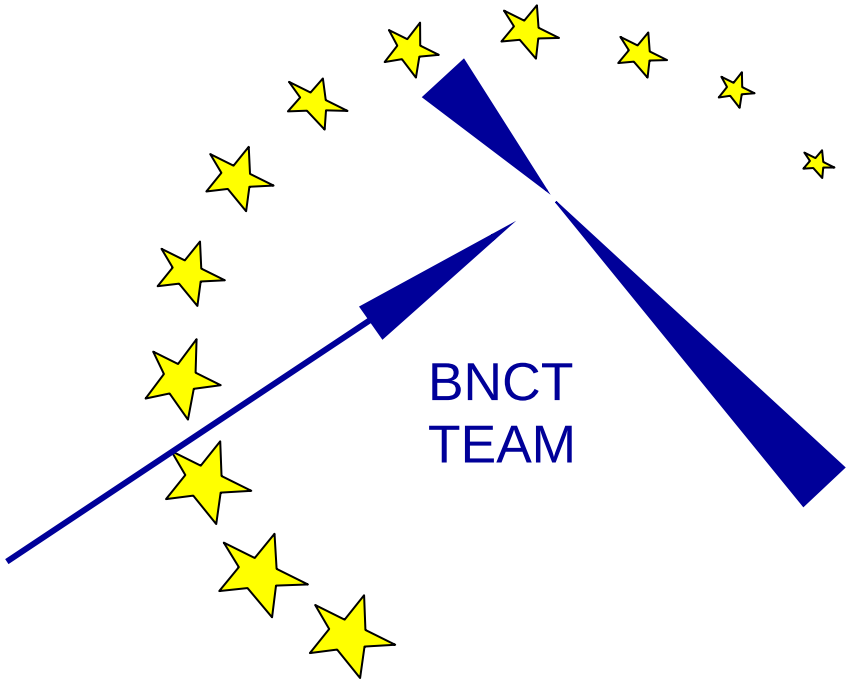
RENOVATE mobility scheme (Under construction)

RISE only supports mobility of staff from EU to TC and inside EU from academic to non-academic (industry)

Our problem: Most partners are interested in exchange academic to academic

We need to increase the attractivity of the Japanese partners – let us start with Okayama!

There is a past we can build on



European Commission funded projects
BMH4-CT1996-0325 (coordinated by D. Gabel)
QLK3-CT-1999-01067 (coordinated by W. Sauerwein)
IST-2000-25252 (coordinated by G. Brugal)

The European BNCT Project

Coordinator: Prof. Dr. med. W. Sauerwein

The Swiss Foundation
“Fondation Neurochirurgie 2001”, Lausanne

The German-Israeli Foundation GIF