Working together for better health
Partnering with Boehringer Ingelheim
About Boehringer Ingelheim

Only independent, family-owned, top 20 global pharmaceutical company

Established over 130 years ago

146 companies operating in 47 countries

More than 47,700 employees

2800 scientists in drug discovery centres of excellence

Sustained growth and investment over many years

Blockbuster brands: Spiriva®, Micardis®, Pradaxa®

Independence Responsibility Innovation Care
In recent years, four investigational agents from Boehringer Ingelheim have been granted breakthrough therapy designation by the FDA.

Jardiance® is the only diabetes medication to show a significant reduction in both cardiovascular risk and cardiovascular death in a dedicated outcome trial.¹

Joint publications with leading scientists:

Transcriptional plasticity promotes primary and acquired resistance to BET inhibition

Philipp Rathert, Mareike Roth, Tobias Neumann, Felix Muerdter, Jee-Seek Roe, Matthias Muhr, Sumit Deswal, Sabine Cerny-Reiterer, Barbara Peter, Julian Jude, Thomas Hoffmann, Lukas M. Borya, Elia Axelsson, Norbert Schweier, Ulrike Tomisch-Grunt, Lukas E. Dow, Davide Gianelli, Mark Pearson, Peter Valent, Alexander Stark, Norbert Kreut, Christopher R. Vakoc & Johannes Zuber

Affiliations | Contributions | Corresponding author

Received 10 November 2014 | Accepted 07 July 2015 | Published online 14 September 2015

¹ Results of the EMPA-REG OUTCOME® trial were published in New England Journal of Medicine, DOI: 10.1056/NEJMoa1504720
Global Research and Development Presence

Global research and development presence: Major research sites in USA, Germany and Austria

Industry-leading expertise in research, development and medicine

- 7,895 highly qualified people working in our facilities worldwide

Extensive capabilities in both small molecule drugs and biotherapeutics

Actively extending our global network of academic and industry partners

Ridgefield, CT, USA
- CardioMetabolic Diseases
- Immunology & respiratory diseases
- Non-clinical drug development
- Biologics centre of excellence

Kobe, Japan
- Early drug formulation
- Specific pharmacokinetic investigation

Biberach and Ingelheim, Germany
- Immunology & respiratory diseases
- CardioMetabolic diseases
- CNS diseases
- Non-clinical drug development

Vienna, Austria
- Oncology

Milan, Italy
- Support for synthesis in exploratory and lead optimisation projects

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Discovery Research Strategy
Building on our strengths, creating synergies, capturing emerging science

Our discovery research strategy enhances our ability to innovate and encourages scientific creativity. It is based on three pillars:

- **Discovery Research Therapeutic Areas**: building on our strengths in R&D by focusing on diseases where we have built expertise over time and are actively investing from early research, through clinical development, to commercialisation.

- **Immune Modulation and Biotherapeutics Discovery (IMBD)**: focusing on highly dynamic research fields such as immune modulation and NBE discovery to impact and create synergies across several of our Discovery Research Therapeutic Areas.

- **Research Beyond Borders**: where we explore emerging science and technology for and beyond our Discovery Research Therapeutic Areas.

Our global network of academic and industry partners is fundamental to help us achieve our goals.

Building on our strengths:
Discovery Research Therapeutic Areas

- **Cardio-Metabolic Diseases**
- **Central Nervous System Diseases**
- **Immunology & Respiratory Diseases**
- **Oncology**

**Immune Modulation & Biotherapeutics Discovery**

**Research Beyond Borders (RBB)**
Capturing emerging science/technologies for and beyond our TAs
Research Beyond Borders (RBB)

Why?

Prepare BI for the future
- New disease biology/indications based on unmet medical need
- New therapeutic modalities beyond NCE and NBE
- Emerging science/technologies for and beyond the current TAs

Create new avenues for innovation
- Empower BI scientists to be creative/extract value from innovation
- Extend current TA horizons and explore new areas of science
- Increase access to external sources of innovation (BI~1350 scientists↔scientists around the world)
- Build on internal strengths to leverage opportunities

Increase visibility
- Become the partner of choice for external innovators

Increase flexibility, agility and responsiveness to scientific advances
- Active seeking of internal and external ideas
- Streamlined decision-taking within RBB mandate
- Deploy flexible and novel collaboration/business models to enable and execute innovative projects
RBB explores emerging science and technologies for and beyond our core therapeutic areas:

- To create new therapeutic opportunities and capabilities for drug discovery and development
- To help bridge BI’s timely and efficient entry into new areas of research to develop solutions for high unmet medical need for the benefit of patients.

High priority areas include new target spaces, therapeutic approaches and technologies.

RBB integrates both internal and external insights and opportunities to bring together the talents and capabilities of our scientists most effectively with the strengths of scientists around the world.
Working together...what is important to us...

Shared success and each partner bringing their best towards mutually aligned goals that speed the path to deliver better therapies for patients

Openness to new approaches for strategic biotech/pharma and academic partnerships

Building effective relationships that deliver long-term value and growth

Join us in working together for better health!
Capabilities to Complement External Expertise
Facilitating success for projects from science to sales

**Research**
Global research presence
Major research sites in the USA, Germany and Austria

**Clinical trials**
988,860 patients, 1,414 studies, 115 substances, 95 countries

**Market access**
Experienced market access team
Integrated part of the R&D, marketing and regulatory teams

**Clinical development**
Dedicated phase 1 clinical unit

**Regulatory**
Three breakthrough therapy designations
10 approvals in 10 months

**Sales & marketing**
Effectively translates R&D achievements into brand successes

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1. 2005-2014
2. Approved by the US Food and Drug Administration and/or the European Medicines Agency; August 2014–May 2015

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Our Partnering Focus

Our partnering focus encompasses opportunities across the drug discovery and development value chain:

- Building on our strengths by seeking partnerships in our established therapeutic areas and commercial franchises
- Collaborating on new biology and new therapeutic concepts within our core areas
- Investing in next-generation science both within and beyond our core therapeutic areas
- Leveraging enabling technologies
Areas of research and collaboration opportunities:

- **Type 2 diabetes**: β-cell regeneration; insulin resistance and adipose tissue inflammation; gut microbiota; gut-brain axis
- **Obesity**: Energy expenditure; fat cell browning; feeding and reward system; novel CNS circuits
- **Diabetic retinopathy**: Diabetic macular oedema; neuronal dysfunction; vascular dysfunction; neoangiogenesis; fibrosis
- **Non-alcoholic steatohepatitis (NASH)**: Inflammation; fibrosis; metabolic pathways / TG trafficking; stellate cell biology
- **Kidney disease**: Podocyte biology; renal inflammation and fibrosis; oxidative stress; cardio-renal axis

Specific research interests:
- Regenerative medicine approaches for targeting pathophysiology in the cardio-renal axis
- Therapeutic approaches targeting the gut microbiome

Research facilities located in Biberach, Germany and Ridgefield, CT, USA
Central Nervous System (CNS) Diseases Research

Areas of research and collaboration opportunities

- **Cognition:** Targets along glutamatergic pathways in cortical brain areas; modulation of GABAergic interneurons; mechanisms of synaptic plasticity

- **Impulsivity:** Alignment of behavioural symptoms to maladaptive brain circuitry (optogenetics in mesolimbic systems); monoaminergic modulation; operant behaviour in translational studies

- **Negative valence:** Alignment of behavioural symptoms to maladaptive brain circuitry (optogenetics in corticolimbic systems); epigenetic modulation; cortical disinhibition

- **Maladaptive social functioning (social interaction):** Alignment of behavioural symptoms to maladaptive brain circuitry (optogenetics in corticolimbic systems); genetic analysis of autism spectrum disorders

Research facility located in Biberach, Germany
Areas of research and collaboration opportunities

- **Regulation of mucosal barrier injury and repair** (e.g. epithelial health and inflammation, epithelial-immune interactions, microbiome-host interactions): Crohn’s disease; COPD; spondyloarthritis; asthma; graft-versus-host disease; systemic sclerosis; acute respiratory distress syndrome; IPF; ulcerative colitis

- **Control of aberrant tissue remodeling**: Lupus nephritis; Crohn’s disease; COPD; graft-versus-host disease; asthma; IPF; systemic sclerosis; ulcerative colitis

- **Innate effector function**: Broad application across immunology and respiratory indications

- **Immune modulation**: Modulation of immune checkpoint signals to promote tissue tolerance for immunology indications and asthma

Research facilities located in Biberach, Germany and Ridgefield, CT, USA
Areas of research and collaboration opportunities:

**Cancer cell-directed therapies:**
- Growth signalling
  - e.g. RTKs, Wnt, Notch, KRAS, MET, MYC
- Regulation of apoptosis
- Epigenetic regulation
- Regulation of protein homeostasis

**Immune cell-directed therapies**
- Priming of tumour-specific T-cells
  - Vaccines
- Immune cell re-activation
  - Checkpoint control
  - NK-cell activation
- Immune cell re-direction
  - T-cell engager approaches

**Research facility located in Vienna, Austria**
Areas of research and collaboration opportunities

- Targets relevant for modulation of the activity of the immune cell types such as T-cells, NK Cells and DCs
  - Modulation can be re-activation or de-activation with potential to provide a therapy within the core therapeutic areas of Boehringer Ingelheim

- New vaccination approaches for the treatment of cancer

- New technologies to modulate the immune response to treat auto-immune disease or cancer

Research facilities located in Biberach, Germany; Ridgefield, CT. USA and Vienna, Austria
Areas of research and collaboration opportunities

**Microbiome:**
- Identification of novel bacteria and bacterial products, establishing their causal role in human health and disease

**Regenerative Medicine:**
- New targets or methods for identifying targets that are implicated in the mobilisation and/or differentiation of endogenous stem cells/progenitor cells

**Gene Therapy:**
- New therapeutic concepts and technology enhancements

**Hearing Loss:**
- Identification of mechanisms and technologies which prevent loss of hearing or allow restored sensitivity

Having established internal hubs to support the new focus areas, RBB is now extending its global scientific network by building teams at strategic innovation hot spots around the world. For creating new avenues for innovation, RBB will position itself as a partner of choice for external innovators.
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