Science For A Better Life

Bayer-Peking University Collaboration

2017 Call for Joint Project Proposals

Mission Statement

- We are searching for research collaborations and new technologies such as molecules, cell lines, animal models, biomarkers, biospecimen, or formulations and delivery systems pertaining to our indications. These are **Oncology**, **Cardiovascular Diseases** and **Gynecology**.
- If you have an exciting research proposal or technology offer, you are invited to submit your proposal by contacting us directly!






Points of Contact

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FAQs

- **Where will the joint research project be conducted and by whom?**

  The joint research project will be carried out at PKU by the Primary Investigator (PI) or a research team led by the PI at PKU.

- **Besides the PKU PI, who will be involved in a joint research project?**

  An Alliance Manager who serves as a key contact for overall coordination of the project, the Project Manager(s) who are Bayer scientist(s) supporting the project scientifically by direct communication with the PI on project progress through teleconferences on a monthly basis.

- **How long will a joint research project run?**

  Typically, a joint research project will run one to three years.

- **Will Bayer provide fund to support a joint research project ?**

  Bayer has designated budget to support joint research projects with PKU. The exact budget number will be jointly discussed.

- **Is there an example of a joint research project?**

  A joint research project could be, for example, a PKU PI has a disease model in which Bayer could test its compound for efficacy, or a PKU PI has a certain technology that could be applied to target identification of Bayer's compound, etc.

- **What will be the outcome of a joint research project?**

  Outcomes of a joint research project may include joint publication, opportunity for patent filing or licensing, further support on continuation of the project, etc.

Areas of Interest for Collaboration - Indications (1/4)

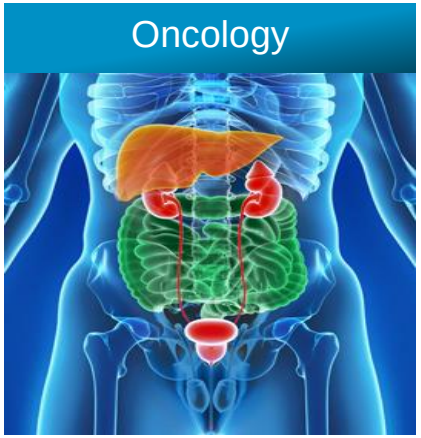
- **Oncology**

  We are interested in new targets and tools, small molecules, and biologicals (i.e. function-blocking-antibodies) with a clear first-in-class potential, plasmids and cell lines, in-vitro technologies for functional analyses and animal models pertaining to the fields of

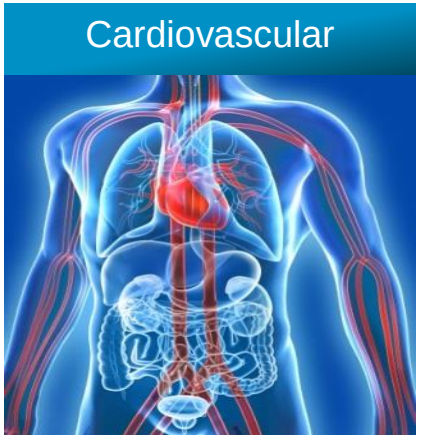
  (1) Oncogenic Signaling
  - Approaches towards tumor signaling targeting the “undruggables”
  - Tumor cell selective induction of apoptosis or other forms of cell death
  - Transcription and chromatin modulators
  - Selective targeting of tumor-specific metabolic dependencies

  (2) Immuno-Oncology

  (3) Antibody Drug Conjugates



Areas of Interest for Collaboration - Indications (2/4)



- **Cardiovascular Diseases**

We are interested in new targets and tools, small molecules, proteins, animal models and biomarkers pertaining to the fields of

(1) Acute Care Research

- Thrombotic and Athero-thrombotic Diseases
  (e.g. Acute Coronary Syndromes, ischemic stroke prevention, orthopedic surgery, medical ill, AV fistula, SPAF, cryptogenic stroke, ECMO, Peripheral Arterial Occlusive Disease , Critical Limb Ischemia)
- Acute/Intensive Care
  (e.g. Acute Lung Injury/Acute Respiratory Distress Syndrome, Acute Kidney Injury, DIC)

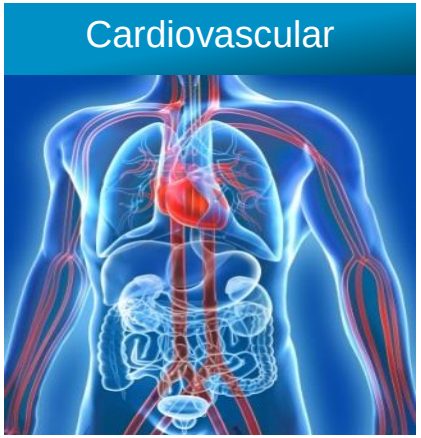
(2) Heart Diseases

- Heart Failure
- Atrial Fibrillation
- Cardioprotection (ischemia/reperfusion)

Areas of Interest for Collaboration - Indications (3/4)

- **Cardiovascular Diseases** (cont.)

  We are interested in new targets and tools, small molecules, proteins, animal models and biomarkers pertaining to the fields of



(3) Kidney Diseases

- Chronic Kidney Disease (CKD) progression
- Ischemia- or hypertension-induced CKD
- Cardiovascular disease associated with CKD
- Diabetic Nephropathy
- IgA Nephropathy

(4) Vascular Diseases

- Pulmonary Arterial Hypertension addressing remodeling of vessel wall
- Secondary Pulmonary Hypertension
- Resistant Arterial Hypertension
- Chronic forms of peripheral vascular diseases
- Idiopathic Pulmonary Diseases and Muscular Dystrophy Duchenne

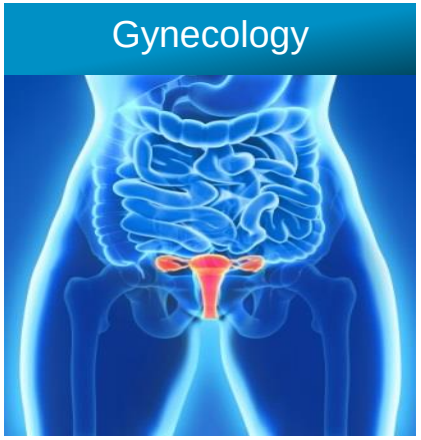
Areas of Interest for Collaboration - Indications (4/4)

- **Gynecology**

  We are in particular interested in animal models, new targets and tools, small molecules, biologicals (i.e. function-blocking-antibodies), plasmids and cell lines, in-vitro technologies for functional analyses pertaining to the fields of

  Hyper-proliferative Diseases

  - Uterine Fibroids
  - Adenomyosis Uteri
  - Polycystic Ovary Syndrome (PCOS)



Areas of Interest for Collaboration - Technologies (1/7)

- **Biologics**

  We are looking for…

(1) Antibody Lead Discovery Technologies

- (antibody) phage display
- immunization techniques
- B-cell technologies
- (antibody) yeast display
- novel antibody formats
- bispecific antibodies
- tolerization
- antibodies to GPCRs and ion channels
- microfluidics technologies

(2) Protein Engineering and Assays

- DNA library construction
- assays for target validation and HT assays
- immunological and reporter gene assays

(3) Cell and Protein Sciences

- mammalian cell expression (antibodies and other proteins)
- production cell lines for biologicals
- technologies for protein purification
- next generation sequencing
- analytics for characterization of biological drug candidates – mass spectrometry, glycosylation, epitope mapping, functional assays,
- developability assays
- in silico and HT in vitro assays to predict/test solubility, viscosity and aggregation behavior of antibodies/biologics
- site specific conjugation of ADCs

Areas of Interest for Collaboration - Technologies (2/7)

Animal Models

We are interested in transgenic, syngeneic, knock-out, knock-in, xenografts, orthotopic models for Oncology, Cardiovascular Diseases, and Gynecology.

(1) For Oncology

- Models of the following indications: gastric, prostate, head & neck, melanoma, colon, bladder, ovarian, liver, triple-negative breast (TNB) cancer, including the aspects of metastasis, e.g. models of brain/bone metastasis due to lung, breast and prostate tumors, and hematological tumors
- Models refractory to clinically approved therapies, e.g. Tarceva-resistant lung CA, Herceptin-resistant mamma CA, Avastin-resistant/insensitive tumors, Taxane-resistant tumor models, immune checkpoint blockade inhibitors
- Models measuring activities of metabolic enzymes in-vitro and in-vivo
- Anti-tumor immune response, immuno-oncology: syngeneic in-vivo models and, ideally, models using mice harboring a humanized immune system
- 3D-in-vitro technologies, organoid cultures, cell/cell & cell/ECM interactions, “sprouting” or “microenvironment” for tumor growth studies

Areas of Interest for Collaboration - Technologies (3/7)

- **Animal Models** (cont.)

(2) For Cardiovascular Diseases

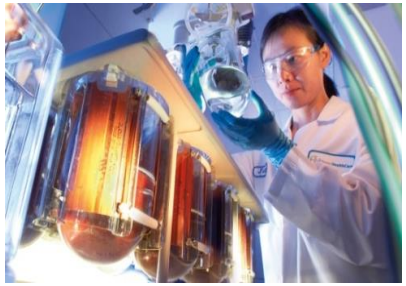
- Short-term animal models, e.g. innovative imaging techniques for PAOD and ischemic stroke
- Animal models with respect to development state for thrombotic disorders mimicking high risk patients
- Animal models with underlying cause Acute Lung Injury/Acute Respiratory Distress Syndrome
- Animal models mirroring Secondary Pulmonary Hypertension (e.g. PH/COPD)
- Animal models for on-line tracking of Heart Failure development and therapy success
- Animal models for HFpEF
- Animal models mirroring Atrial Fibrillation
- Animal models of acute and chronic kidney injury, diabetic nephropathy
- Ischemic stroke (prevention) models
- Bleeding models
- Idiopathic Pulmonary Diseases -> animal models other than bleomycin
- Muscular Dystrophy Duchenne -> animal models (rodent & non-rodent)
- Non-rodent kidney disease models in dogs, pigs or primates

Areas of Interest for Collaboration - Technologies (4/7)

- **Animal Models** (cont.)

(3) For Gynecology

- Rat, mouse, primate models for Gynecological Therapy: human xenografts for uterine fibroids, dysmenorrhea, dysfunctional bleeding; genetically engineered mice or rats developing uterine fibroids



Areas of Interest for Collaboration - Technologies (5/7)

Biomarkers

We are interested in technologies useful for the development of predictive, prognostic, safety, and pharmacodynamic markers in all our indications. Furthermore, we are interested in markers that are technically validated and fit-for-purpose in clinical settings to support our drug development programs.

(1) For Oncology

- Diagnostic technologies and/or already established molecular markers with predictive and/or pharmacodynamic value to support our drug development programs

(2) For Cardiovascular Diseases

- Biomarkers which represent pathomechanisms or a certain degree of a pathomechanism in…
  - Heart Failure e.g. extracellular matrix turnover and fibrosis, microcirculation, cardiomyocyte injury, metabolic remodeling, mitochondrial dysfunction
  - Kidney Diseases e.g. kidney fibrosis, inflammation. **Preferred:** circulation/blood-based or urinary biomarker
  - Vascular/Lung Diseases e.g. fibrosis, inflammation. **Preferred:** circulation/blood-based biomarker
- Analytical devices to continuously monitor vital functions, which represent pathomechanisms or a certain degree of a pathomechanism in all cardiovascular indications

Areas of Interest for Collaboration - Technologies (6/7)

- **Biospecimen**

  We are interested in tissue samples to support our research dealing with proliferative diseases.

  (1) For Oncology

  - Prostate (in particular the process of metastasis), hematological tumors, breast, colon, lung, ovarian, as well as mesothelioma, gastric, liver, head & neck, melanoma, bladder, and triple-negative breast (TNB) cancer, hematological malignancies, pediatric tumors
  - Refractory to targeted therapy or immunotherapy e.g. Tarceva-resistant lung CA, Herceptin-resistant mamma CA, Avastin-resistant/insensitive tumors, Taxane-resistant tumor models, PD-1/PD-L1-resistant tumors; tissue of non-responders or patients becoming refractory to immune checkpoint inhibitors; under-, post- or refractory to standard therapy according to guidelines, ideally matched to pre-therapy samples

  (2) For Gynecology

  - Tissue from endometriosis/adenomyosis uteri, uterine fibroids or PCOS patients

Areas of Interest for Collaboration - Technologies (7/7)

- **Formulations and Delivery Systems**

  (1) Formulation Development (Bios)

  - Protein formulation, high concentration monoclonal antibodies, modelling of drying processes, novel excipients, prefilled syringe, ex vivo simulation of protein administration, subcutaneous application, ADCs, immunoconjugates

  (2) Formulation Development (liquid SMOLs)

  - Dosage – lyophilisate / technology, stability improvement, solubility, parenterals – particles

  (3) Formulation Development (ocular, inhale)

  - Release modelling – polymeric implants, RoAdmin – intravitreal / intranasal / ophthalmic / inhale, alternative polymers for sustained IVT release, dosage – microparticles / aerosol / dry powder / nebulizer, extrusion – melt

  (4) Formulation Development (solids)

  - Excipients, technology – agglomeration / granulation / coating / nanosizing, dosage – granules / tablet / amorphous / solid dispersion / nanocrystals / controlled release / modified release, Continuous Pharmaceutical Manufacturing

  (5) Delivery Technologies and Applications

  - ElectroNanospray, biorelevant dissolution models, poor solubility, 3D printed tablets/devices, intravitreal application, e-health, liquid aerosol application, dry powder application, intranasal application, ophthalmic application, Biosensor (hormone, oncological/cardiological biomarker), release modelling – polymeric implants, non thermic radiation impact on drugs (bluetooth)

Submission Process

- SUBMIT YOUR PROPOSAL **BY APRIL 15th 2017***

  Please use the **Application Form** to submit an abstract of your research proposal or technology offer, including its characteristics, a description of its therapeutic potential, relevant publications, and IP situation.

  Please note that **only non-confidential information should be provided**.

  *Additional application after the deadline is also welcomed and will be considered at a later time.

- EVALUATION OF YOUR PROPOSAL

  6 - 8 weeks after submission

  The information provided will be evaluated by Bayer scientific experts. The decision is dependent on current specific needs and actual research project portfolio.

- FEEDBACK

  Bayer Alliance Manager will contact you regarding the decision and discuss possible next steps.

For more information, please visit: http://pharma.bayer.com/en/innovation-partnering/partnering/
https://innovate.bayer.com/what-we-offer/

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Thank you!