2022

Catalyzing translational medicine in academia

SPARK

BIH

SPARK-BIH

Charité BIH Innovation SPARK-BIH
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SPARK-BIH program in Berlin

The **SPARK program in Berlin** was founded in 2015 by Prof. Dr. Craig Garner and Prof. Dr. Ulrich Dirnagl with the support of the Stiftung Charité. The goal was and is **to support academic inventors in translating their research findings** into therapies, products and services, such as novel therapeutics (small molecules, biologics, cellular therapies), medical devices and diagnostics for unmet medical needs.

The program in Berlin was **modeled after the successful SPARK program at Stanford University** which Prof. Dr. Garner was a member of. Since its founding in 2006 SPARK has grown to a global network with programs implemented at more than 50 universities worldwide. The SPARK network serves as a resource for knowledge, advisors and examples of best practice. An annual meeting brings together the leadership of all SPARK programs to discuss global health challenges, strategies to improve translation and how to augment the SPARK educational program. An international workshop on Bioinnovation and Entrepreneurship brings together SPARK participants from all around the globe. This workshop has been offered in an online format during the Covid Pandemic.

In 2018 the **Berlin Institute of Health (BIH)** decided to perpetuate the program and to include **SPARK-BIH** as part of their **mission to support translational medicine**. SPARK-BIH was successfully embedded within Charité BIH Innovation, the joint technology transfer of BIH and Charité. Thereby, SPARK in Berlin has grown from supporting about 4 projects per year with 50.000€ each to a program that **currently funds and mentors almost 30 project teams**. Employees from Charité and BIH can apply **with translational projects from all medical disciplines**.

Projects are selected for funding in an annual call for proposals with a panel of external experts. Selection criteria include the height of innovation, size of the unmet medical need, competitive advantage over current gold standards, data quality and likelihood

of translational success. Two funding tracks have been implemented: Earlier projects are supported with up to 50.000€ for one year in track 1; later and more mature projects are supported for two years with a budget of more than 50.000€ as part of track 2. **Funding is strictly milestone-based and projects are closely monitored by members of the SPARK team**.

Teams selected are supported in the SPARK program **with coaching, mentoring, advice, and an extensive expert network to accelerate the translation** of their academic invention into a marketable product to the benefit of patients and society. Furthermore, SPARK educates faculty, students and fellows on topics relevant for translation and business development via their educational series including forums and workshops. In 2020 a Europe-wide webinar series and a new format, the Innovator Café, have been established. Here the SPARK community get's the opportunity to learn from success stories and failures of experienced entrepreneurs and young CEOs.

In 2019, the **Inventors for Health Program (I4H)** has been implemented at SPARK-BIH to serve as the front-end of innovation and growth for **early-stage ideas**. The Inventors for Health Program has been developed in close cooperation with their partner, **the Stiftung Charité**. The program focuses on developing breakthrough ideas in health and is currently made up of two phases – a development and funding phase. Through a series of hands-on bootcamps, inventors identify and elaborate on their ideas, develop entrepreneurial skills, and develop initial prototypes of their solutions. These teams are augmented by the addition of team-members from other disciplines such as business and design to create truly holistic solutions. In future it is planned that the most promising ideas can apply to be further developed by SPARK-BIH or the Digital Health Accelerator.

Dr. Tanja Rosenmund
Director SPARK-BIH

Your SPARK-BIH team

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Founder SPARK-BIH

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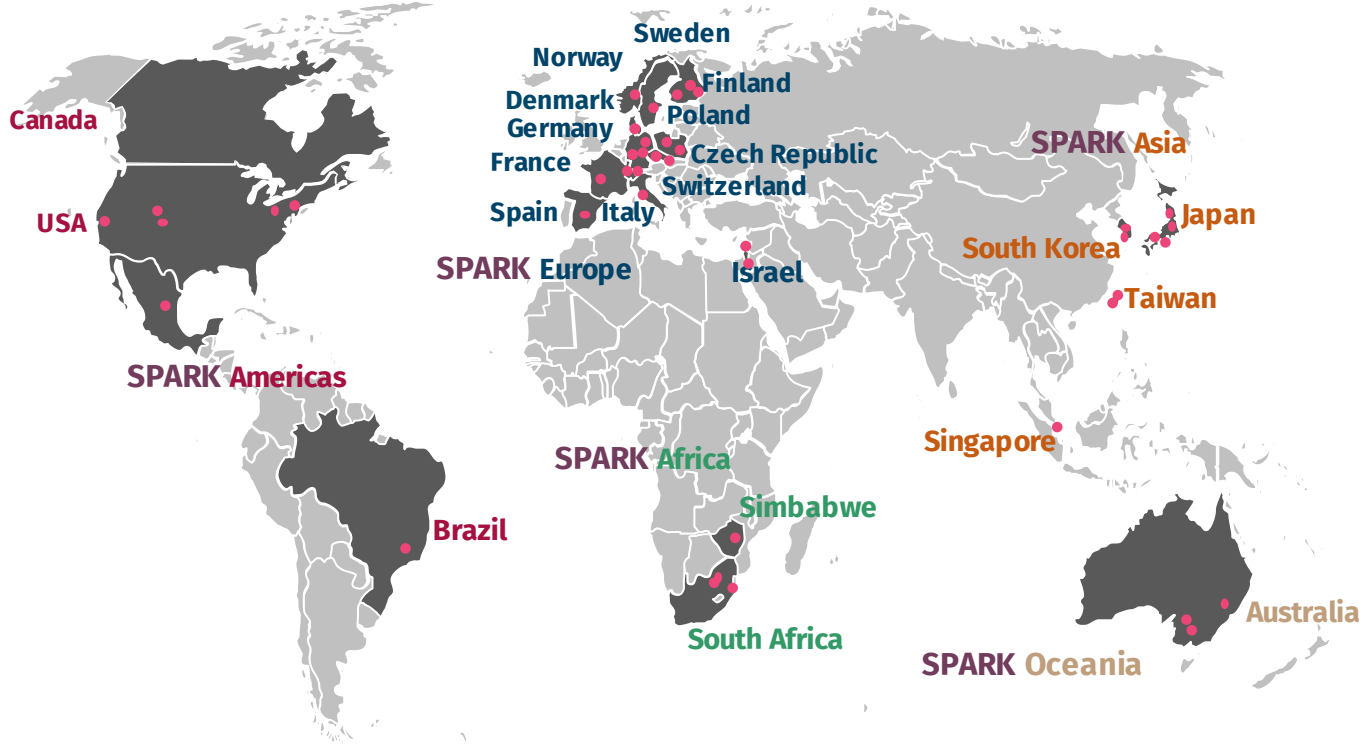
Dr. Christian Tidona
Founder and Managing Director BioMed X Institute

SPARK-BIH is part of the global SPARK network

Over 50 different institutions have established or are developing their own versions of the SPARK program. The mission is to improve human health by uniting academics and industry experts around the globe to generate an efficient, effective and exciting pathway for translation of academic discoveries and innovative solutions through education and project support.



SPARK-BIH is part of Charité BIH Innovation

SPARK-BIH ist part of Charité BIH Innovation, the joint technology transfer office of the Charité and the BIH. Charité BIH Innovation consists of four parts enabling the translation and commercialization of academic projects. SPARK-BIH is closely working with the patents & licensing team in order to protect and exploit innovation.

Patents, licensing, law and startup consulting

Identifying, protecting and commercializing assets (with key partner: Ascenion)

Strategic cooperations

Forming and managing-strategic cooperations with academia and industry

SPARK-BIH

Translating medical inventions (drugs, diagnostics, medtech) into products and solutions to benefit patients

Digital Labs

Translating digital health solutions to patients/ market (incl. Digital Health Accelerator)

How does SPARK-BIH work?

SPARK-BIH was created to support academics in translating their biomedical inventions into novel therapeutics, medical devices and diagnostics that address unmet medical needs.

SPARK-BIH is part of Charité BIH Innovation, the joint technology transfer of BIH and Charité.

The purpose of SPARK-BIH is to support academic projects with funding, coaching, mentoring, advice and education to accelerate their translation for the benefit of patients and society.

Our support is reflected in translationally relevant preclinical data, follow-on translational funding, new IP, licensing agreements, industry partnerships, sound clinical trials as well as the founding of life science startups.

By applying for funding to enhance the translatability of your project you automatically profit from the SPARK-BIH mentoring and education program.

Project proposals are evaluated on the basis of several aspects, the most important being: (1) height of unmet medical need, (2) quality of data, (3) the potential for translation to market/patient.

Refunding mechanisms (e.g. royalties, shares) secure that in case of commercial successes a part of the revenues will be used for future development programs.

What is NeuroCure/SPARK-BIH?

SPARK-BIH and the NeuroCure Cluster of Excellence joined forces in 2020 and initiated a combined call for projects from the NeuroCure community.

NeuroCure is a Cluster of Excellence in the neurosciences at the Charité - Universitätsmedizin Berlin. The primary aim of this interdisciplinary network is to explore and understand the mechanisms of diseases of the central nervous system in order to find potential new therapies for neurological and psychiatric disorders. In 2020, NeuroCure and SPARK-BIH joined forces to find the best teams from the neuroscience community to be part in the translational program of SPARK-BIH. This call enabled a further focus on neuroscience projects and a widening of the SPARK network by also including NeuroCure affiliated teams that are not associated with the Charité.

The four selected teams received funding from NeuroCure and mentoring as well as support from the SPARK-BIH program to accelerate their translational projects into outstanding medical solutions. The funding of these four teams has been renewed for a second funding period in 2022.

After the successful implementation of the NeuroCure/SPARK-BIH program, NeuroCure and SPARK-BIH prolong their collaboration and will run a second call for projects in 2022.

How does the SPARK-BIH I4H programm work?

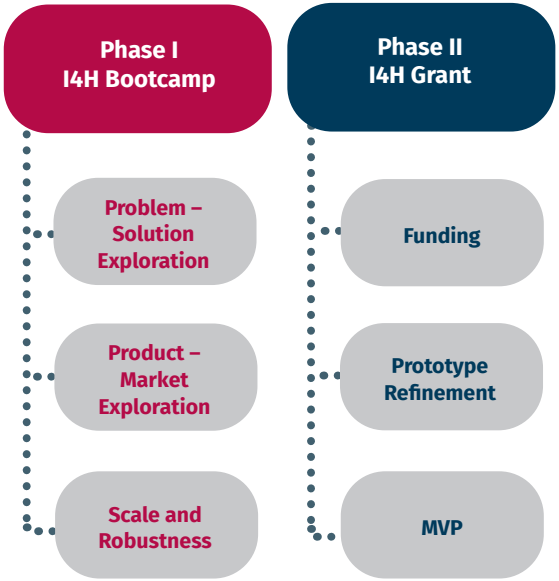
The Inventors for Health (I4H) Program is a pilot program that has been developed together with the Stiftung Charité and addresses scientists with very early projects and ideas.

Traditionally, the barriers-to-entry for medical innovation, research and development have been high. The I4H pilot program is democratizing that process and allowing for citizens and patients to co-develop solutions together with scientists and medical professionals.

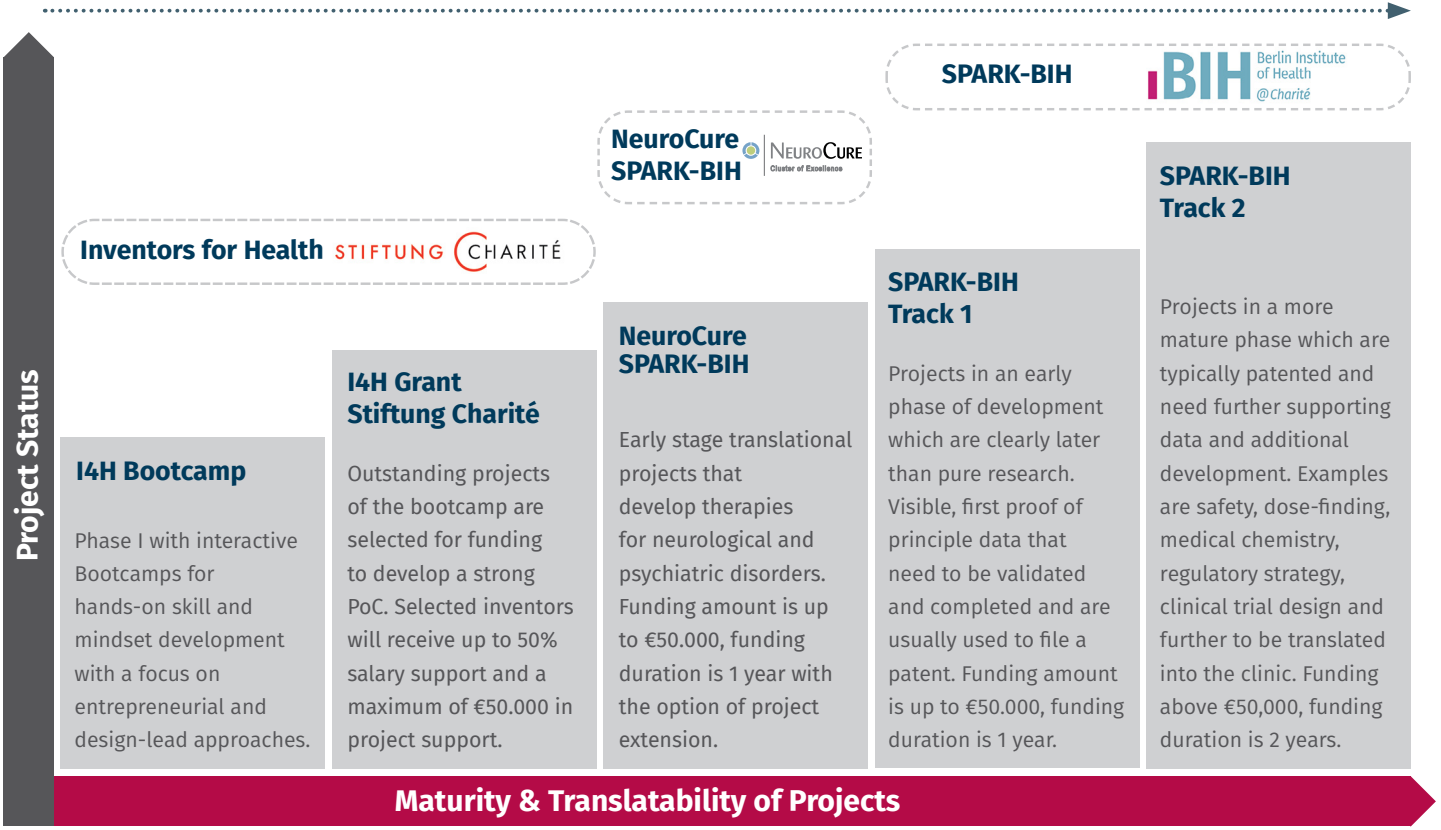
Unlike traditional incubation programs focusing purely on later commercialization, the **I4H program** focuses on developing breakthrough medical innovations by developing the people behind the ideas through skill-building, mindset change, and exposure to a network of innovators and medical change-makers.

Accordingly, the I4H pilot program tests a novel program design. In the future it is planned to use key components of the program as scouting mechanisms to identify and develop early ideas. Subsequent funding might be realized by established funding programs such as SPARK-BIH or the Digital Health Accelerator of the BIH.

Currently, I4H is made up of two phases: In the first phase, inventors develop their idea(s) rapidly through design-based approaches, with help from experts from other disciplines. In the second phase, funded teams advance their ideas to minimally viable products (MVP) for testing and further development, making use of SPARK-BIH.



Maturity pipeline of funding opportunities from Stiftung Charité, NeuroCure & SPARK-BIH



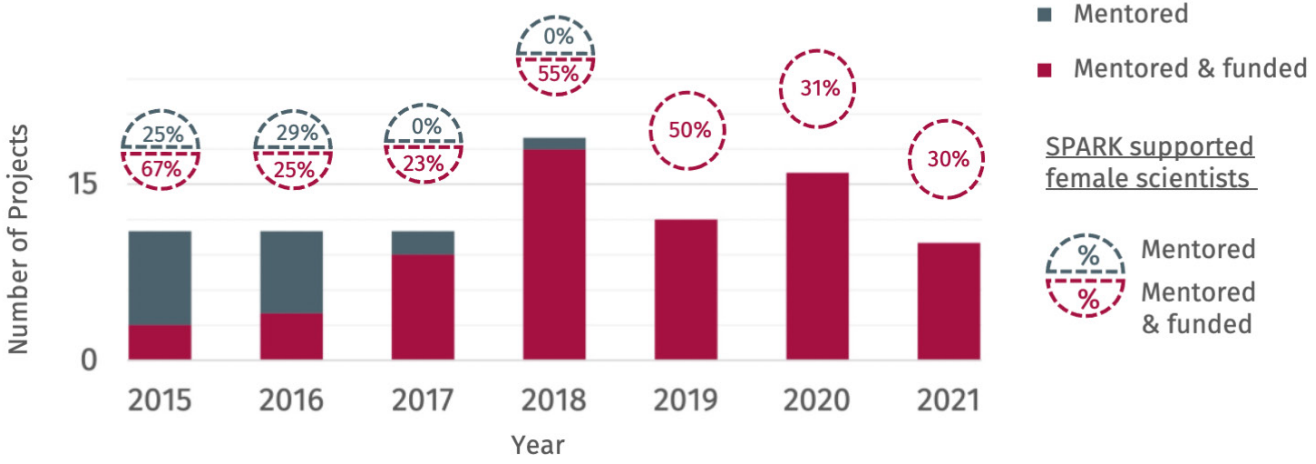
"The SPARK meetings represent a wonderful exchange forum for getting ideas into practice. So many knowledgeable people from so many different but complementary fields are rarely found. A real gem in scientific exchange at the interface to practice not otherwise found in Germany but highly needed."

Prof. Dr. Udo Schumacher, Universitätsklinikum Hamburg-Eppendorf
SPARK Advisor

SPARK-BIH in numbers

SPARK-BIH projects from 2015-2021

Number of SPARK-BIH projects from 2015-2021



286 Project proposals submitted & reviewed

72 Individual grants awarded

56 Projects mentored & funded

* Numbers include all SPARK funding lines (SPARK Berlin, SPARK-BIH, NeuroCure/SPARK-BIH and I4H funded by the Stiftung Charité)

Translational success of SPARK-BIH projects from 2015-2021

41 **patents** were filed by our **SPARK** teams during or after participating in the **SPARK** program

10 **accelerator or bootcamp programs** were started by our **SPARK** teams

19 **follow-on fundings for next steps towards patient/market** were acquired by our **SPARK** teams amounting to **more than 17,9 Mio EUR**

89% of **SPARK** teams were **successful** in reaching their milestones and continuing with their project after **SPARK**

90% **satisfaction** of our **SPARK** teams with the **SPARK** program overall

20 **prices** or **awards** have been won by our **SPARK** teams

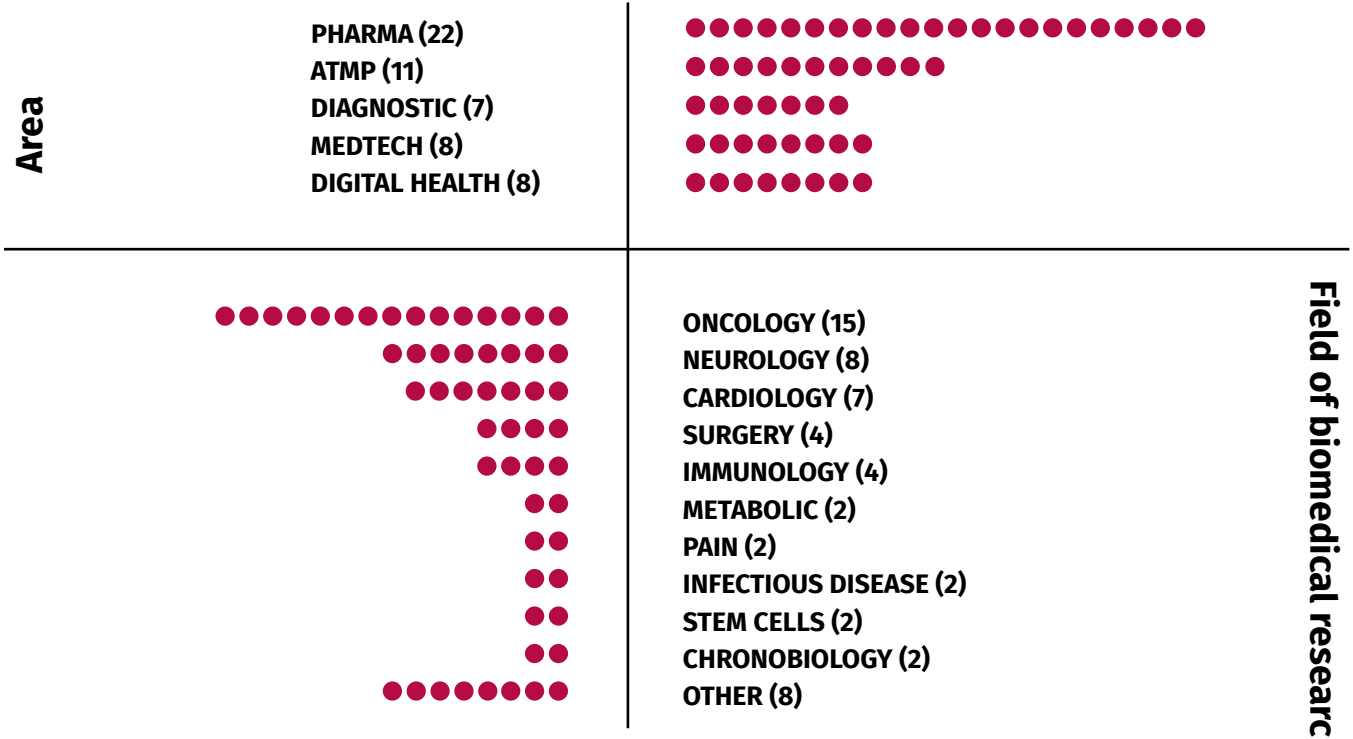
10 **SPARK** teams have founded or plan to **found a startup**

1 **SPARK** team has had a **cooperation with industry**

5 of our **SPARK** teams **prepared clinical trials** for their project or were able to **continue and improve the running clinical trials**

* Numbers are based on a survey that was submitted by SPARK teams as well as consultation of the patent team of Charité BIH Innovation
** Numbers include all SPARK funding lines (SPARK Berlin, SPARK-BIH, NeuroCure/SPARK-BIH and I4H funded by the Stiftung Charité)

Biomedical fields and areas of SPARK-BIH funded projects from 2015-2021



* Numbers include all SPARK funding lines (SPARK Berlin, SPARK-BIH, NeuroCure/SPARK-BIH and I4H funded by the Stiftung Charité)

Statistics on SPARK-BIH organized educational seminars 2015-2022

"I am here to get or keep in touch with "entrepreneurial" ideas and find inspiration for translation from science to business. It is the first time I participated and very much liked the format." – *Attendee in Forum in 2017*

83 **SPARK** offered educational seminars from 2015-2022

12 **SPARK Europe sites** contribute to the SPARK Europe educational program

96%* **overall satisfaction** with the educational lecture series

>3400 **participants** in the educational and online webinar lecture series from 2015-2022

30 **Events** hosted by **SPARK Europe**

* Numbers are based on evaluations submitted by seminar attendees at different educational seminars in the years 2015-2022

"In the beginning I considered SPARK just another program among all those university-based supporting initiatives. I hoped for some financial support but not more. However, it turned out to provide something much more valuable than money. SPARK provides multi-level competence, bringing in the right experts at the right time. In our case, this was not only the critical mind of other SPARKees, but also clinicians, advisors and business experienced people, pushing our project to a much higher level. Giving us a special pre-hearing during the Go-Bio application was extremely helpful. The payless support by a team of experts, tailor made to our needs was a so far unique experience for me. Personally, I learned a lot, starting from being a purely academic person, I meanwhile got a sense of how business people think and regulatory boards work. Still there are a lot of things I need to learn to survive in this new environment. I highly appreciate to have SPARK on my side on this journey."

Prof. Dr. Christoph Schwarzer

SPARK-BIH projects

Current SPARK-BIH portfolio

Generation and preclinical evaluation of neuroblastoma-specific CAR constructs

PRINCIPAL INVESTIGATOR:
PD Dr. Annette Künkele-Langer,
Dr. Laura Grunewald, Dr. Kathleen Anders
Charité

ATMP
Oncology

2021

Track 1

SUMMARY

Neuroblastoma remains the leading cause of cancer deaths in children under five, highlighting the urgent need for innovative therapies. CAR-T cell therapies for this indication face several obstacles such as limited persistence and efficacy of CAR-T cells.
Therefore, there is a high need for optimized neuroblastoma-specific CAR-T cell therapies.
Annette Künkele-Langer and her team aim to develop novel CAR constructs to generate CAR-T cells for neuroblastoma therapy and subject these cells to a detailed preclinical validation.
The ultimate aim is the development of a successful cell therapy for this deadly childhood cancer which would represent a milestone in the history of pediatric oncology.

PROJECT GOALS

- Generation of novel CAR constructs for CAR-T cell therapy
- Validation of CAR-T cells *in vitro* and *in vivo*

LONG-TERM GOALS

- Fullfil regulatory requirements
- Perform phase I/II clinical trials
- License to Biotech/Pharma or formation of startup

A universal platform for the discovery of new therapeutic modalities

PRINCIPAL INVESTIGATOR:
Dr. Yollete Guillén Schlippe
Charité

Pharma
Oncology

2021

Track 1

SUMMARY

Most therapeutic targets involved in aberrant intracellular protein-protein and protein-RNA interactions remain elusive to traditional drug discovery efforts.
The team led by Y. Guillén Schlippe has developed a broadly applicable discovery platform capable of identifying hits for such therapeutically "undruggable" targets.
The goal of the current project is to demonstrate that this discovery platform is capable of delivering new therapeutic lead molecules for a variety of targets involved in cancer and bacterial infections.
Validation of the platform and generated hits will open the door to new therapeutic opportunities and modalities, expanding the "druggable" proteome.

PROJECT GOALS

- Validation of the discovery platform
- Identification of hits for novel therapeutic targets

LONG-TERM GOALS

- Validation of lead drug candidates
- License to Pharma or startup foundation

Safety and efficiency assessment of a novel miniaturized oxygenator

PRINCIPAL INVESTIGATOR:
Prof. Dr. Leonid Goubergrits
Charité

MedTech
Cardiology

2021

Track 1

SUMMARY

A membrane oxygenator is a device used to add oxygen to and remove carbon dioxide from the blood. It can be used to replace lungs in cardiopulmonary bypass, and to support lungs in long-term life support called ECMO. Current complications include neurological injuries as subarachnoid hemorrhage, ischemic infarctions, or brain death. These complications are caused by the low efficiency of current oxygenators due to high priming volume of 40 % to 50 % of the total oxygenator volume associated with non-physiological conditions.
The project aim is to prove safety and efficiency of a novel oxygenator concept allowing to reduce priming volume. If successful, this may allow for future development of miniaturized oxygenators and implantable artificial lungs.

PROJECT GOALS

- Translate an idea into the functional prototype
- Show superiority to conventional oxygenators

LONG-TERM GOALS

- Validation and proof of biocompatibility with blood tests and animal models
- License to industry

Development of a stapler for solid organs

PRINCIPAL INVESTIGATOR:
Dr. Panagiotis Fikatas
Charité

MedTech
Surgery

2021

Track 1

SUMMARY

Current solutions for solid organ resection in surgery are limited, carry the risk for intra- or postoperative bleeding and are associated with a high probability of fistula development. These secondary complications pose a great medical burden for patients and lead to increased treatment costs.
Within previous SPARK-BIH funding periods, a functional prototype of a novel surgical stapler that allows a minimal-invasive, wedge-shaped resection of solid organs has been developed and the US patent has been granted.
The aim of the project in this SPARK-BIH funding period is the *in vivo* validation of the novel stapler to demonstrate that organs are cut safely and with a reduced risk for complications.

PROJECT GOALS

- Perform validation tests *in vivo*
- US patent granted, EP and JP patent applications pending

LONG-TERM GOALS

- Startup foundation or license to industry
- CE certification as a medical device

PREVIOUS SPARK FUNDINGS

- Track 1 2017
- Track 2 2019

CD5-specific TCR-T cells for treatment of relapsed or refractory T cell neoplasms

PRINCIPAL INVESTIGATOR:
PD Dr. Antonia Busse
Charité

ATMP

Oncology

2021

Track 2

SUMMARY

Patients with T-Non Hodgkin lymphomas (T-NHL) and T-acute lymphoblastic leukemia (T-ALL) have a poor prognosis, limited therapies are available and only about 30% are cured by front-line therapy.
This project seeks to complete the preclinical characterization of a novel adoptive cell therapy with a T cell receptor (TCR) against an HLA-A2 restricted epitope of the T cell antigen CD5. CD5-specific TCR-T could hence represent a novel salvage / bridging therapy option for HLA-A2+ relapsed or refractory T cell neoplasms or could be used as consolidation treatment after HLA-A2 mismatch allogeneic hematopoetic stem cell transplantation with the goal to reach long-term remission.

PROJECT GOALS

- Complete the preclinical development of a novel ATMP
- Prepare phase I clinical trial
- Establish industry partnership

LONG-TERM GOALS

- Perform phase I clinical trial
- License to Biotech/Pharma

ALARM – A viral alert realtime monitoring

PRINCIPAL INVESTIGATORS:
Michael Lommel,
Dr. Ulrich Kertzscher, Dr. Jens Dernedde
Charité

MedTech

Infectious Disease

2021

Track 2

SUMMARY

The COVID-19 pandemic poses a great social and economic burden on individuals and society and the infection with the SARS-CoV-2 virus may lead to severe acute or long-term disease.
An important tool against the COVID-19 pandemic is the early diagnosis of SARS-CoV-2 infected individuals. Tests help to detect and break infection chains more rapidly and can provide additional security in everyday life.
In this SPARK project, the team develops a simple, fast and affordable test system that detects the virus with high sensitivity, is cheaper and more accurate than commonly used lateral flow antigen tests and will be particularly suitable for screenings at large events.

PROJECT GOALS

- Build a functional devise prototype
- Pre-clinical validation

LONG-TERM GOALS

- Startup foundation or license to industry
- CE certification as a medical device

Prototype construction of stapler for biliary and pancreatic anastomosis

PRINCIPAL INVESTIGATOR:
Dr. Panagiotis Fikatas
Charité

MedTech
Surgery

2021

Track 2

SUMMARY

An anastomosis is a surgical procedures that establishes a connection between two anatomical structures. In abdominal surgery, anastomosis performed on the bile duct and the pancreas are extremely challenging procedures that require excellent surgical skills and can only be performed by hand.
In this SPARK project, the team develops two devices that allow biliary and pancreatic anastomosis in a safe, quick and reproducible way.
The novel devices will reduce the risk of secondary complications, minimize the risk of lethal secondary effects and reduce the necessity for further hospital treatment.

PROJECT GOALS

- Build two functional prototypes
- Perform validation tests in “dry-lab”
- Submit patent application

LONG-TERM GOALS

- Perform validation tests *in vivo*
- Startup foundation or license to industry

A virus-free platform technology for next-generation CAR therapeutics


PRINCIPAL INVESTIGATORS:
Dr. Dimitrios Laurin Wagner, Jonas Kath
Charité

ATMP
Oncology

2021

Track 2

SUMMARY

One of the most promising immunotherapies against cancer is the adoptive cell transfer of genetically modified T cells. Herein, patient-derived Chimeric Antigen Receptor (CAR) expressing T cells have been one of the most successful therapy to date. However, routine clinical implementation of CAR T cells is stalled by high prices, certain severe adverse events and the complexity of generating an autologous cell product from chemo-pretreated patients.
Therefore, this project aims to develop a virus-free platform technology for generation of novel improved and cost-effective next-generation CAR therapeutics suitable for autologous and/or allogeneic use.

PROJECT GOALS

- Development of a virus-free platform technology for generation of next-generation CARs
- Preclinical characterization of a novel CAR T cell therapy
- Prepare phase I/IIa clinical trial

LONG-TERM GOALS

- Perform phase I/IIa clinical trial
- License to Biotech/Pharma or startup company

Validation of a consensus DNA sequence for vaccination against pandemic coronaviruses (PanCoVac)


PRINCIPAL INVESTIGATORS:
Prof. Dr. Günther Schönrich,
Dr. Mohammed Yassen
Charité

Pharma
Immunology

2021

Track 2

SUMMARY

The ongoing pandemic of coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and has led to more than 5,4 million deaths up to December 2021.
Currently, licensed vaccines encode the SARS-CoV-2 S-protein particularly aiming at induction of neutralizing antibodies. This may result in viral escape by mutant variants and short-lived protection against SARS-CoV-2.
The team seeks to prevent future severe infections caused by novel SARS-CoV-2 mutant variants or by potentially future zoonosis. For this purpose, the team has generated a vaccine based on a compact sequence (PanCoVac) that is expected to confer immunity against a wide range of SARS-CoV-2 mutant viral strains as well as potential new coronaviruses.

PROJECT GOALS

- Validate PanCoVac *in vitro* and *in vivo*
- Validate PanCoVac's wide-spectrum efficacy
- File for patent

LONG-TERM GOALS

- License to Pharma or startup foundation
- Perform phase I / II clinical trial

PREVIOUS SPARK FUNDING

- Track 1 2020

Infection based large scale production platform for rAAV gene therapy vectors

PRINCIPAL INVESTIGATOR:
PD Dr. Stefan Weger
Charité

ATMP
Gene Therapy

2021

Track 2

SUMMARY

Gene transfer vectors have developed into the leading platform for gene therapeutic treatments of numerous human diseases and several rAAV vectors have already been approved for commercialization.
The current methods for rAAV production represent a bottleneck and render the generation of these therapeutics extremely expensive.
This projects aims at developing a new method which allows a more efficient production of clinically applicable rAAVs, leading to increased availability and reduced costs for gene therapies.

PROJECT GOALS

- Establishment of universal platform for large-scale rAAV production
- Identification of industrial partner for co-development
- Extension of the platform to different rAAV serotypes

LONG-TERM GOALS

- License to Biotech company or startup foundation
- Perform phase I clinical trial

AI supported quantitative assessment of aortic valve calcification


PRINCIPAL INVESTIGATORS:
Prof. Dr. Anja Hennemuth,
Dr. Olena Nemchyna
Charité/Deutsches Herzzentrum Berlin

Digital Health

Cardiology

2020

Track 1

SUMMARY

Aortic stenosis (AS) is the most common valvular heart disease in the Western world. In the management of patients with AS, it is essential to accurately diagnose the disease severity and determine the proper timing of a surgical intervention. Echocardiography is the current standard modality for evaluating AS severity, but it is not always sufficient to confirm the diagnosis of severe AS. In certain cases computed tomography (CT) is necessary to quantify aortic valve calcium load and to identify patients with true severe AS. Nevertheless, CT does not qualify as a routine examination. Hence, the aim of the project is to create and validate a prototype machine learning solution for the quantitative assessment of aortic valve calcification.

PROJECT GOALS

- Train machine learning algorithms on annotated data of patients with AS
- Optimize and validate AI solution

LONG-TERM GOALS

- CE certification as a medical device
- Implementation of the solution in the clinical workflow
- licensing to MedTech company or startup foundation

"SPARK is a great platform to learn about the drug development process and to think as a translational researcher. It exposed us to topics which we as basic scientists typically do not have on our daily agenda but which are vital for translation, such as intellectual property and requirements for clinical trial design. Advice from other SPARKees was helpful in streamlining the way towards a drug and to identify important checkpoints within preclinical validation."

Prof. Dr. Chiara Romagnani

Expansion of natural killer cells for viral infection and cancer


PRINCIPAL INVESTIGATORS:
Prof. Dr. Chiara Romagnani,
Timo Rückert,
Charité & German Rheumatism Research Centre

Pharma
Oncology

2020

Track 1

SUMMARY

The immune system has evolved different strategies to prevent and fight cancer and infections. Natural Killer (NK) cells are an innate immune cell type able to kill tumor and/or infected cells. The team has identified a specific peptide whose presence is shared by a human virus and certain tumors that leads to expansion of a specific Natural Killer cell type. The project aims for the preclinical development of a vaccine prototype for treatment of these tumors as well as of the respective human viral infection. The advantage of this approach is that cancer patients can benefit from this boost for the immune system that is ready not only to fight this virus infection but also relapsing tumors.

PROJECT GOALS

- Generation of a novel vaccine prototype for treatment of specific tumors as well as of a viral infection
- *In vivo* Proof-of-Concept
- Preclinical development of the vaccine

LONG-TERM GOALS

- Perform phase I/II clinical trial
- License to Pharma or startup foundation

PREVIOUS SPARK FUNDING

- Track 1 2018

Combinatorial treatment against metastatic colorectal cancer

PRINCIPAL INVESTIGATORS:
Prof. Dr. Ulrike Stein,
Prof. Dr. Wolfgang Walther,
Dr. Dennis Kobelt, Paul Curtis Schöpe
MDC & Charité

Pharma

Oncology

2020

Track 2

SUMMARY

Colorectal cancer is the third most diagnosed cancer and fourth most common cause of death worldwide, metastasis being the cause of about 90% of deaths.
The team has previously identified a key driver and novel biomarker of metastasis formation. Moreover, new inhibitory compounds able to inhibit this metastasis driver were identified through high throughput screening with former SPARK support.
During the current funding period, the team will evaluate these inhibitors for their ability to restrict tumor progression and metastasis formation with adequate *in vivo* tolerability. Furthermore, the molecular action of the colorectal cancer biomarker will be explored further.

PROJECT GOALS

- ADMET characterization and mode of action assessment of identified hit compounds
- MedChem analysis, design and synthesis to obtain lead compounds
- *In vivo* testing of lead compounds for antitumoral and antimetastatic activity

LONG-TERM GOALS

- Clinical trial phase I
- Licensing to Pharma

“With the help of the SPARK program we could refocus our priorities and were able to advance our project from an idea to a finished trial protocol.“

PD Dr. Wolfgang Böhmerle

Prevention of Paclitaxel-related neurotoxicity

PRINCIPAL INVESTIGATORS:
Prof. Dr. Matthias Endres, PD Dr. Wolfgang Böhmerle, PD Dr. Petra Hühnchen
Charité

Pharma

Neurology

2020

Track 2

SUMMARY

Neurotoxicity is a common and potentially long-lasting side effect of cytotoxic drugs including Paclitaxel (PTX). Preclinical studies have shown that neuronal damage by PTX can be reduced with a marketed drug that can readily be repositioned. With their previous 2018 SPARK-BIH validation fund, the team successfully developed a roadmap for clinical translation of this key-finding.
Currently, it plans to conduct an explorative proof-of-concept phase II clinical trial to prove that co-administration of the repositioned drug prevents neurological side effects of PTX. During this funding period, the team is going to initiate the trial and perform a preliminary interim safety analysis to demonstrate safety and feasibility of the intervention.

PROJECT GOALS

- Obtain ethical approval by BfArM & LaGeSo
- Set-up clinical trial including e-documentation, infrastructure & medication kits
- Complete interim safety study with 20 breast cancer patients

LONG-TERM GOALS

- Complete clinical phases with further funding
- Change medical practice

PREVIOUS SPARK FUNDING

- Track 1 2018

A novel solution for a total artificial heart


PRINCIPAL INVESTIGATORS:
Tim Bierewirtz,
Marcus Granegger, PhD
Charité

MedTech
Cardiology

2020

Track 2

SUMMARY

Heart transplantation remains the life-saving therapeutic option for patients with end-stage heart disease. However, the large heart transplant waiting list is the reflection of a severe and persistent shortage of donor hearts. Total artificial heart (TAH) is an artificial organ that mimics the native heart. It is designed to replace the heart in patients with end-stage heart failure as a bridge to heart transplantation. There are very few TAH solutions on the market and the one available are nonetheless risk prone regarding reliability, blood damage and thrombus formation. Hence, the aim of the project is to develop a functional prototype of an implantable, pulsatile TAH with superior performances by means of reliability, implantability and hemocompatibilty.

PROJECT GOALS

- Manufacturing and assembly of fully functional prototypes
- Perform virtual and physical fitting studies
- Perform acute/chronic *in vivo* validation study within large animals

LONG-TERM GOALS

- Startup foundation or license to MedTech company
- CE certification as a medical device

PREVIOUS SPARK FUNDING

- Track 1 2019

Off-the-shelf chimeric antigen receptor (CAR) product with broad applicability for malignant diseases

PRINCIPAL INVESTIGATOR:
Prof. Dr. Gabriele Pecher
Charité

ATMP
Oncology

2020

Track 2

SUMMARY

Cancer still remains the second leading cause of death worldwide. Tumors often do not respond to standard treatment and become essentially incurable.
The team develops a novel advanced therapy medicinal product (ATMP) for the precision immunotherapy of both solid tumors and hematological diseases to generate an allogeneic, “off-the-shelf” CAR-modified therapeutic agent. The ATMP will be validated and preclinical testing will be accomplished.

PROJECT GOALS

- Generation of a novel allogeneic ATMP for anti-cancer therapy
- Preclinical development of the ATMP

LONG-TERM GOALS

- Perform phase I/II clinical trial
- License to Pharma or startup foundation

Biomarkers for tumor immune therapy associated neurological side effects

PRINCIPAL INVESTIGATORS:
Prof. Dr. Matthias Endres, PD. Dr. Wolfgang Böhmerle, Dr. Samuel Knauss, Dr. Leonie Müller-Jensen, PD Dr. Petra Hühnchen
Charité

Diagnostic

Neurology

2020

NeuroCure

SUMMARY

Tumor immunotherapy and in particular immune checkpoint inhibitor treatment continues to transform oncological therapy and the number of patients treated with checkpoint inhibitors is expected to increase substantially in the coming years. High response rates to the treatment are contrasted by potentially fatal immune related adverse events (irAE). Albeit neurological irAE (irAE-N) are rare, they are associated with high morbidity and mortality.
This projects aims at identifying immunological biomarkers to identify irAR-N in patients treated with immune checkpoint inhibitors. The increased surveillance of patients with a risk profile will affect patient's treatment and reduce the cost of care as well as mortality and morbidity associated with the treatment.

PROJECT GOALS

- Identify biomarkers for irAE-N
- File patent

LONG-TERM GOALS

- Cooperation with Medtech company / Start-up foundation
- Implementation of identified biomarkers in clinical practice

Novel therapy for neuromuscular disease caused by mutations in myotubularins

PRINCIPAL INVESTIGATOR:
Prof. Dr. Volker Haucke
FMP

Pharma
Neurology

SUMMARY

Mutations in myotubularin1 affect 1:50,000 newborn males and cause a severe muscle disorder (XLMTM) which is characterized by severe generalized muscle weakness with ventilator, wheelchair and feeding tube dependence in addition to dramatically reducing survival.
Despite it's severity, there is no treatment yet. This project aims at utilizing a novel target for the treatment of this disease.
By screening an in-house library and optimizing hits via medicinal chemistry, the team aims at finding and developing the first small molecule inhibitor for the treatment of this fatal disease.

PROJECT GOALS

- Identification and generation of lead compounds
- *In vitro* and *in vivo* proof-of-concept studies
- Hit-to-lead optimization

LONG-TERM GOALS

- Develop first small molecule inhibitor as treatment for XLMTM
- Licensing to Pharma company

Screening for novel modulators that restore synaptic signaling in human iPSC-derived neurons from SYNGAP syndrome patients

PRINCIPAL INVESTIGATORS:
Prof. Dr. Dietmar Schmitz, Prof. Dr. Markus Schülke-Gerstenfeld, Prof. Dr. Sarah Shoichet, Dr. Nils Rademacher, Judith von Sivers
Charité

Pharma

Neurology

SUMMARY

SYNGAP syndrome is a rare congenital disorder caused by mutations in the SYNGAP1 gene. The main feature is intellectual disability; patients also suffer from up to 140 seizures per day, and to date, there is no efficient therapy for the disorder.
Studies in animal disease models have highlighted that SYNGAP1 loss of function results in defective synaptic signaling. The goal of this project is to identify a novel drug therapy by screening for molecules that restore defective signaling cascades. The team has therefore designed an assay that will be adapted for high-throughput screening of an FDA-approved drug library. This may pave the way for a unique and novel therapy for this rare and severe disease.

PROJECT GOALS

- Develop stable assay
- Identify FDA-approved drugs that rebalance the altered synaptic function in rodent neurons

LONG-TERM GOALS

- Use patient-derived iPS cells to validate hit compounds
- Repurposing of identified drug(s)

Neural mapping using transcranial magnetic temporal interference stimulation

PRINCIPAL INVESTIGATORS:
Khaled Nasr, Prof. Dr. Surjo Soekadar, Prof. Dr. Dr. Andreas Heinz
Charité

MedTech
Neurology

SUMMARY

Deep brain stimulation has provided dramatic benefit for a variety of clinical conditions. However, current non-invasive technology allows only superficial stimulation of the brain. The only possible ways of reaching deeper brain regions require invasive approaches.
This project aims at developing a medical device that enables non-invasive stimulation of deep brain areas at millimeter precision to enable the treatment of neurological and psychiatric disorders such as depression or OCD.

PROJECT GOALS

- Develop and build prototype
- *In vivo* testing
- Preparation for CE certification

LONG-TERM GOALS

- Phase I clinical study
- Implementation of the solution in the clinical workflow by licensing to Medtech company or startup foundation.

Appsy - Antidepressant medication companion


PRINCIPAL INVESTIGATORS:
Dr. Constantin Volkmann,
Rosana Ardila, PD Dr. Christian Müller
Charité

Digital Health
Psychiatry

SUMMARY

Antidepressants are widely used in the treatment of psychiatric disorders including major depression. Many patients want to discontinue antidepressants in the course of treatment, but face substantial barriers, since most physicians aren't trained in safe de-prescribing. Stopping antidepressants may lead to clinical deterioration due to relapse or discontinuation symptoms that affect up to 60% of patients and may be severe and long-lasting. Appsy is a patient-centered digital application that accompanies the antidepressant discontinuation process, so that the patients can safely and successfully discontinue the medication in the outpatient setting.

PROJECT GOALS

- Development of a strong proof of concept
- Initial validation of concept with stakeholders

LONG-TERM GOALS

- To provide safe antidepressant discontinuation and enable patients to lead lives without medication

DiaperID - a medical APP for smart stool recognition and newborn screening for biliary atresia



PRINCIPAL INVESTIGATORS:
Prof. Dr. Philip Bufler,
Dr. Christian Hudert, Lucas Griessmair
Charité

Digital Health

Pediatrics

SUMMARY

Biliary atresia is a rare disease of the newborn liver that, if left untreated, can lead to liver failure within months. Early diagnosis is crucial to avoid liver transplantation. Pale stools are an early clinical sign and their detection should be simple. This is the vision of DiaperID. The team aims to develop a platform application to screen for stool colour using image analysis supported by machine learning. Both parents and health care professionals will be asked to use the platform as a routine test within the newborn screening program to collaboratively combat diseases of this nature by simply taking pictures of their newborn's stool and uploading the image for subsequent analysis.

PROJECT GOALS

- Development of a strong proof of concept
- Validation of the idea and business model

LONG-TERM GOALS

- That every newborn baby in Germany will be screened for rare liver diseases by analyzing stool pictures via DiaperID

GrOwnValve – Anchoring mechanism for a personalized, autologous heart valve for children

PRINCIPAL INVESTIGATOR:
PD Dr. Boris Schmitt
Charité

MedTech
Cardiology

2019

Track 2

SUMMARY

The aim of the project is the production and testing of an anchoring mechanism of a personalized, autologous heart valve for children enabling growth in a once-in-a-lifetime point-of-care minimally invasive implantation. The novel anchoring mechanism facilitates placement of the valve without hindering growth of valve and vessel. For babies born with a congenital heart valve defect there is no dedicated child valve on the market. Instead they often receive xenogenic animal valves which degrade over the following years urging for risky open-heart re-surgery.

PROJECT GOALS

- Perform preclinical testing of anchoring mechanism together with the valve
- Prepare phase II clinical trial in children

LONG-TERM GOALS

- CE certification as a medical device

PREVIOUS SPARK FUNDING

- I4H 2019

GrOwnValve

In vivo validation of a novel class of pain medication


PRINCIPAL INVESTIGATORS:
Dr. Viola Seitz
Prof. Dr. Christoph Stein
Charité

Pharma
Pain

2019

Track 2

SUMMARY

Although pain research has identified a plethora of targets, no truly innovative analgesics have reached the market in the past years, mostly due to low efficacy or severe side effects. This leaves a significant unmet medical need for novel, safe and effective compounds with reduced side effect burden and abuse liability.
The project seeks to complete external validation of *in vivo* data on NFEPP, a novel compound that has demonstrated potent pain relief without addiction potential in initial experiments. A patent has been filed and results were published in Science in 2017.

PROJECT GOALS

- External validation of preclinical *in vivo* studies
- Secure follow-on applied research funding

LONG-TERM GOALS

- Further develop under CMC and GMP conditions
- Test safety & toxicity of NFEPP
- Perform phase I/IIa clinical trials
- License to Pharma

A novel gene therapy for treatment of aggressive B cell Lymphoma


PRINCIPAL INVESTIGATORS:
Prof. Dr. Antonio Pezzutto,
PD Dr. Antonia Busse
Charité

ATMP
Oncology

2019

Track 2

SUMMARY

A specific point mutation of the protein MyD88 is known to be a key oncogenic driver event in around 20% of patients with an aggressive variant of Diffuse Large B cell Lymphoma, and in around 50% of patients with Primary CNS Lymphoma. Both patient populations have a poor prognosis, and only limited therapies are available especially for the elderly and patients with severe comorbidities. The project seeks to complete the preclinical characterization of a human-derived T cell receptor that selectively recognizes this specific mutation of MyD88. Adoptive T cell therapy with MyD88-specific T cells would represent a truly tumor-specific therapy, being much more selective than CAR T cells or immune checkpoint inhibitors.

PROJECT ACHIEVEMENTS DURING SPARK

- Preclinical development of novel TCR T cell candidate accomplished
- Successful publication of preclinical data in *Journal for ImmunoTherapy of Cancer*
- PEI scientific advice meeting
- Planning of FiH study
- Follow-on funding acquired of Else Kröner-Fresenius Foundation
- Pitch contribution at BIO Partnering at JP Morgan 2022

LONG-TERM GOALS

- Perform phase I clinical trial
- License to Pharma or clinical co-development

Validation study for cervical HPV and dysplasia screening test

PRINCIPAL INVESTIGATOR:
PD Dr. Andreas Kaufmann
Charité

Diagnostic

Oncology

2018

Track 2

SUMMARY

The team has developed a diagnostic test for cervical HPV infection and dysplasia detection with high sensitivity, specificity as well as a high positive predictive value. The initial use is in triaging of equivocal screening findings. Current tests like cytology and PCR-based HPV testing either lack diagnostic accuracy or require a biopsy in follow up. After patenting, the team is currently performing a clinical study. In the future, CE certification of the test and accreditation of a service lab are planned to bring the test to the patients. Cervical cancer is the second most common cancer in women living in low and middle income countries with more than half a million new cases in 2018. Due to lack in standard screening procedures the test could be used there as a screening tool.

PROJECT ACHIEVEMENTS DURING SPARK

- Developed a multiplexed quantitative mRNA-based test combining HPV and biomarker expression
- Developed algorithm to predict disease stage
- Patent filed in 2019
- Study conducted, analysis started

LONG-TERM GOALS

- Founding of a startup company in 2022
- CE certification of test
- Service lab accreditation

PREVIOUS SPARK FUNDING

- Track 1 2017

“SPARK has fostered an outside view on our IVD product helping to consider critical aspects of development and marketing.”

PD Dr. Andreas Kaufmann

MyoPax: We repair muscle – the human muscle stem cell


PRINCIPAL INVESTIGATORS:
Prof. Dr. Simone Spuler,
Dr. Verena Schöwel
MDC & Charité

ATMP

Stem cells

2018

Track 2

SUMMARY

Muscle wasting and weakness are leading symptoms of a wide variety of diseases. The entire muscle can be affected or only single muscles do not function, yet with dramatic impairment of life quality and life-threatening consequences. Muscle diseases are currently untreatable. In Europe alone, over 6 million citizens are affected. The team MyoPax develops an innovative autologous muscle stem cell therapy to treat muscle wasting. The team's technological innovation enables highly standardized manufacturing of pure, native and highly regenerative muscle stem cells from small human muscle tissue specimens to treat acquired and inherited muscle diseases. The team has acquired follow-up funding and prepares to set up a startup company to clinically pursue the development of their approach to fight muscle diseases.

PROJECT ACHIEVEMENTS DURING SPARK

- Preclinical proof-of-concept, preclinical safety, PEI scientific advice meetings
- Planning of phase I/IIa clinical trial
- Follow-on funding acquired: BMBF 2020 for clinical trial, Helmholtz Enterprise 2018-2019, IBB Coaching Bonus 2019, Translatorik program of the Else Kröner-Fresenius Foundation 2019-2020, Helmholtz Validation Fund 2020-2022, SPOT MDC Spin-Off Support 2020-21
- Science4Life award 2019 for "MyoPax" business concept, Charité Entrepreneur-ship summit award winner 2019
- Pitch contribution at Bio-Europe 2017, World Health Summit 2019, 9th BioM BioAngels Event 2020
- BMBF Funding for clinical study in 2021

LONG-TERM GOALS

- Founding of a startup company in 2022
- Running the first in human clinical study in 2021

PREVIOUS SPARK FUNDING

- Track 1 2016

“The SPARK program was instrumental in supporting the MyoPax idea from a basic research project into a solid GMP-compatible product presently under preclinical testing. Without SPARK, any translational effort into the clinic would have ceased two years ago.“

Prof. Dr. Simone Spuler

SPARK-BIH projects

Our completed SPARK-BIH projects that started funding & mentoring between 2015 and 2020

"SPARK put us on track to focus on an advanced therapy for underserved patients and helped us to align to industrial project management and quality standards for drug development."

"SPARK helped me to put my exploratory, basic scientist mind to the sideline for a while, to focus on bringing the results of our research to patients and market."

Prof. Dr. Regine Heilbronn

Novel compounds to treat excessive water loss in states of dysfunctional vasopressin-mediated water reabsorption

PRINCIPAL INVESTIGATOR:
PD Dr. Enno Klussmann
Max Delbrück Center for Molecular Medicine

Pharma
Cardiology

2020

Track 1

SUMMARY

Diabetes insipidus is characterized by excessive water loss of up to 20 l of urine per day. In this disease, water reabsorption in the renal collecting duct is decreased due to reduced accumulation of the water channel aquaporin 2 (AQP2) in the plasma membranes of principal cells, caused by dysfunctional vasopressin-mediated signaling. The team led by Dr. Klussmann has shown in vitro and in preliminary analyses of human patients that an antifungal drug promotes water reabsorption via AQP2. Now the team aims to develop new proprietary compounds with better ADME-Tox properties.
Despite the medical burden, there is currently no efficient treatment for excessive water loss and many patients could benefit from the development of a pharmacological intervention.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Synthesis of a library of compounds
- *In vitro* functional studies with library of compounds
- Animal studies with selected lead candidates

LONG-TERM GOALS

- Secure funding for further lead compound development
- Plan clinical phases

SatTyping: A software-based typing of regenerative stem cells towards resource-saving and efficient production of ATMPs


PRINCIPAL INVESTIGATORS:
Dr. Verena Schöwel-Wolf,
Dr. Andreas Marg, Prof. Dr. Simone Spuler
MDC & Charité

DigitalHealth
Stem Cells

2020

Track 1

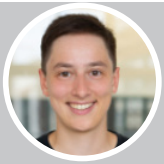
SUMMARY

Muscle wasting and weakness are leading symptoms of a wide variety of diseases with dramatic impairment of life quality and life-threatening consequences. The team develops an innovative autologous muscle stem cell therapy to fight muscle diseases. For the efficient production of human muscle stem cells for regenerative therapy, the SatTyping team aims to develope a software-based standardized in-process-control. The advanced therapy medical product market is urgently seeking for automation of product manufacturing to ensure marketability. The SatTyping software solution promotes resource-saving production of adherent cells and contributes to digitization when it comes to scalability.

PROJECT ACHIEVMENTS DURING AND AFTER SPARK

- Testing of a software-based solution for in-process quality control for adherent growing cells

RadioEye - A unique diagnostic decision support tool for radiologists

PRINCIPAL INVESTIGATORS:
PD Dr. Katharina Erb-Eigner, Sophie Au
Charité

Digital Health
Radiology

SUMMARY

The team RadioEye is developing a digital application to help radiologists worldwide reach the correct diagnosis quickly and effectively. By using image-based diagnostic tools rather than traditional logic trees or syntactic search, the team is working to create an effective diagnostic support tool that takes full advantage of the format that radiologists are most attuned to, image-based search and recognition. RadioEye will focus first on the development of this platform for use in eye and eye-socket scans.

PROJECT GOALS

- Development of a strong proof of concept
- Validation of the idea and business model

LONG-TERM GOALS

- Become the No. 1 image-based reference tool for radiologists worldwide
- Improve quality of radiology reports and save lives

Validation of anti-cancer agents in patient-derived canceroids

INVESTIGATOR:
Prof. Dr. Reinhold Schäfer
Charité

Pharma
Oncology

2019

Track 1

SUMMARY

Members of the family of signaling RAS-GTPases are frequently mutated in cancer, causing > 1 million deaths worldwide annually by triggering tumor pathogenesis and conferring resistance to therapies. Currently, compounds targeting the Ras-signaling pathway are in preclinical and clinical testing. However, these lead drugs show uncertain long-time effects.
Targeting transcriptional hubs downstream of RAS has the potential to block malignancy and therapy resistance. The project aims to validate modulators of a RAS-responsive transcription factor: Compounds identified via high-throughput-screening on an approved-drug library are validated in patient-derived canceroids. This strategy has the potential to establish a new concept of anti-RAS mono- or combinatorial therapy.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- *in vitro* and organoid studies with screening hits
- Selection of candidates to be tested *in vivo*

LONG-TERM GOALS

- Start an investigator-initiated trial based on repositioned drug(s)
- License to Pharma

A novel peptide to regenerate the central nervous system


PRINCIPAL INVESTIGATORS:
Dr. Sarah-Christin Starossom,
Prof. Dr. Friedemann Paul
Charité

Pharma
Neurology

2019

Track 1

SUMMARY

Multiple sclerosis (MS) is the most common chronic autoimmune and incurable disease of the the central nervous system. In MS, oligodendrocytes and the protective sheath (myelin) that covers nerve fibers are the primary targets of autoimmune attacks. Endogenous regeneration fails in most patients leading to devastating neurological symptoms including vision loss, fatigue and paralysis. The medical need is high as there is currently no approved drug addressing remyelination/ oligodendrogenesis.
The team has identified a novel mechanism targeting remyelination and oligodendrogenesis. Based on these findings, the project aims at developing a novel therapeutic option for MS.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Synthesis of peptide libraries
- Functional studies on proliferation, cell death and oligodendrogenesis
- Identification of candidates

LONG-TERM GOALS

- Validate novel drug treatment for MS
- License to Pharma

Exploring a novel therapeutic target in cystic fibrosis

PRINCIPAL INVESTIGATOR:
Dr. Anita Balázs
Charité

Pharma

Pulmonology

2019

Track 1

SUMMARY

Cystic Fibrosis (CF) is a life-limiting disease caused by mutations in the *CFTR* gene. Although highly effective CFTR modulators are emerging, ~10-15% of patients will not benefit from these therapies, while the high price of these drugs prevents access in many countries.
Hence, there is an unmet need to develop new therapies that can be applied to patients, independently of the underlying CFTR mutation. A strategy to achieve this, relies on restoring epithelial ion transport, bypassing CFTR dysfunction.
This project aims to validate drug candidates previously identified in a drug screen as potential modulators of an alternative ion transporter. These potential hits may path the way for a novel and inclusive therapy for CF.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- *in vitro* functional studies with selected hits
- Further analysis of mechanism of action

LONG-TERM GOALS

- Show *in vivo* PoC
- Perform clinical testing
- License to Pharma

A novel advanced therapy medicinal product (ATMP) to treat solid tumors

PRINCIPAL INVESTIGATOR:
Prof. Dr. Gabriele Pecher
Charité

ATMP
Oncology

2019

Track 2

SUMMARY

So far, there is no cure for patients with metastatic solid tumors, and new therapies are urgently needed.
The project aims to develop a novel ATMP for the therapy of breast cancer. The group will use a CAR next generation platform technology in order to generate optimized immune cells to fight the immunosuppressive microenvironment of solid tumors. The ATMP will be validated and preclinical testing will be accomplished.

PROJECT ACHIEVEMENTS DURING AND AFTER SPARK

- Novel CAR for treatment of solid tumors identified
- Preclinical *in vitro* and in *vivo* testing of ATMP

LONG-TERM GOALS

- Perform phase I/II clinical trial
- License to Pharma or startup foundation

TimeTeller: A non-invasive method for the molecular and computational characterization of the internal biological clock in humans

PRINCIPAL INVESTIGATOR:
Prof. Dr. Angela Relógio
Charité

Diagnostic

Chronobiology

2019

I4H

SUMMARY

Cancer treatment outcome, co-morbidities and side effects vary largely from patient to patient. Treatment regimens do not take circadian variations into account, neither of the patient nor of the drug metabolism. Adjusting the timing of treatment to the patient's circadian rhythm can optimise efficacy and diminish side effects, leading to better life quality for patients and reduced cost of care. The team has developed a reliable, non-invasive and easy-to-perform method for the characterization of the clock – called TimeTeller. It is further validated to offer personalized cancer support treatment and patient care by optimising the timing of treatment based on the circadian rhythms of the patient and the drug target. TimeTeller is a hybrid technology that uses molecular, mathematical and digital processing to profile an individual's inner circadian variations and provide personalised scheduling for behavioural and medical timing.

PPROJECT ACHIEVEMENTS DURING AND AFTER I4H

- Development of TimeTeller – an innovative easy-to-perform method to determine the individual circadian rhythm using human saliva samples
- Follow-on funding by the BIH Digital Health Accelerator

LONG-TERM GOALS

- CE certification
- Implementation of TimeTeller for treatment optimization in the clinic
- Startup foundation

Pre-Education - Patient empowerment through automated digital education of gynaecological patients on the course of treatment

PRINCIPAL INVESTIGATOR:
Dr. Jessica Olschewski
Charité

Digital Health

Other

2019

I4H

SUMMARY

Medu+ aims at enabling patients to access audited information to inform themselves about diagnosis, treatment and additional care programs through access to a digital platform before, during and after their clinical pathway.
Whether it's the initial consultation, a post-operative session, or something else, the clinical environment for many patients can represent an unknown and unsure place, where information sources are varied and sometimes inconsistent. Medu+ is helping to close the loop on patient information sources starting with the gynecological clinic at the Charité and moving outwards from there.

PROJECT ACHIEVMENTS DURING AND AFTER I4H

- Developed the digital platform Medu+ accessible for patients and gynecologist at Charité.
- Medu+ contains curated disease-relevant information and care plans and thus supports doctor-patient communication.

"Through the educational and entrepreneurial forum I profited from experts and was trained in bringing therapy into clinic. I also got insights into hurdles, developmental processes, regulations that other SPARK projects are dealing with. The financial support allowed us to carry on the translational process of our project. Brainstorming for solving unexpected reactivity of our reagent was finally crucial to save the whole project."

Dr. Simone Rhein

TCR gene therapy of CD22-positive B cell malignancies

PRINCIPAL INVESTIGATORS:
Dr. Simone Rhein,
Prof. Dr. Antonio Pezzutto
Charité

ATMP

Oncology

2018

Track 1

SUMMARY

In recent years, chimeric antigen receptor (CAR) T cell therapies have become a novel effective option for treatment of B cell malignancies. The clinical success however is hampered by down-modulation of surface antigen expression upon CAR treatment. Since TCRs do not depend on antigen surface expression, they represent a good alternative to CAR cell therapies.
The project aims to generate a novel TCR therapy for treatment of B cell malignancies by targeting the B cell antigen CD22. A new TCR candidate is being tested for off-target toxicity and will be compared to CD22 CAR T cells. Patients with B cell malignancies that are naïve or resistant to CD19-targeted CAR immunotherapy could strongly benefit from this novel CD22-directed TCR T cell therapy.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Novel CD22-specific TCR identified
- Preclinical proof-of-concept and in vitro safety testing
- Follow-on funding acquired of Deutsche Krebshilfe

LONG-TERM GOALS

- Perform phase I clinical trial
- License to Pharma or clinical co-development

Drug discovery for mitochondrially inherited Leigh syndrome (MILS)


PRINCIPAL INVESTIGATORS:
Prof. Dr. Alessandro Prigione,
Prof. Dr. Markus Schülke-Gerstenfeld
MDC & Charité

Pharma
Neurology

2018

Track 1

SUMMARY

The team has developed a novel assay system based on patient-derived induced pluripotent stem cells (iPSCs) to identify compounds for treating Leigh syndrome. Using this assay, a class of drugs applicable for repurposing that restore the cellular disease phenotype has been identified. The team has initiated a compassionate use treatment for a terminal ill patient. The patient has recovered significantly. Based on these results a clinical study is planned. Leigh syndrome is a rare severe mitochondrial disease affecting children where treatment options are lacking.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Identified and validated compound class for treatment of Leigh syndrome
- Performed compassionate treatment
- Plan to prepare phase I/II orphan drug repurposing trial

LONG-TERM GOALS

- Run a clinical study

Gene therapy for the treatment of temporal lobe epilepsy


PRINCIPAL INVESTIGATORS:
Prof. Dr. Regine Heilbronn,
Prof. Dr. Christoph Schwarzer
Charité & Medizinische Universität Innsbruck

ATMP
Neurology

2018

Track 1

SUMMARY

The project aims at developing a gene therapy for the treatment of drug-resistant focal epilepsy. An adeno-associated viral (AAV) vector will be delivered to the epileptic focus, re-expressing a neuropeptide that will be released in an activity-dependent manner, i.e. in periods of high neuronal activity which precedes the onset of a seizure. Suppression of neuronal excitability thereby suppresses the epileptic event. Strong proof of concept data in mice and rats have supported the feasibility of this strategy. The team is setting up a startup and has acquired follow-up funding to further pursue the strategy and develop the gene therapy for the use in patients.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Patents filed in 2016
- Preclinical Proof-of-concept *in vivo* and human brain tissue ex vivo in 2016
- Secured GoBio funding of 3.9 Mio. € in 2018 for 3 years
- Science4Life Venture Cup 2021
- GMP production in preparation
- Startup EpiBlok Therapeutics founded in 2022

LONG-TERM GOALS

- Clinical trial phase I

“When first invited, I came for money. Now I come for priceless expertise and multi-level support.“

Prof. Dr. Christoph Schwarzer

Molecular imaging of biofilm infections - Validation of FISH controls for automated endocarditis diagnostics


PRINCIPAL INVESTIGATORS:
Prof. Dr. Annette Moter,
Dr. Judith Kikhney
Charité

Diagnostic
Immunology

2018

Track 1

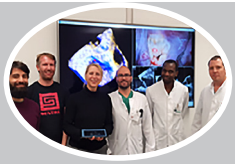
SUMMARY

Fluorescence in situ hybridization (FISH) is a molecular technique, which allows identification and visualization of microorganisms within tissues. Currently, the daily diagnostic use of FISH is restricted to highly specialized laboratories because it involves not only high-level of expertise, but also many hands-on steps, time-consuming microscopy, laborious annotation and documentation of FISH images and is lacking standard high quality controls. In this project diagnostic use of FISH in daily routine for endocarditis diagnostics is tested by automating the full process of this technique. The group is focusing on multiple aspects of this diagnostic procedure – with one emphasis on the generation of solid and validated routine positive controls.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Design and validation of controls
- Developed a sample tracking software
- Currently developing semi-automated digital image analysis for detection of bacteria in histological sections
- Developed an intelligent image handling archiving and documentation system
- Currently testing entire platform in routine diagnostic and comparing the ‘hands-on’ with the automated FISH (within the BMBF-funded iSOLID consortium)

Image-based support of minimal-invasive mitral valve repair



PRINCIPAL INVESTIGATOR:
Prof. Dr. Anja Hennemuth
Charité & German Rheumatism Research Centre

Digital Health
Cardiology

2018

Track 1

SUMMARY

About 7000 isolated mitral valve surgeries are performed in Germany every year. Mitral valve repair (MVR) is superior to valve replacement. Successful repair does not only lead to better survival but also better quality of life and avoidance of anticoagulants.
However MVR success rates strongly correlate with the experience of the surgeon as MVR is difficult to learn due to differences in pre-OP images of the moving heart and during the operation (or during surgery). This indicates the need for a better intraoperative decision support. The team works on the application of image-based surgery planning and image-based navigation with different modalities. This could help the surgeon to accurately consider anatomical and dynamic properties of the valve during surgery.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Started development of software modules for image fusion and integrated visualization and interaction
- Started setting up quality management and documentation system
- Initiated collaborations to specify user needs and interface questions
- Initiated industry collaborations for clinical integration
- Acquired BMBF funding together with industry partner

“The SPARK team provided us with crucial critical questions, complementary expertise and a very friendly dynamic team.”

Prof. Dr. Anja Hennemuth

“Without financial support, the project would not have been possible and the fantastic SPARK team helped us to achieve tremendous progress in a structured and well-focues way.“

Dr. Kostja Renko

Inhibition of thyroid hormone inactivation for cancer treatment

PRINCIPAL INVESTIGATORS:
Dr. Kostja Renko,
Prof. Dr. Lutz Schomburg
Charité

Pharma

Oncology

2018

Track 1

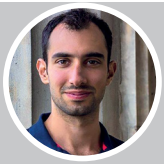
SUMMARY

An initial compound library screen led to a preliminary list of hormone modulators. The compound target reportedly plays a role in different cancer entities. During the SPARK funding period, drug candidates were characterized for specificity, potency and on-cell effects. Furthermore, in silico drug design was started to predict improved candidates. Experimental approaches to verify the reported beneficial effects in a cancer cell line completed the overall strategy. Future plans include strategic cooperation with oncology experts.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Verification and characterization of >50 compounds from an HTS approach
- Further testing of selected, specific candidates on intact cells
- Ongoing validation of candidates in cancer cell lines
- Plan of strategic cooperations with oncologists

Prediction and prevention of congestive events in heart failure patients



INVESTIGATOR:
Dr. Alessandro Faragli
Charité

Diagnostic

Cardiology

2018

Track 1

SUMMARY

Heart failure (HF) represents the leading cause of hospitalization worldwide. Because of the difficulty in treating this chronic disease, re-hospitalizations are associated with high cost for the healthcare systems, accounting for €28 billion per year in Europe only. The team aims at building an algorithm to predict and prevent congestive events in heart failure patients. They have identified risk predictors and created an algorithm. At the moment, the team is performing a database analysis on existing cohorts of HF patients to build the first risk prediction model.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Risk predictors identified
- First algorithm designed

LONG-TERM GOALS

- Perform clinical study to determine accuracy of prediction algorithm
- Submit invention disclosure
- License to medtech or startup foundation

FiXatas - Ready-to use surgical knots

PRINCIPAL INVESTIGATOR:
Dr. Panagiotis Fikatas
Charité

MedTech
Surgery

2018

Track 2

SUMMARY

In the project a device and method for the generation of extra corporally pre-tied surgical knots has been developed. The device consists of a yarn carrier with a pre-tied but still open knot ready to use during surgery. It is easy to use even by non-surgeons without special training. Knots produced are stronger and more stable than other sliding knots and tying is faster. Potential user groups have been extended. The first use field will be endoscopic surgery where tying knots is very challenging due to limitations in space and the visual field. Several patents and designs have been filed. The team has founded a startup in early 2020.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Patent granted in 2018
- Project developed from invention to marketable product
- Winner of the Ethicon Future Award 2016
- 3rd Place of PROFUND “Research to Market Challenge 2017”, 2nd Place at BPW 2018 contest, 2nd Place at YES! Delft Pitching 2019
- Started negotiations with medtech
- Startup Clouz founded in 2019

PREVIOUS SPARK FUNDING

- Track 1 2016

CLOUZ

Predicting post-operative complications in real-time


PRINCIPAL INVESTIGATORS:
Prof. Dr. Alexander Meyer,
Prof. Dr. Volkmar Falk
Charité & DHZB

Digital Health

Surgery

2018

Track 2

SUMMARY

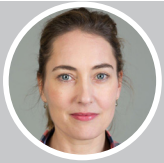
The large number of concurrent patient data in critical care units goes well beyond the capacity of the intensive care physician and may lead to treatment delays or clinical errors. The team applies deep machine learning methods in a critical care scenario to provide timely and highly accurate decision support to the clinical staff. They have developed a set of forward-facing real-time prediction models for severe post-cardiothoracic surgery complications. Primary focus is the prediction of postoperative bleeding.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Prototype ready including user interface and client-server infrastructure
- Business plan completed
- Collected first user feedback
- Completed team
- Started recruiting partner hospitals
- Further refined and improved bleeding model
- Started to work towards regulatory approval with experts
- Follow-on funding by the BIH Digital Health Accelerator
- Startup x-cardiac funded in 2021

x-cardiac

New treatment strategies by targeting the inflammasome



PRINCIPAL INVESTIGATOR:
Prof. Dr. Karoline Krause
Charité

Pharma

Dermatology

2018

Track 2

SUMMARY

The project has identified several inhibitors of inflammasome activation in a high-content screen. Inflammasome activation is a hallmark of several monogenic and complex systemic auto-inflammatory diseases for which only few standard therapies exist. In addition, inflammasome activation plays a central role in the pathogenesis of additional diseases such as contact dermatitis. The identified inhibitors are evaluated for their use in the different indications. One compound has the potential to be repurposed.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Identified several lead candidates
- Extended indication & initiated collaboration
- Preclinical proof of concept in human skin models
- Patent filing planned for 2020
- Started writing Investigator's brochure
- Started partnering with Pharma concerning novel chemical entity

PREVIOUS SPARK FUNDING

- Track 1 2015
- Track 1 2018

"SPARK enabled us to translate an initial mechanistic idea into a successful preclinical drug development project."

"SPARK is a great initiative to de-risk innovative projects and to enhance translational research from bench to bedside. SPARK provided us with excellent partners, pushed our project and helped a lot in making decisions and focusing on the next steps."

Prof. Dr. Karoline Krause

"SPARK was most crucial:
-because of the entire networking for scientific and regulatory advice to accelerate project translation into clinical application
- financial support to perform in vitro and in vivo experiments to accumulate the essential data sets for approval by authorities to enter clinical phase I/II trial
- these data are also crucial to attract sponsors/investors for the post-SPARK phase"

Prof. Dr. Ulrike Stein

Treatment for metastatic colorectal cancer

PRINCIPAL INVESTIGATORS:
Prof. Dr. Ulrike Stein,
Prof. Dr. Wolfgang Walther
MDC & Charité

Pharma

Oncology

2018

Track 2

SUMMARY

Colorectal cancer is the third most diagnosed cancer and fourth most common cause of death worldwide, metastasis being the cause of about 90% of deaths. Team Stein has identified two FDA approved drugs that combined robustly inhibit the metastasis of colon cancer. They have initiated a first phase II clinical trial for one of the drugs – and are aiming at initiating a second phase II clinical trial for combinatorial therapies for colorectal cancer (CRC). An option contract has been negotiated with a biotech company, which also includes an option for an industry partnership with the Stein Team.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- One patent granted, several patents pending
- First preclinical developmental steps & POC completed
- Phase II mono-therapy clinical study is running
- Ongoing licensing negotiations & planned industry partnership

MC4R agonist treatment of patients with monogenic obesity

PRINCIPAL INVESTIGATOR:
Prof Dr. Peter Kühnen
Charité

Pharma

Metabolic

2018

Track 2

SUMMARY

Obesity is an increasing problem with immense socioeconomic burden and severe suffering for the individual patients.
The team has identified a novel intracellular pathway via the Melanocortin-4 receptor (MC4R) which plays a pivotal role in weight regulation. When this signaling pathway is disturbed, the patients experience a constant hunger feeling irrespective of how much they eat.
The aim of this project is to identify patients that benefit from a MC4R agonist treatment resulting in a normal hunger feeling, and thus reducing the weight naturally. Hence, the team recruits affected patients for an investigator-initiated clinical trial in order to find novel treatment options.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Patent filed
- Diagnostic screen established
- Mutations and epigenetic modifications within the MC4R pathway identified for selection of patients eligible to MC4R agonist treatment
- Patients recruited to Phase 2 investigator-initiated clinical trial
- Company sponsored-phase 3 trial led to FDA approval
- Paul-Martini-Prize 2020 for outstanding achievements in clinical-therapeutic drug research

"SPARK support was essential to continue and to improve our translational research project. Additionally it opened new horizons to evaluate new alternative peptides for our target protein."

Prof. Dr. Peter Kühnen

Flurinocyte - urine flow cytometry as biomarker for renal diseases

PRINCIPAL INVESTIGATORS:
PD Dr. Philipp Enghard
Charité

Diagnostic

Nephrology

2017

Track 1

SUMMARY

The project aims at developing a diagnostic assay to quantify cellular components present in human urine via flow cytometry. Cells identified and quantified allow the differential diagnosis of several renal diseases. The presence or absence of specific cell types correlated to disease activity and disease severity. This simple urine test could be used as a diagnostic tool, to screen patients who need a renal biopsy, monitor treatment and predict outcome. The assay could become a helpful tool in the clinic when a quick primary assessment is required to define subsequent clinical workup and may enable a more personalized treatment.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Data validation in different patient groups
- Established an easy-to-use sample conservation protocol to simplify the test logistics
- Currently validating marker and sample logistics in two multi-center studies on renal diseases

"The SPARK program was absolutely decisive to change our mindset in planning and thinking of experiments and research, from being limited to basic research to a holistic understanding of the requirements of translational research."

PD Dr. Philipp Enghard

"SPARK is fundamental for researchers from any field to bring an idea from research to what needs to be done in the business field."

Dr. Alessandro Faragli

Novel drugs strengthening endogenous immuno-regulatory processes

PRINCIPAL INVESTIGATOR:
Stefan Frischbutter, PhD
Charité & German Rheumatism Research Center

Pharma

Immunology

2017

Track 1

SUMMARY

The balance in the immune system between suppression or activation of immune responses is highly complex, very tightly regulated and fine-tuned with multiple cell types orchestrated. If this fine-tuning is out of balance, diseases such as autoimmunity occur.
In this project, the team is focusing on the suppressive capacity of the immune system and evaluates the use of drugs to bring this arm back in balance. The team has developed a high-throughput-screening platform and has already identified several bioactive molecules with re-balancing capacity. They validate these drug candidates in primary human immune cells and assess the resulting immune reaction in order to determine their potential impact on autoimmune disorders.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Hits from drug screen validated
- Immune responses partially dissected
- Target validation and drug development ongoing
- Major hurdles have been identified in pursuing the idea into the clinic

"Before entering the SPARK program, we had many translational paths in mind. Now we have found the most promising one."

Stefan Frischbutter, PhD

"We are very thankful to SPARK for laying in front of us the whole spectrum of expertise in the field of drug development and giving us access to role-models in the field conveying that "we can do it" as well."

Prof. Dr. Markus Schülke-Gerstenfeld

BodyTime - A new diagnostic tool to assess the internal clock

PRINCIPAL INVESTIGATOR:
Prof. Dr. Achim Kramer
Charité

Diagnostic

Chronobiology

2017

Track 1

SUMMARY

The circadian clock is a biological program that structures physiology and behaviour according to the time of day. It is active in practically all cells of our bodies. The circadian clock is thus a cell-based program that is essential to health and well-being. The team has developed a new diagnostic tool to probe human internal time and rhythm using a single blood sample. It has utility in defining the correct time of day for drug dosing, in order to achieve the least adverse effects. Of note, >50% of the top selling drugs target clock-controlled genes and thus likely have specific time of day effectiveness. This solution can therefore offer value in reducing side effects as well as helping with sleep disorders or work performance.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Identified core set of time-telling genes
- Patent filed in 2018
- Developed a robust assay and predictive algorithm with 30 min accuracy
- Follow-on funding by the BIH Digital Health Accelerator
- Started beta-testing with different patient cohorts in 2019
- Startup BODYCLOCK Technologies founded in 2021

BODYCLOCK

Inhibitors of ribosome assembly

PRINCIPAL INVESTIGATOR:
Dr. Rainer Nikolay
Charité

Pharma

Infectious Disease

2016

Track 1

SUMMARY

In this project it is planned to develop a new class of antibiotics, based on the inhibition of prokaryotic ribosome assembly. According to the WHO antibiotic resistance is a global threat. The team has developed an *in-vivo* screening assay based on reporter strains, where large and small ribosomal subunits have been tagged with red or green fluorescent proteins. A disturbance in subunit assembly can be detected via the fluorescent ratio. Based on this fluorescence-based reporter assay, a high throughput screen was performed to identify small molecule inhibitors that specifically interfere with the assembly of either the large or the small ribosomal subunit and thereby inhibit bacterial growth.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- HTS was performed at the FMP
- Due to low specificity of the screening assay hit candidates could not be identified
- Advise to improve the screening assay & evaluate alternative approaches (e.g. structure-based design)
- Identified hit compounds in in-silico structure-based design methods in collaboration with AG-Wolber (FU Berlin)
- Hit compounds are being tested in several assays.

"The input from SPARK was crucial to realize that a structure-based design of small molecule inhibitors would be a more direct and most probably more promising approach. Following this suggestion, a collaboration with a structure-based modelling group (AG Wolber, FU Berlin) was established."

Dr. Rainer Nikolay

Affinity matrix for antigen-specific depletion of plasma cells secreting pathogenic autoantibodies

PRINCIPAL INVESTIGATOR:
Prof. Dr. Falk Hiepe
Charité

Pharma

Immunology

2016

Track 1

SUMMARY

Long-lived autoreactive plasma cells secreting pathogenic antibodies play a crucial role in the development of autoimmune diseases. However, they are resistant to conventional immunosuppressive drugs and therapies targeting B cells. Current therapies targeting plasma cells such as proteasome inhibitors deplete all plasma cells including those contributing to protective humoral immunity.
Therefore, the group has developed an affinity matrix technology for depletion of plasma cells based on the specificity of their secreted antibodies. The group currently validates their technology to deplete autoantibody-secreting plasma cells in a murine autoimmune model. The project recently gained interest and support by the industry.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Development of an affinity matrix technology for depletion of plasma cells in an antigen-specific manner
- Winner of the Sanofi iAward 2018 & 2020
- Preclinical proof of concept by 2025

Lead optimization of STOML3 inhibitors for the treatment of neuropathic pain


PRINCIPAL INVESTIGATORS:
Prof. Dr. Gary Lewin,
Dr. Christiane Wetzel
MDC

Pharma
Pain

2015

Track 1

SUMMARY

In this project a small molecule inhibitor for STOML3 will be developed to treat neuropathic pain. The protein is required for the transduction of pain signals in peripheral pain receptors. STOML3 expression is upregulated after nerve injury in sensory fibers making it a great target. In a high throughput screen several inhibitors of STOML3 oligomerization and thus (mechano)transduction were identified. In vivo proof of concept has been achieved in two mouse models for neuropathic pain. Neuropathic pain is a condition caused by nerve damage or disease affecting the nervous system. In half of the patients pain relief cannot be achieved by current treatment options.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Preclinical proof-of-concept in 2016
- Patent filed in 2016
- Publication: 2017
- Secured Helmholtz Validation Fund in 2016 for further development and optimization of lead compounds candidates

Development of a platform for the isolation of T cell receptors for cancer immunotherapy


PRINCIPAL INVESTIGATORS:
Dr. Felix Lorenz, Dr. Julian Clauss, Dr. Inan Edes, Prof. Dr. Wolfgang Uckert
MDC

ATMP
Oncology

2015

Track 1

SUMMARY

Immunotherapy currently holds the most potential for cancer treatment, with T-cell therapies as one promising approach. The team develops a high throughput platform to identify T cell receptors (TCRs) specific for cancer antigens for a novel and effective T-cell therapy for untreatable blood cancer patients.
Preliminary studies not only demonstrated the feasibility of the strategy, but also identified two novel TCRs. Patents covering these TCRs as well as the platform have been filed. The team is setting up a startup (called Captain T Cell) and has acquired follow-on funding to further pursue the strategy. They aim for testing their TCR therapy in a clinical phase I/IIa study and also hope to develop T-cell immunotherapies for other tumor-related illnesses in the foreseeable future.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Robust platform established to develop >30 isolated TCRs
- Multiple patents filed from 2015-2020
- Winner at life sciences and healthcare startup accelerator OneStart in 2016
- Jury price at BioVaria showcasing event for life science technologies in 2017
- GO-Bio Funding in 2018
- Total follow-on pre-seed funding of 4 Mio. € until 2020
- Startup planned for 2021/22

"SPARK was the starting point for my whole team to start thinking how we can translate our research results in developing drugs for patients."

"I was so excited to participate in the SPARK mentoring program, because it provides a completely new perspective on the clinical translation of projects. For scientists it is so important to get insights into the process of translating basic research findings into treatments. These insights provided by the SPARK program definitely shaped my way of thinking about current and future scientific projects."

Dr. Felix Lorenz

SPARK-BIH projects

Mentored-only SPARK-BIH teams

Cairos against Chaos: A novel eHealth system for enhanced transfusion and medication safety

PRINCIPAL INVESTIGATOR:
Dr. Michael Notter
Charité

Digital Health

Transfusion medicine

2015

SUMMARY

Blood Transfusion requires a maximum level of security and precision, because, if performed inappropriately, it can kill patients. This is why a paper-based security and documentation system is legally mandatory and implemented in every single hospital that prevents errors from occurring.
In this project, the entire transfusion process is digitally captured. This is achieved by combining a proprietary infusion catheter for automatic pre-transfusion blood sampling with a software- and radiofrequency (RFID)-based identification system. An app has been developed to maintain a high level of patient security and a seamless documentation of the whole process. A prototype system is currently being tested in the Charité.

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Value proposition and business model tested
- Team composition evaluated and experts identified
- Clinical testing initiated at Charité in 2014 – 2018
- 2019 collaboration with “Interdisziplinäre Arbeitsgemeinschaft für Klinische Hämotherapie (IAKH)” aiming at supra-regional implementation of Cairos

Development of a liposome-based delivery system for Langerhans cells


PRINCIPAL INVESTIGATORS:
Prof. Dr. Christoph Rademacher,
Dr. Robert Wawrzinek
MPI of Colloids and Interfaces

Pharma
Other

2015

SUMMARY

The team identified a small molecule ligand to Langerin that can be used for targeted delivery of antigen to Langerhans cells. What renders them very special is that they are one of the few dendritic cells residing in the epidermis, the uppermost layer of the skin, and therefore a very attractive target for immune modulation attempts. The team showed that decorating liposomes and other nanoparticles with their small molecule ligand leads to highly specific uptake by Langerhans cells *in vitro*, *in vivo* and in human skin explant models. The team currently translates the technology for the delivery of novel vaccines and anti-cancer treatment

PROJECT ACHIEVEMENTS DURING & AFTER SPARK

- Startup Cutanos founded in 2021

LONG-TERM GOALS

- Offer targeted delivery solutions for immune modulation

CUTANOS

SPARK-BIH project glossar – team affiliations (I)

Dr. Anita **Balázs**, Charité, Department of Pediatric Pulmonology, Immunology and Intensive Care Medicine, Head of Department: Prof. Dr. Marcus Mall
"Exploring a novel therapeutic target in cystic fibrosis"

Prof. Dr. Philip **Bufler**, Dr. Christian **Hudert**, Lucas **Griessmair**, Department of Pediatrics, Division of Gastroenterology, Nephrology and Metabolic Medicine, Charité - Universitätsmedizin Berlin
"DiaperID - a medical APP for smart stool recognition and newborn screening for biliary atresia"

PD Dr. Antonia **Busse**, Medical Clinic of Oncology and Hematology
"CD5-specific TCR-T cells for treatment of relapsed or refractory T cell neoplasms"

Prof. Dr. Matthias **Endres**, PD. Dr. Wolfgang **Böhmerle**, Dr. Samuel **Knauss**, Dr. Leonie **Müller-Jensen**, PD Dr. Petra **Hühnchen**, AG Endres, Charité, Department of Experimental Neurology
"Biomarkers for tumor immune therapy associated neurological side effects"

Prof. Dr. Matthias **Endres**, PD Dr. Wolfgang **Böhmerle**, PD Dr. Petra **Hühnchen**, AG Endres, Charité, Department of Experimental Neurology
"Prevention of paclitaxel-related Neurotoxicity"

PD Dr. Philipp **Enghard,** Charité, Medical Department, Division of Nephrology and Internal Intensive Care Medicine
"Flurinocyte - urine flow cytometry as biomarker for renal diseases"

PD Dr. Katharina **Erb-Eigner**, Sophie **Au**, Klinik für Radiologie, Charité - Universitätsmedizin Berlin
"RadioEye - A unique diagnostic decision support tool for radiologists"

Dr. Alessandro **Faragli,** Charité, Medical Department, Experimental Cardiology, AG Post/Alogna, Head of laboratory: Dr. Alessio Alogna (BIH Junior Clinical Scientist)
"Prediction and prevention of congestive events in heart failure patients"

Dr. Panagiotis **Fikatas,** Charité Department of Surgery, Experimental Surgery, Head of department: Prof. Dr. Igor M. Sauer
"Development of a stapler for solid organs"
"Prototype construction of stapler for biliary and pancreatic anastomosis"
"FiXatas - Ready-to use surgical knots"

Stefan **Frischbutter,** PhD**,** Charité, Comprehensive Allergy Center Charité & German Rheumatism Research Center
"Novel drugs strengthening endogenous immuno-regulatory processes"

SPARK-BIH project glossar – team affiliations (II)

Marcus **Granegger,** PhD & Tim **Bierewirtz**, Charité, Institute for Imaging Science and Computational Modelling in Cardiovascular Medicine, Biofluid Mechanics Laboratory, Group leader: PD Dr. Ulrich Kertzscher
"A novel solution for a total artificial heart"

Prof. Dr. Leonid **Goubergrits**, Institute of Computer-assisted Cardiovascular Medicine
"Safety and efficiency assessment of a novel miniaturized oxygenator"

Prof. Dr. Volker **Haucke**, Department Molecular Pharmacology and Cell Biology, Leibniz-Forschungsinstitut für Molekulare Pharmakologie im Forschungsverbund Berlin e.V. (FMP)
"Novel therapy for neuromuscular disease caused by mutations in myotubularins"

Prof. Dr. Regine **Heilbronn** & Prof. Dr. Christoph **Schwarzer**, Charité, Institute of Virology & Innsbruck Medical University, Department of Pharmacology
"Gene therapy for the treatment of temporal lobe epilepsy"

Prof. Dr. Anja **Hennemuth**, Charité, Institute for Imaging Science and Computational Modelling in Cardiovascular Medicine (ICM) & Member Of Management Board at Fraunhofer Institute for Digital Medicine (MEVIS)
"Image-based Support of Minimal-Invasive Mitral Valve Repair"

Prof. Dr.-Ing. Anja **Hennemuth**, Institute for Imaging Science and Computational Modelling in Cardiovascular Medicine (ICM), Charité Universitätsmedizin Berlin, Group Data science and Medical image processing, Dr. Olena **Nemchyna**, DHZB Dienstleistungs GmbH
"AI supported quantitative assessment of aortic valve calcification"

Prof. Dr. Falk **Hiepe,** Charité, Department of Rheumatology and Clinical Immunology (including working area of Physical Medicine) , Rheumatologic Research lab, AG Hiepe - Development of Therapeutic Strategies for Autoimmune Diseases
"Affinity matrix for antigen-specific depletion of plasma cells secreting pathogenic autoantibodies"

PD Dr. Andreas **Kaufmann**, Charité, Department of Gynecology, Gynecological tumor immunology lab
"Validation Study for Cervical HPV and Dysplasia Screening Test"

PD Dr. Enno **Klussmann**, Max Delbrück Center for Molecular Medicine (MDC), Group leader, PI Anchored Signalling
"Novel compounds to treat excessive water loss in states of dysfunctional vasopressin-mediated water reabsorption"

Prof. Dr. Achim **Kramer**, Charité, Institute of Medical Immunology, Department of Chronobiology
"BodyTime - A new diagnostic tool to assess the internal clock"

SPARK-BIH project glossar – team affiliations (III)

Prof. Dr. Karoline **Krause,** Charité, Department of Dermatology, Venereology and Allergology, Dermatologic Allergology (AG Maurer) & Comprehensive Allergy Center Charité
"New treatment strategies by targeting the inflammasome"

PD Dr. Peter **Kühnen** & Prof. Dr. Heike **Biebermann**, Institute for Experimental Pediatric Endocrinology, Director of Institute: Prof. Dr. Heiko Krude
"MC4R agonist treatment of patients with monogenic obesity"

PD Dr. med. Annette **Künkele-Langer,** Department of Hematology, Oncology and Cancer Immunology | CVK
"Generation and preclinical evaluation of neuroblastoma-specific CAR constructs"

Prof. Dr. Gary **Lewin**, Dr. Christiane **Wetzel**, Max Delbrück Center for Molecular Medicine, Lewin Lab - Molecular Physiology of Somatic Sensation
"Development and optimization of novel small molecules to treat metabolic syndrome"

Michael **Lommel**, Dr. Ulrich **Kertzscher**, Institute of Computer-assisted Cardiovascular Medicine, Dr. Jens **Dernedde**, Institute of Laboratory Medicine, Clinical Chemistry and Pathobiochemistry
"ALARM – A Viral Alert Realtime Monitoring"

Dr. Felix **Lorenz**, Julian **Clauss**, Dr. Inan **Edes**, Prof. Dr. Wolfgang **Uckert**, Max Delbrück Center for Molecular Medicine, Uckert Lab - Molecular Cell Biology and Gene Therapy
"Development of a platform for the isolation of T cell receptors for cancer immunotherapy"

Prof. Dr. Alexander **Meyer** & Prof. Dr. Volkmar **Falk**, Charité, Department of Cardiovascular Surgery, Medical Data Science Group
"Predicting post-operative complications in real-time"

Prof. Dr. Annette **Moter**, Dr. Judith **Kikhney**, Charité, Institute of Microbiolowgy, Infectious Diseases and Immunology, Group leader "biofilm" & Biofilm Center of the German Heart Center Berlin
"Molecular imaging of biofilm infections - Validation of FISH controls for automated endocarditis diagnostics"

Khaled **Nasr**, Prof. Dr. Surjo **Soekadar**, Department of Psychiatry and Neurosciences, Charité - Universitätsmedizin Berlin
"Neural mapping using transcranial magnetic temporal interference stimulation"

Dr. Rainer **Nikolay,** Charité, Institute of Medical Physics and Biophysics, Spahn Lab - Cryo-Electron Microscopy of Macromolecular Machines
"Inhibitors of ribosome assembly"

SPARK-BIH project glossar – team affiliations (IV)

Dr. Michael **Notter**, Charité, Medical Department, Division of Hematology, w and Tumor Immunology, Clinical Research and Digital Medicine, Notter Group – Engineering patient safety
"Cairos against Chaos: A novel eHealth system for enhanced transfusion and medication safety"

Dr. Jessica **Olschewski,** Charité, Department of Gynecology
"Pre-Education - Patient empowerment through automated digital education of gynaecological patients on the course of treatment"

Prof. Dr. Gabriele **Pecher**, Charité Berlin, Medical Clinic of Oncology and Hematology, Department of Molecular Gene- and Immunotherapy
"A novel therapy medicinal product for the therapy of solid tumors"
"Off-the-shelf chimeric antigen receptor (CAR) product with broad applicability for malignant diseases Combinatorial treatment for metastatic colorectal cancer"

Prof. Dr. Antonio **Pezzutto** & PD Dr. Antonia **Busse**, Charité, Medical Clinic of Oncology and Hematology, Charité Medical School, and MDC, Department of Molecular Immunotherapy
"A novel gene therapy for treatment of aggressive B cell lymphoma"

Prof. Dr. Alessandro **Prigione**, Max Delbrück Center for Molecular Medicine, AG Prigione - Mitochondria and cell fate reprogramming
Prof. Dr. Markus **Schülke-Gerstenfeld**, Charité, Department of Neuropediatrics, NeuroCure Clinical Research Center, AG Schuelke – Translational Genomics
"iPSC-based drug discovery of mitochondrially inherited Leigh syndrome (MILS)"

Prof. Dr. Christoph **Rademacher**/Dr. Robert **Wawrzinek,** Max Planck Institute of Colloids and Interfaces, Biomolecular Systems, Research Group "Structural Glycobiology"
"Development of a liposome-based delivery system for Langerhans cells"

Dr. Angela **Relogio**, Charité, Institute for Theoretical Biology (ITB), Molecular Cancer Research Center (MKFZ), Systems Biology of Cancer
"TimeTeller: A non-invasive method for the molecular and computational characterization of the internal biological clock in humans"

Dr. Kostja **Renko**, Charité, Institute of Experimental Endocrinology, AG Renko
Prof. Dr. Lutz Schomburg, Deputy director of Institute of Experimental Endocrinology, AG Schomburg
"New thyroid hormone enzyme inhibitor for cancer treatment"

SPARK-BIH project glossar – team affiliations (V)

Timo **Rückert**, Prof. Dr. Chiara **Romagnani**, AG Romagnani - Innate Immunity, DRFZ/Charité
"Expansion of Natural Killer cells for viral infection and cancer"

Prof. Dr. Reinhold **Schäfer,** Deputy Director (Translational Research) of the Charité Comprehensive Cancer Center, Molecular Tumor Pathology
Director: Prof. Dr. med. Ulrich **Keilholz**
"Validation of anti-cancer agents in patient-derived canceroids"

Dr. Yollete Guillén **Schlippe**, Institute of Medical Physics and Biophysics
"A universal platform for the discovery of new therapeutic modalities"

PD Dr. Boris **Schmitt**, Charité, Department of Pediatric Cardiology, Group leader KidCathLab
"GrOwnValve - Bioresorbable stent as anchor for a personalized, autologous heart valve for children"

Prof. Dr. Dietmar **Schmitz**, Neuroscience Research Center, Charité - Universitätsmedizin Berlin, Prof. Dr. Markus **Schülke-Gerstenfeld**, Department of Neuropediatrics/Experimental Neuropediatrics, Charité - Universitätsmedizin Berlin
"Screening for novel modulators that restore synaptic signaling in human iPSC-derived neurons from SYNGAP syndrome patients"

Prof. Dr. Günther **Schönrich**, Dr. Mohammed **Yassen**, AG Schönrich, Institute of Virology Charité-Universitätsmedizin Berlin
"Validation of a consensus DNA sequence for vaccination against pandemic coronaviruses (PanCoVac)"

Dr. Verena **Schöwel**, Dr. Andreas **Marg**, Prof. Dr. Simone **Spuler**, Out-patient Clinic for muscle disorders, Charité / ECRC
"SatTyping: A software-based typing of regenerative stem cells towards resource-saving and efficient production of ATMPs"

Dr. Viola **Seitz** & Prof. Dr. Christoph **Stein,** Charité, Insitute of Experimental Anesthesiology
"In vivo validation of a novel class of pain medication"

Prof. Dr. Simone **Spuler** & Dr. Verena **Schöwel,** Max Delbrück Center for Molecular Medicine, Experimental and Clinical Research Center and Charité, Spuler Lab – Myology, Muscle Research Unit
"We build muscles– the human muscle stem cell"

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"A novel peptide to regenerate the central nervous system"

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"Combinatorial treatment for metastatic colorectal cancer"

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