

SARS-CoV-2: Running Research Activities

- **Project 1: Drug repurposing screen targeting SARS-CoV-2**
 - Topic: Drug Discovery (Repurposing)
 - Activity: Screening of the Fraunhofer Repurposing Set (BROAD Library) (approx. 5.600 compounds) in a cell-based viral replication assay
 - Fraunhofer IME-SP activities / Project partner activities:
 - Provision of access to the Fraunhofer Repurposing Set (BROAD Library of approx. 5.600 compounds) (Fraunhofer IME-SP)
 - Phenotypic screen (SARS-CoV-2 replication-assay) in BSL3 Lab (Partner: University Hospital Frankfurt)
 - Establishment of High Content analysis protocols for the evaluation of the replication assay (confluency, cell number, etc.) (Fraunhofer IME-SP)
 - High-Content analysis of replication assay data (of inactivated and fixed cells) and data evaluation (Fraunhofer IME-SP)
 - Validation and profiling of Hits (Fraunhofer IME-SP and Partner)
 - Funding: Federal state funding (Hessen)
 - Project duration: 4 months

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- Project 2: **EXSCALATE4CoV**
 - Topic: Drug Discovery
 - Activity: Computer-Aided Drug Design (CADD) in combination with High-Throughput Screening (biochemical and phenotypic)
 - Fraunhofer IME-SP activities / Project partner activities:
 - Virtual screening of SARS-CoV-2 targets and identification of potential inhibitors (Partner)
 - Provision of access to the Fraunhofer Repurposing Set (BROAD Library of approx. 5.600 compounds) (Fraunhofer IME-SP)
 - Development of biochemical screening for SARS-CoV-2 targets (Proteasen, Ligasen und Polymerasen) (Fraunhofer IME-SP)
 - High-Throughput-Screening of above mentioned assays (Fraunhofer IME-SP)
 - Phenotypic screening (SARS-CoV-2 replikation-assay) (Partner)
 - Protein crystallisation and structure determination of SARS-CoV-2 proteins (Partner)
 - Funding: European Commission, H2020-SC1-PHE-CORONAVIRUS-2020 (Emergency Call))
 - Project duration: 18 months

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- **Project 3: Text Mining for Robert Koch Institute**
 - Topic: Text- und Data-Mining for Drug Discovery
 - Activity: Real-time monitor for scientific data and publications in the area of SARS-CoV-2/COVID-19 for the identification of potential targets for Drug Discovery (z.B. for drug repurposing)
 - Fraunhofer IME-SP activities / Project partner activities:
 - Development of a SARS-CoV-2/COVID-19 text mining application (Partner)
 - Establishment of workflows for the extraction of information (Partner)
 - Provision of expert knowledge of the molecular pathophysiology of SARS-CoV-2/COVID-19 (Fraunhofer IME-SP)
 - Funding: Fraunhofer internal funding
 - Project duration: 36 months

SARS-CoV-2: Planned Research Activities (submitted proposal)

- Project 4: COVID-19 test kit
 - Topic: Diagnostik
 - Activity: Development and implementation of a self-test kit for COVID-19 and an algorithm for data analysis
 - Fraunhofer IME-SP activities / Project partner activities:
 - Algorithm development (Fraunhofer IME-SP)
 - Development of diagnostic assay (Fraunhofer IME-SP)
 - Provision of access to compound collections, assay development and High-Throughput-Screening (Fraunhofer IME-SP)
 - Clinical testing of the kit (Partner)
 - Test kit development and approval (Partner)
 - „sequencing platform“ – samples and study (Partner)
 - Funding: European Commission, H2020 Enhanced EIC Accelerator Pilot (SME Instrument Phase 2)
 - Project duration: 18 months

SARS-CoV-2: Fraunhofer IME-SP 4D (drugs, data, devices, diagnostics) competency

- Competence 1: Drug repurposing in the frame of COVID-19 (4D-drugs)
- Competence 2: Medical Data Science for COVID-19 data (4D-data)
- Competence 3: Validation and pilot studies for COVID-19 tools (4D-devices, 4D-diagnostics)
- Fraunhofer IME-SP activities:
 - Provision of access to the Fraunhofer Repurposing Set (BROAD Library of approx. 5.600 compounds)
 - Hosting of compound libraries of third parties (e.g. 600 cpds Malaria Pandemie Box, 800 cpds. Dompe Pharma)
 - High-Throughput Screening and Assay Development for the “rapid” testing of compounds and compound families (S1, S2 Labs)
 - High-Throughput Screening, establishment of analysis protocols (e.g. High-Content), data analysis, Hit-validation, Hit-profiling
 - Bioinformatics analysis of Hits, conjunction with multidimensional meta data
 - Structure-based drug discovery (IME-SP) and structure determination 1-4 Å (together with DESY)
 - In vitro toxicity studies
 - Set-up of a repository & data management for repurposing compounds (corona.repurposing@ime.fraunhofer.de)
 - Datamining, analysis, algorithms, ontologies for COVID-19 data
 - Pilot studies and validation of tools und devices
 - Provision of expert knowledge of the molecular pathophysiology of viruses
 - Co-operation with institutes focusing on virology (Ciesek Frankfurt, Addo UKE Hamburg, Guenther BNITM Hamburg) and institutes hosting animal facilities
 - Project management and network with clinical labs, pharmaceutical companies, European Commission, European Institutes