Sanofi iDEA-TECH Awards North America 2023-2024
Call for Pre-Proposals

Description & Objectives

Sanofi is a global pharmaceutical company committed to improving access to healthcare and supporting the patients we serve throughout the continuum of care.

The Sanofi iDEA-TECH Awards initiative is designed to innovate through collaborations, with a focus on **cutting-edge digital and data tools and new technologies for R&D applications.** The goal is to:

- Identify **new projects** and help develop new approaches and translational technologies from key academic institutions and start-ups
- **De-risk** cutting-edge science and technologies that can bring high potential value to R&D
- Build strong **relationships** with new partners that can lead to **longer-term partnerships**

Each selected Investigator will receive up to **$150K USD,** have a **dedicated Sanofi scientific expert assigned to the project** for 1-year and gain **privileged access to developing an extended collaboration**.

Sanofi's main objectives in creating the iDEA-TECH Awards program are to rapidly start one-year projects that maximize the opportunity for continued collaborations of mutual interest.

Application Process

iDEA-TECH Awards 2023-2024 is open to **academic institutions across North America** and **start-ups.**

Ideas must be submitted using the provided *Pre-proposal template* and submitted via the *iDEA-TECH portal link.* Before submitting, please work with your **Tech Transfer Office (TTO)** or business office to make sure that your proposal is aligned with the scope and fulfills the application criteria of the call. Pre-proposals that are not validated by your institution TTO (for academic PIs) or do not fit with the guidelines (format, timeline, etc.) will not be evaluated. Please note that pre-proposals must not contain any confidential information or unpublished results and cannot include 3rd party collaborators other than those involved in the iDEA-TECH Awards initiative.

Submission portal link: iDEA-TECH North America 2023

Selection process

Projects will be prioritized through a **2-step selection process**.

Step 1: The first step involves the evaluation of the 2-page pre-proposal form (enclosed template), which was designed to be easy to populate and review. Please note that there is no requirement around the level of maturity for each project at this stage. However, the Investigator must provide clear objectives and a concrete work-plan achievable within 12 months. Pre-proposals should also address one or several of the priority areas of interest described below under the "scope of the call".

Step 2: Selected pre-proposals will need to be developed further in the form of a detailed proposal (8 to 10-pages document) and reviewed for final selection by the Sanofi Steering Committee. Based on the feedback the Investigator may be asked to work with a Sanofi Champion to refine their proposal.

Sanofi iDEA-TECH Awards timeline

Main steps	Due date
Call for Pre-Proposals	**November 7, 2023**
Deadline for Pre-Proposals submission	December 15, 2023
Call for detailed proposals	**January 31, 2024**
Deadline for Detailed Proposals submission	March 13, 2024
Steering Committee Meeting	May 15, 2024
Awardees notified	**May 30, 2024**
Start of projects	October 2024

Should you have any further question regarding the initiative, application, selection process, scope, etc. please contact:
SRI-NA@sanofi.com

iDEA-TECH Awards
North America

Scope of the Call

iDEA-TECH Awards 2023-2024 Cycle

DDS - Data & Data Sciences

Artificial Intelligence (AI)/machine learning (ML) approaches, simulations, predictive modeling to support:

- Pre-clinical safety, clinical development, clinical operations, clinical supply chains, Pharmacovigilance
- Personalized Medicine (biomarkers, patient stratification), Digital Biomarkers, Bioimaging

Large Language Model (LLM) and its application in Biomedical and drug discovery:

- LLM for reasoning
- Cell language models for analyzing single cell data
- Combing LLM with knowledge graph
- Multimodality LLM, for example human language + protein language + imaging etc
- Using LLM to automate data analysis, use tools, query data and use software Application Programming Interfaces (API)
- How to use LLM and other deep learning models to effectively analyze tabular data

LMR - Large Molecules Research

Digital: Computer assisted technologies to improve generation of antibodies or VHHs against interesting disease targets in the field of oncology, immunology and inflammation, rare and neuro diseases; methods for designing for function (e.g. agonism, conditional activation); methods for in silico protein engineering, multiparametric optimization and de novo design of biologics.

Agonism and Agonistic Biologics: Technologies or computer assisted strategies to design agonistic biologics, methods and strategies to analyze and predict agonistic mode of action (target biology), technologies and methods to test/screen agonistic biologics in vitro.

Tissue Specific Biologics Delivery: Technologies or strategies to increase tissue specific (brain, lung, intestine, skin) exposure of biotherapeutics, via systemic or alternative delivery routes.

GMU - Genomic Medicine Unit

- Gene therapy delivery of nanobodies
- Non-viral gene therapy (lipids nanoparticles (LNP), polymer-based, DNA payload) for CNS, ocular, kidney, or muscle delivery
- Modulation of LNP-DNA delivery mediated immune responses
- Small molecule transcriptional modulators for gene regulation
- Development of novel cell internalization sequences, degradation motifs, or active sites to enable targeted immunotherapies
- AI-driven discovery of novel, tissue-specific viral and non-viral delivery methods

Pre-Clinical Safety

- Predictive AI/machine learning approaches for preclinical to clinical translation to improve safety prediction
  - Multi-endpoint or multi-scale modeling (target to organ to system)
  - Modeling a threshold for when suppression of specific white blood cell types leads to higher infection risk
- Quantitative Modeling approaches to important target organs for toxic effects on these organs
  - Simulation of toxic response to drug exposure in liver, kidney, GI
  - Simulation of electrophysiology responses in CNS to drug exposure
- Quantitative Systems toxicology modeling from transcriptomics data
  - Integrated mechanistic model for predicting liver injury
- In vitro 3D microphysiological systems using human cells for immune-mediated or drug-induced vascular injury

DMPK - Drug Metabolism and Pharmacokinetics

- Development of an AI/ML based framework to predict large molecules Pharmacokinetic/pharmacodynamics (PK/PD) dynamics
- Development of in vitro assays to understand and predict the PK of biologics including nonlinear PK due to target-mediated clearance. Investigate which in vitro parameters could be preferably used for physiologically based pharmacokinetic (PBPK) modelling.

PMCB – Precision Medicine Computational Biology

Disease profiling:

- Genomic and Epigenomic profiling of disease states and models at a single cell level (e.g. spatial Dbit-seq, single ATAC)
- Single Cell Proteomics or Ultra-deep multi-omics profiling for disease target and biomarker identification.
- High-dimensional characterization (e.g. single cell RNAseq, CITEseq, spatial omics) of patient tumors treated with immunotherapy or targeted therapy. Prioritize projects on lung, colorectal, pancreatic and hepatocellular cancers
- Single-cell level comparison of immune infiltrating cells from multiple organs in systemic autoimmune conditions
- Multi-modal molecular characterization of hidradenitis suppurativa biopsies to develop biomarker-driven precision medicine strategies

Methods development:

- Technologies linking protein and RNA expression with functional readouts at single cell resolution
- Parallel CRISPR-Based Genetic Perturbation Screening at Single-Cell Resolution
- Methods for cell interaction/neighborhood analysis in high-dimensional spatial profiling data
- Multi-step processing of single cells using semi-permeable capsules

Digital pathology:

- Define digital pathology-driven features to distinguish the cellular composition of normal and inflammatory skin and colon tissues.
- Leverage digital pathology in IBD colon biopsies to develop predictive biomarkers for standard-of-care treatments.

Translational In Vivo Models

- Novel methods to culture and expand primary lung progenitor cells in 2D and 3D, manipulate their differentiation trajectories in organoid models to study the biology of regeneration.
- Exploration of precision cut lung slices (PCLS) for prolonged culture (> 5 days) to better model injury and repair in the lung; proteomic. Transcriptomic, and spatial (histopathologic) characterization of these PCLS following exposure to experimental therapeutics.
- In-vivo tracking of immune cells (lymphocytes, mast cells, macrophages) in homeostatic and disease states in translational models either with novel, cell specific reporter molecules (e.g. labeled ligands, antibodies) or by using reporter mouse models. In vivo tracking will help understand the disease biology and its modulation by cytokines and experimental therapeutics.

RWE - Real World Evidence Development

Real-World Evidence in Clinical Development and Trials:

- Selection of patient cohorts for trials.
- Identify responder populations and bridge to disease endotypes.
- Optimization of endpoints selection.
- Prioritization of indications where an asset could drive differentiated outcomes.
- Model disease progression and natural history of disease.
- Prediction models to prioritize drug combinations using patient RWD.

Real-World Data Sources: Exploring the use of diverse data sources, such as electronic health records, claims data, patient registries, imaging data. **Disease Registries**: Using disease-specific registries to gather data on specific patient populations. **Data Quality and Integration**: Addressing challenges related to data quality, interoperability, and harmonization of RWE sources.

Regulatory Acceptance of RWE: Understanding the evolving role of RWE in regulatory decision-making and drug approval processes. **Ethical and Privacy Considerations**: Addressing ethical and privacy concerns when using patient data for research. **Rare Diseases and Orphan Drugs**: Assessing the effectiveness of treatments for rare diseases where traditional clinical trials may be challenging. **Global Harmonization**: Addressing international standards and collaborations for RWE research.

RWE in Drug Safety and Dosing: Using real-world data to assess the safety of drugs and identify potential adverse events, and dosing definition. **Drug Safety and Risk Management**: Identifying and mitigating risks associated with pharmaceutical products in real-world settings.

Effectiveness of Therapies: Evaluating how well drugs and treatments work in real-world patient populations, beyond clinical trials. **Including Long-term Follow-up**, examining the long-term effects and outcomes of treatments and interventions**, and comparative effectiveness,** comparing the effectiveness of different treatments and interventions in real-world settings.

IDD - Integrated Drug Discovery

- Design and synthesis of novel heterocycles for medicinal chemistry.
- Developing AI tools to identify Mechanisms of Action (MOAs) of compounds characterized in cell painting assays.
- Protein-Protein Interaction (PPI) induction assay amenable to high throughput screening of small molecules.
- Assay or high-speed algorithm to measure the propensity of a “Beyond rule of five” molecule to adopt conformations as function of solvent polarity.
- Targeting RNA with Small molecules as a Mechanism of Action:
    - Cell Screening and Tool validation for identification of small molecules interacting with RNA
    - RNA -Small molecules binding assays (NMR; X ray; CryoEM)
    - In silico specific methodologies involving RNA -Small molecules
    - RNA Focused chemical libraries
- Novel chromatographic and spectroscopic methods for the design of chameleonic leads with improved ADME properties in the Beyond-Rule-of-5 space
- Design and synthesis of new bioisosters and peptidomimetics for macrocyclic bioactive compounds and macrocyclic molecular glues
- Translational human cellular 3D/microphysiological systems (MPS) for medium or high-throughput pharmaceutical compound screening.
- Method development of high-yielding reactions with one equivalent of C-X-building blocks (including CO_2 or other surrogates)
- Unlocking Allosteric pockets –Novel technologies for identification of functional binding sites

CMC – Chemistry Manufacturing and Controls

Genomic Medicine Unit CMC

- Economic analysis for viral and non-viral gene therapy manufacturing process
- Strategies for improving viral vector volumetric productivity and full capsid packaging
- PAT for viral titer and product quality (Empty/Full) inline measurement
- In silico Process Development/modeling for upstream (USP) and downstream (DSP) viral production
- Relationship between adenovirus and AAV packaging and identify virus replication modulators
- Non-viral gene therapy: Developability of antibody fragment lipid micelles for targeted LNP delivery
- Developability and Process development of Nanobody lipid micelles for targeted LNP delivery
- Automation for cryobag/cryovial fill and finish for cell therapy applications

Drug Substance (Mammalian & microbial platform)

- Process Intensification to reduce Cost of Development and Cost of Goods
- Understanding of CHO metabolism and regulation of signaling cascade to improve design of media
- High expression CHO host and vector technology development
- High Throughput Tools & Simulation/Modelling Tools to Increase Development Efficiency
- Novel sensors and analyzers for inline / online analysis of product quality attributes

Drug Substance (Synthetics)

- Predictive Solubility, Predictive Reactivity and automated reaction or formulation optimization
- ML/AI in chemical process definition from High Throughput Screening (from hit to process in a minimum number of experiments)
- Definition of a chemical mechanistic discrimination methodology using ML/AI in closed loop system
- Next Generation of biocatalysts: enzyme catalyzed CSP2-CSP2 bond forming reactions, enzyme catalyzed cycloadditions, general peptide bond forming reactions

Drug Product Synthetics

- Continuous Process applied to Drug Product manufacturing to reduce time to market & development cycle costs & ensure sustainable Eco-Design
- Development of Next generation of Process Analytical Tools (PAT) to support better quality in batch and/or continuous manufacturing
- In-vitro Predictive tool taking into account permeability
- Enabling technologies for BCS3/BCS4 compounds & macromolecules
- Drug Substance (DS)/Drug Product (DP) Co-crystallization

Drug Product (BioDPD)

- Stabilization of unstable/fragile proteins in liquid form at +5°C and/or room temperature (can be bundled with room temperature stable biological products)
- Very high concentration formulations: focus on protein powder suspension-based formulation in non-aqueous vehicle compatible for subcutaneous delivery

Vaccines

- Exploring alternative forms & routes of administration or assessing mucosal immunology post vaccination;
- Improving the stability of nucleotides-based vaccines (e.g. mRNA vaccines);
- Technologies enabling vaccines against autoimmune diseases (ex. allergies, IBD, MS, lupus, etc;
- Novel high throughput Multiplex biological assays to do more with a single sampling;
- Usage of a.i. for new vaccines antigen design and vaccines data analysis;
- Development of antimicrobial approaches using novel biological strategies (mAb, phages, etc);
- Development of targeting systems for guided cell targeting vaccines
- Boosting mRNA vaccines delivery in cytosol
- AI to build on “Smart RNA vaccines” with highly regulated & cell-specific expression
- Faster, cheaper and more efficient sequence-to-mRNA process
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