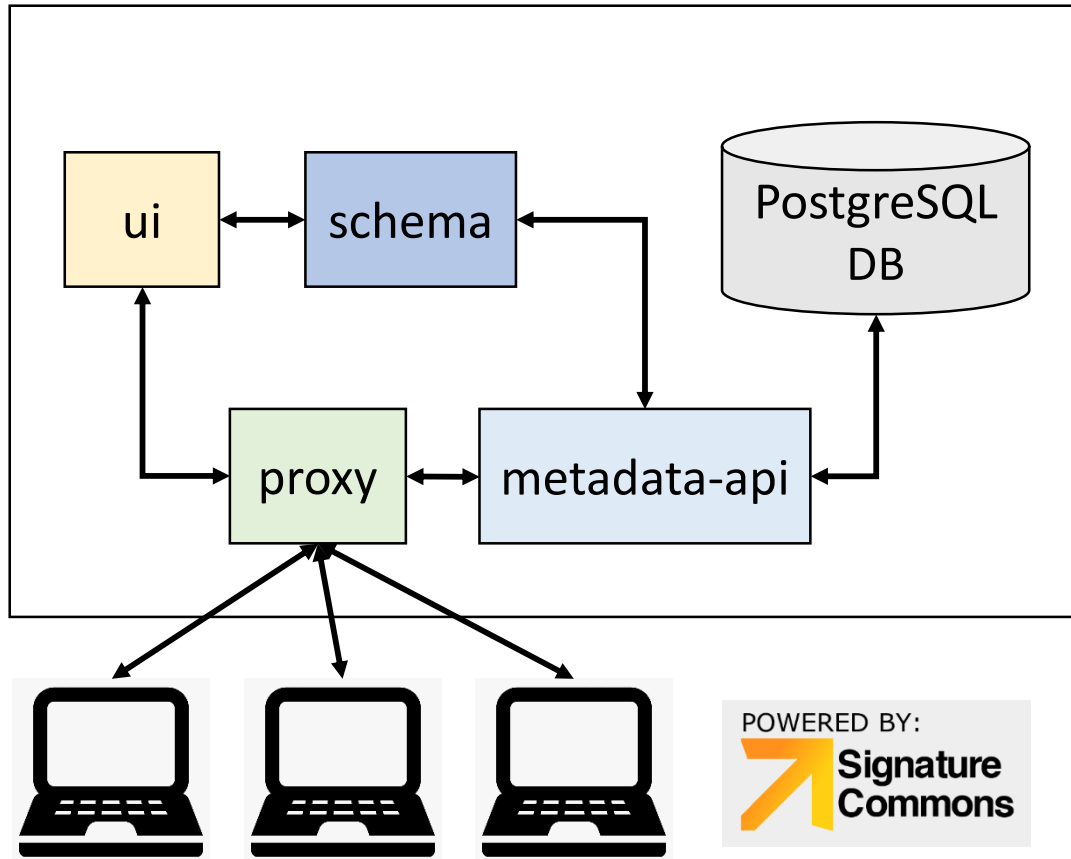


Intelligent Integrative Platform for Sharing Heterogeneous Stem Cell Research Data

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ReMeDy architecture



- ReMeDy is an implementation of Signature Commons, a BD2K-LINCS platform implemented through Docker and designed to store and search diverse metadata in an agile and flexible manner.
- ReMeDy is composed of six packages: proxy, ui, schema, metadata-api, controller, data-api
- The ReMeDy platform uses a relational database for data storage. The leveraged data technology alongside a properly implemented schema for data storage provides strong data conformity to the FAIR guidelines (Findable, Accessible, Interoperable, and Reusable).



ReMeDy data organization

Resource:

- Master container for each published stem cell project
- Contains libraries

Library:

- Container for project CDEs, e.g. Project, Manufacturing / Production, Outcomes Modules
- Contains signatures

Signature:

- Represents individual/ grouped Research System data
- Contains information for patients, animal models, and in-vitro cell lines

Validator:

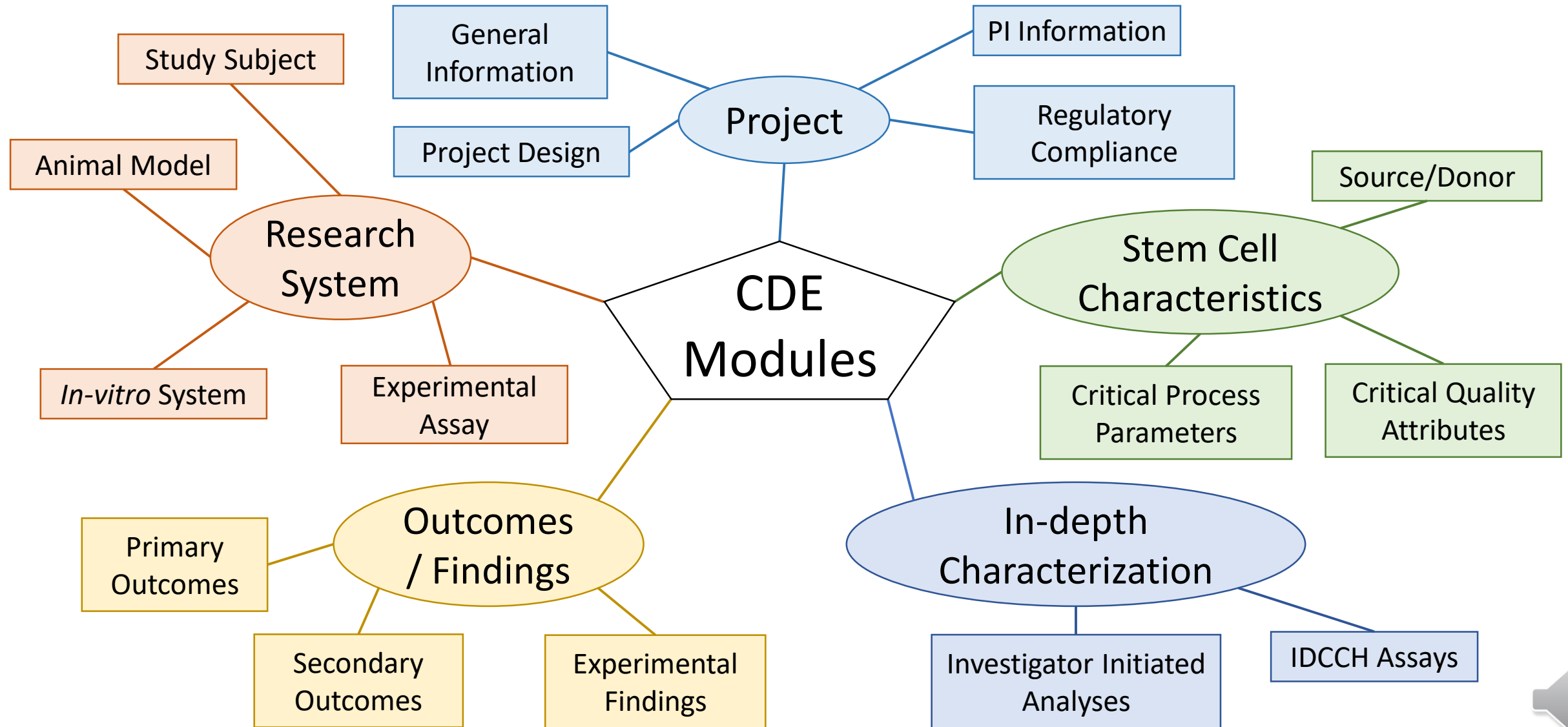
- Quality control file
- Used to verify formatting and requirements of JSON files, prior to ingestion
- Allows for integration of ontology information
- Applicable to resources, libraries and signatures

Schema:

- Visualization control file
- Defines how the data is presented in the search results
- Applicable to resources, libraries and signatures



Multi-modular CDE Framework



ReMeDy functionality

CDE Search

Projects

API

ReMeDy: Regenerative Medicine Data Repository



Search CDEs

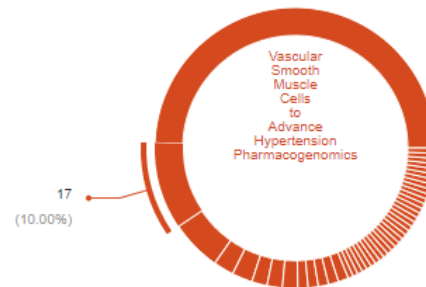
SEARCH ▶

Autologous

Retinal pigment epithelial cells

Destination Therapy

Right Heart Failure



Signatures per Resource

ReMeDy functionality

The screenshot displays the ReMeDy website interface. At the top, a blue navigation bar contains the logo and the text "ReMeDy: Regenerative Medicine Data Repository". To the right of the logo are three navigation links: "CDE Search", "Projects" (which is highlighted), and "API". Below the navigation bar is a grid of twelve project cards, arranged in two rows of six. Each card features a black icon representing a medical or biological concept, followed by a title and a brief description of the project. The icons include a flask, a heart, an eye, a brain, a bone, and a cell.

Icon	Project Title	Description
Flask	A novel model of liver cancer stem cells from iPSCs	A novel model of liver cancer stem cells from iPSCs
Heart	Allogeneic Cardiomyocyte Transplantation	Allogeneic Cardiomyocyte Transplantation
Eye	Autologous Induced Stem-Cell-Derived Retinal Cells for Macular Degeneration	Autologous Induced Stem-Cell-Derived Retinal Cells for Macular Degeneration
Brain	Autologous Mesenchymal Stem Cells in Multiple Sclerosis	Autologous Mesenchymal Stem Cells in Multiple Sclerosis
Brain	Autologous Mesenchymal Stem Cells Transplantation for Spinal Cord Injury- A Phase I Clinical Study	Autologous Mesenchymal Stem Cells Transplantation for Spinal Cord Injury- A Phase I Clinical Study
Heart	Cardiac Repair in a Porcine Model	Cardiac Repair in a Porcine Model
Flask	Clinical-Scale Derivation of Natural Killer Killer Cells	Clinical-Scale Derivation of Natural Killer Killer Cells
Heart	congestive heart failure with autologous adult stem cell transplantation	congestive heart failure with autologous adult stem cell transplantation
Bone	CYP-001 in Steroid-Resistant Acute GvHD	CYP-001 in Steroid-Resistant Acute GvHD
Brain	Dopaminergic progenitors in the treatment of Parkinson's	Dopaminergic progenitors in the treatment of Parkinson's
Brain	Establishment of stable iPS-derived human neural stem cell lines suitable for cell therapies	Establishment of stable iPS-derived human neural stem cell lines suitable for cell therapies
Eye	Generation of corneal epithelial cells	Generation of corneal epithelial cells

The individual project links provide access to all CDE content from each iPSC and CSC project in ReMeDy.

ReMeDy functionality

The screenshot displays the ReMeDy website interface. At the top, a blue header contains the logo and the text "ReMeDy: Regenerative Medicine Data Repository". On the right side of the header, there are links for "CDE Search", "Projects", and "API". Below the header, the main content area is divided into two columns. The left column features a search bar with the placeholder text "Search CDEs" and a blue "SEARCH >" button. Below the search bar are several filter categories: "Species", "Tissue", "Animal species", "Subject ID number", "Date of birth", and "Study protocol name". The "Tissue" filter is expanded, showing a list of checkboxes with corresponding counts: "fibroblasts (1)", "Bone marrow (1)", "Colon (1)", "Connective tissue (1)", "fibroblast (1)", and "Primary tumors and xenografts (1)". The right column displays a list of study subjects. At the top of this column, there are two tabs: "STUDY SUBJECTS (170)" and "PROJECTS (106)". The list contains four entries, each with a small icon (a flask or a heart) and a subject ID description. The first entry has a flask icon and the text "Subject ID: BSCs_001_subject1; HEK293T embryonic kidney cells_001_subject1; nude mice_001_subject1". The second entry has a flask icon and the text "Subject ID: primary non-metastatic invasive breast carcinoma patients_001_subject1; healthy control blood samples_001_subject1". The third entry has a flask icon and the text "Subject ID: NOD/SCID_001_subject1; CD1_001_subejct1; EpCAM(high)/CD44+_001_subject1; EpCAM(low)/CD44-_001_subject1". The fourth entry has a heart icon and the text "Subject ID: immune rejection mice 1". Each entry is followed by a downward-pointing chevron icon.

The customized counting schemas allow users access to quick CDE statistics and easy search refinement.

ReMeDy feasibility testing

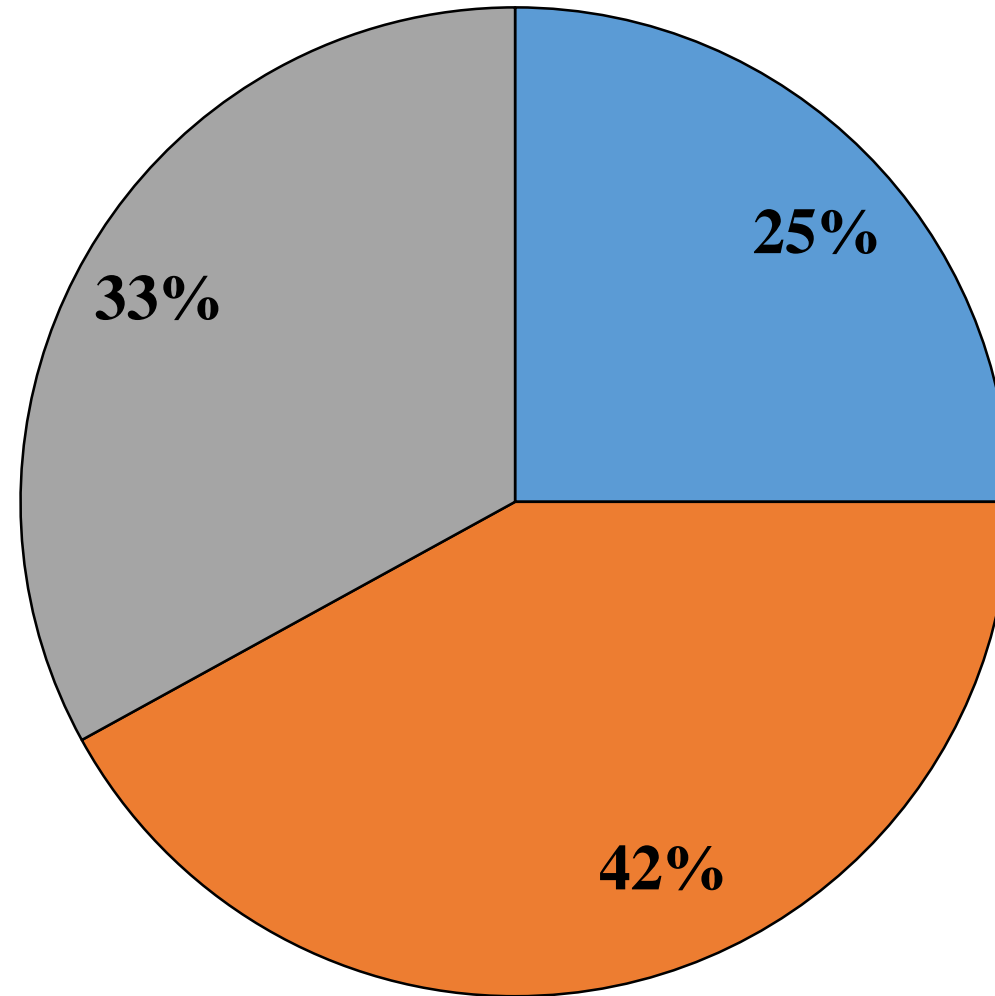
- To test the feasibility of the ReMeDy platform to successfully store data from stem cell projects, we abstracted CDEs from 103 published clinical, pre-clinical, and in vitro induced pluripotent stem cell (iPSC) (51) and cancer stem cell (CSC) (52) studies.
- The studies selection was randomized across PubMed indexed research, with the aim of obtaining a diverse set of research across time, research location, and research type.
- Abstraction was performed by trained personnel with experience in stem cell research.
- A total of 103 iPSC resources were created, along with 170 research subject records.
- On average, 76 CDEs per iPSC study were abstracted out of a total of 841 CDEs in the multi-modular framework.

Distribution of stem cell projects in ReMeDy by project type

■ Clinical Trial

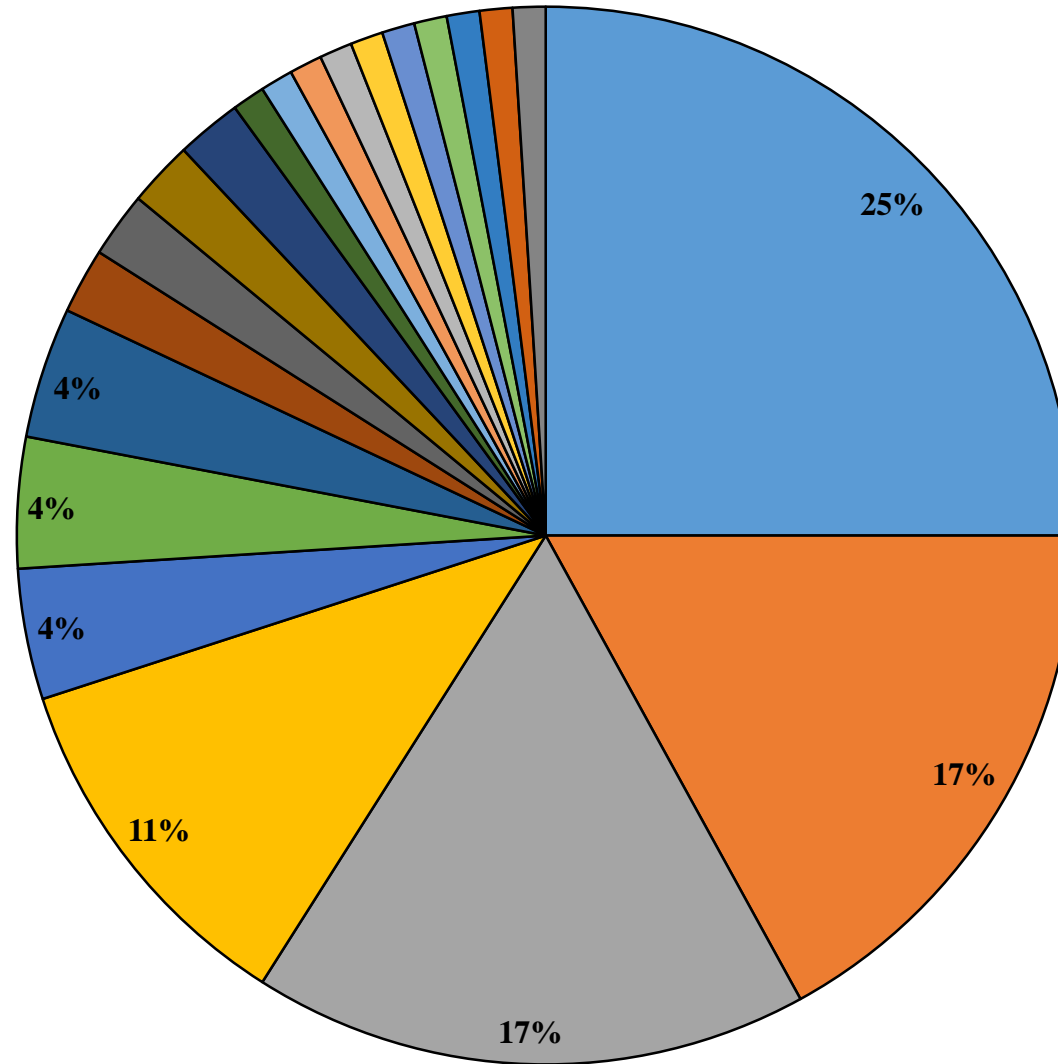
■ Preclinaical Trials

■ In Vitro



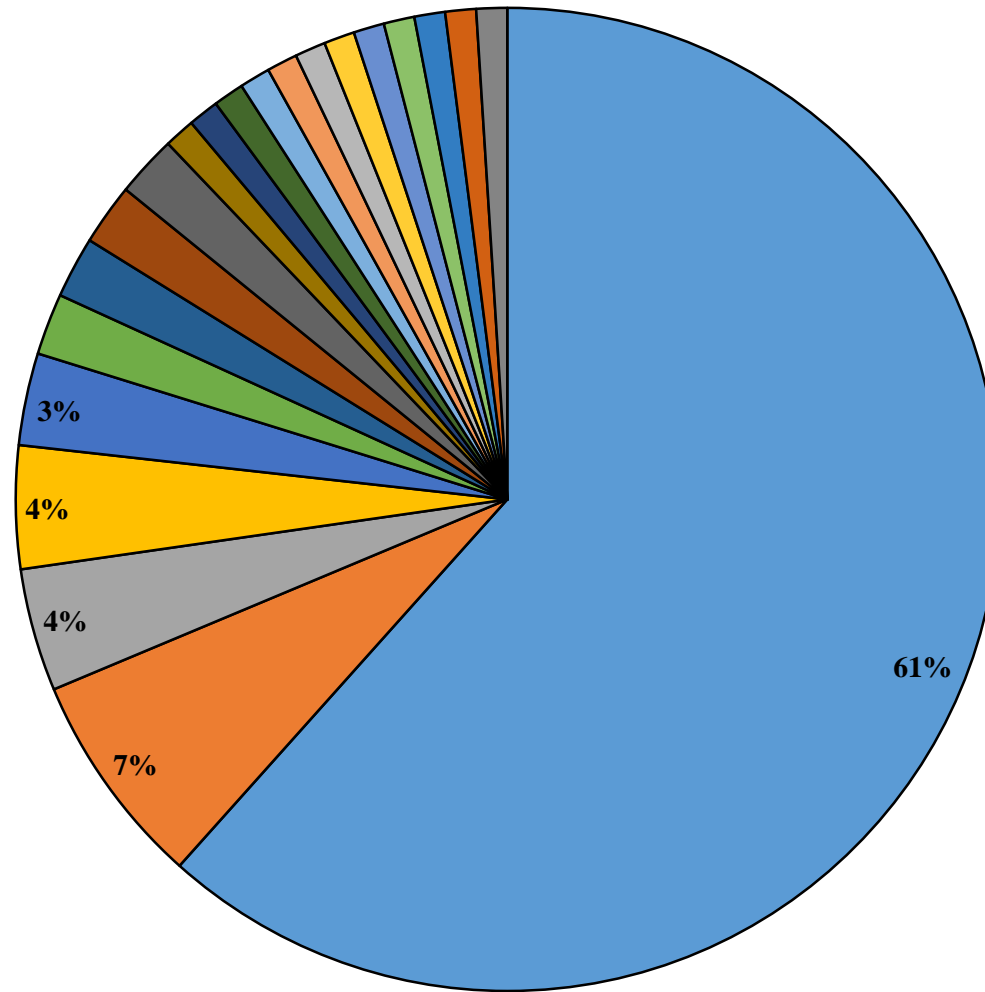
Geographical distribution of stem cell projects in ReMeDy

- USA
- China
- Japan
- Italy
- UK
- Germany
- South Korea
- France
- Spain
- Switzerland



Distribution of stem cell projects in ReMeDy by primary disease

- Cancer
- Myocardial Infarction
- Sclerosis
- Spinal Cord Injury
- Macular Degeneration
- Graft-vs-Host Disease
- Anemia
- Stroke
- Lung Disease





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School of
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Thank you for
your attention

<https://remedy.mssm.edu/>

