**The *Fondation Leducq* is pleased to announce the recipients of the Grant for Research Equipment and Technology Platforms (RETP).**

*The objective of this grant program is to promote innovative, original, and promising research in France, in the areas of cardiovascular and neurovascular disease, by supporting the acquisition of research equipment or technological platforms for which there is demonstrable need, and no currently available funding.*

*1. NEUROVASC-7T*

**Institution:** CEA Saclay/NeuroSpin, Biomedical Imaging Institute (IIBM)

Fundamental Research Division (DRF)-Gif sur Yvette

**Research Unit:**  UNIRS-MRI & Spectroscopy Unit

**Lead Investigator:** Cyril Poupon

**Program Director:** Jean-Robert Deverre

**Requested:** Upgrade of the clinical Siemens 7T MRI System (gradient coil+8Tx/32Rx antenna+Skope system for motion monitoring)

**Amount granted:**  960k€

*Summary of the scientific project:*

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| Develop novel imaging techniques and biophysical models to better characterize the cerebral tissue changes and microvasculature alterations in hereditary cerebral small vessel disease. This research program using a translational approach from genetic animal models to humans will be conducted in close collaboration with the National Referral Centre for rare neurovascular disorders. |

*2. High-resolution structural and functional imaging of microvascular hemodynamics of the brain in health and disease.*

**Institution**: Center of Psychiatry & Neuroscience (CPN) & Wave Physics for Medicine and Biology

**Research Unit**: INSERM U894 & U979

**Lead Investigator**: Thierry Galli and Mickael Tanter

**Requested:** Confocal super resolution microscope Leica equipped with gated STED laser line; Portable ultrasound research system 2D & 3D

**Amount granted**: 1,373,515€

*Summary of the scientific project:*

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| Develop technologies and novel applications of confocal and ultrasound imaging combined with electrophysiology for assessing brain's spatiotemporal neurovascular dynamics in health and disease models (cerebral small vessel diseases, cannabis-induced changes of brain functional architecture and connectivity...) |

*3. A window on pathological vasculature.*

**Institution:** PARCC

**Research Unit**: INSERM U970

**Lead Investigator:** Anne Eichmann

**Requested:** Confocal multiphoton laser scanning microscope

**Amount granted:** 594,716 €

*Summary of the scientific project:*

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| Develop a new platform for high resolution imaging of living animals using confocal multiphoton laser scanning microscopy in order to visualize multiple steps of vascular disease development and progression and bring a critical novel understanding of blood vessel remodeling. |

4. *An integrated Zebrafish/CRIPR-Cas9/Rodent platform for rapidly identifying the genetic basis of cardiovascular and neurovascular pathophysiology*

**Institution:** Institut de Génomique Fonctionnelle-Montpellier

**Research Unit:** INSERM U1191-UMR CNRS 5203

**Lead Investigator:** Chris Jopling

**Program Director:** Patrice Mollard

**Requested:** Zebrafish Aquarium;Photoacoustic imaging system;Electrophysiology rig;Olympus multiphoton microscope

**Amount granted:** 825,195€

*Summary of the scientific project:*

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| Accelerate the identification of novel candidate genes involved in congenital heart defects, cerebral dysfunction in epilepsy, cardiac arrhythmias through zebrafish models and reduce the use of rodents. |

5. *Imaging cardiac cell lineages at the origin of congenital heart disease*

**Research Unit:** INSERM UMRS 910 AMU-Faculté de Médecine La Timone Marseille

**Lead Investigator**: Michel Pucéat

**Requested:** Confocal microscope Zeiss;slide scanner;high speed camera;stereomicroscope

**Amount granted:** 496,000€

*Summary of the scientific project:*

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| Investigate how cardiac lineages contribute to formation of the myocardium, including specialized myocytes of the conduction system and the valves, during normal development and in CHD models to provide new insights into the molecular regulation of cardiac progenitor cell biology. |

6. *Integrated Positron Emission Tomography- Magnetic Resonance Imaging (PET-MRI) for Cardiovascular and Neurovascular research*

**Institution:** Bichat University Hospital AP-HP (Departments of Nuclear Medicine/Radiology)

**Research Unit:** INSERM UMS34

**Lead Investigator:** Dominique Le Guludec

**Requested:** Integrated PET-MRI system

**Amount granted:** 1,550k€

*Summary of the scientific project:*

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| Improve the early identification of patients at high risk of developing acute cardiovascular events or organ dysfunction by identifying more specifically biological processes in the vessel wall, (atherosclerosis) in the heart (valvular disease, myocardial fibrosis) and in the brain (post-ischemic injury). |

7. *iPSC phenotyping and innovative pharmacological approaches in cardiology using high-thoughput automated patch clamp and natural bioactive peptides.*

**Institution:** Institut du Thorax Nantes

**Lead Investigator:** Michel De Waard

**Program Director:** Flavien Charpentier

**Requested:** Automated patch-clamp system for high throughput screening Sophion Qube

**Amount granted:** 650,000€

*Summary of the scientific project:*

Produce iPSC-derived cardiomyocytes to improve functional understanding of known mutations responsible of ion channels cardiovascular pathologies and drug discovery using animal venoms.

8. *From 3D study of vascular and neuronal networks in whole tissues to topographic and mechanical investigation of the vascular wall.*

**Institution:** CIRB at College de France

**Lead Investigator:** Stéphane Germain and Isabelle Brunet

**Requested:** Lightsheet Ultramicroscope;Atomic Force microscope coupled to fluorescence microscope

**Amount granted:** 500,093€

*Summary of the scientific project:*

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| Decipher the signals involved in vascular morphogenesis and in loss of integrity of heart and brain blood vessels in ischemic cardiovascular diseases to understand the molecular mechanisms using Atomic Force microscopy and at a larger organ scale using the Ultramiscroscope. |

9. *Biophysical Modulation of cell migration: from cardiac regeneration after injury to atherosclerosis.*

**Institution:** Ecole Polytechnique de Palaiseau

**Research Unit:** Hydrodynamics Laboratory (LadHyX)

**Lead Investigator:** Abdul Barakat

**Requested:** High Resolution Cellular Imaging Platform: Atomic force microscope; nanoindenter; multiview microscope; microfluidics platform

**Amount granted**: 708,583€

*Summary of the scientific project:*

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| To quantitatively assess the interplay between biophysical stimulation and the migration of vascular and cardiac cells by using state of the art imaging and image analysis that can be applied both in vitro and in vivo in the zebrafish and to endothelial cell migration. |

10. *Ultrasound and MR imaging to assess myocardial and cerebral reperfusion injury and potential benefit of therapeutic interventions.*

**Institution:** OPeRa IHU/ Claude Bernard University-Lyon

**Lead Investigator:** Michel Ovize

**Requested:** High Frequency ultrasound for mouse cardiac and brain imaging; Echocardiography for large animal models cardiac imaging;

MR upgrade equipment for cardiac/cerebral applications

**Amount granted:** 469,990€

*Summary of the scientific project:*

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| Develop preclinical ultrasound, photoacoustic and Magnetic Resonance imaging tools to propose robust biomarkers to assess myocardial and cerebral reperfusion injury in rodents and large animals allowing new knowledge on promising therapeutic targets. |

11. *The vertebrate vascular system in brain function, dysfunction and repair.*

**Institution:** Paris-Saclay Institute (PSI) of Neuroscience

**Research Unit:** Equipe CASBAH, Neuro-PSI, Gif sur Yvette

**Lead Investigator:** Jean-Stéphane Joly

**Requested:** Swept-light microscope;Olympus objectives;Zebrafish sorter;

Robots for loading and handling well plates; upgrade of multiphoton microscope; Racks for zebrafish and mouse; equipment of imaging room.

**Amount granted:** 890k€

*Summary of the scientific project:*

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| Study of cerebrovascular diseases by using zebrafish and mouse models to understand the influence of the vasculature on brain cell types and on the homeostatic control of brain stem cells in normal and pathological conditions. |