



SCREENACTION
CRISQR

An initiative of the Canceropôle Provence-Alpes-Côte d'Azur



Presentation of the CRISPR Screen action

Selected in the context of a call for novel structuring actions from the Canceropôle's Provence-Alpes-Côte d'Azur, the CRISPR Screen action aims to **build a regional infrastructure on the innovative CRISPR/Cas9-based screen technology** and constitute a task-force working collaboratively with the cancer research community in the South region of France.

The objective of this action is to **develop, improve and spread CRISPR/Cas9 functional genomics screening approaches** that leverage different versions of the Cas9 enzymes to better understand gene function and identify biologically-relevant targets in various cancer subtypes. In addition, we will also work on enhancing lentiviral delivery methods, and create infrastructure and resources to enable their use on large and small scales.



Value for collaborative partners

The CRISPR Screen action provides researchers with ‘toolbox’ to interrogate gene function at the genome-wide level with local site specificities and complementary expertise.

By collaborating with the CRISPR screen action, scientists can gain access to CRISPR-based high-throughput screening technology to:

INVESTIGATE

The role of coding, non-coding and regulatory elements in cancer subtypes

UNDERSTAND

Mode of action of new drugs and drug/gene interactions (resistance/sensitization mechanisms)

IDENTIFY

Disease-relevant genetic variants & synthetic lethal partners

DISCOVER

New dependencies and clinically actionable pathways



The action leaders and their expertise

Marseille Luminy Campus

Genome-wide CRISPR screens
(all modalities)

Sandrine Roulland

Expert in B-cell immunology & lymphoma oncogenesis



- Guidance and development of Loss of Function & drug-modifier screens
- ECCITE-seq (CRISPRc+single cell)

Salvatore Spicuglia

Expert in epigenetic regulation in normal T cells & oncogenesis



- Development of CRISPRi screens
- Guidance for custom libraries against non-coding regions
- Bioinformatic analysis

Both sites

CRISPR + Single cell
Wet-lab & bioinformatics

Nice

Sophia & Archet Campus

Lentiviral optimization

Bernard Mari

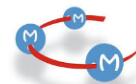
Expert in non-coding RNAs in pathological lung tissues



- Development of CRISPRi screens and single cell RNA-seq
- Supervise implementation tools for CRISPRi+ scRNAseq

Els Verhoeyen

Specialist in lentiviral vectorology for immune cells



- Supervise development and evaluation of novel lentiviral pseudotypes for novel CRISPR libraries



The offer: a CRISPR screening service

EXPERIMENTAL DESIGN

- CRISPR modalities (KO, repression, activation), cell models, custom or pre-made library
- Phenotypic readouts and local constraints (*in vivo*, cell sorting, single-cell)
- Definition of tasks and timeline between CRISPR action members and partner team

THE CRISPR TOOLBOX

- Assistance in generating cell-line models stably expressing Cas9
- Pooled CRISPR library design, construction, amplification, NGS validation
- Large-scale viral production and delivery to partners teams
- Guidance in transduction/cell culture library screening
- DNA extraction, library preparation and NGS

R & D

- Optimization of lentiviral delivery in non-permissive target cells (lines, primary, organoids, *in vivo*...)
- Development of 'enhanced' CRISPR-based techniques by combining CRISPR with single-cell genomics
- Develop array (customized) screens to validate primary screen results

BIOINFORMATICS

- Analyze genome-wide screens with established pipelines, hit calling
- Development of computational tools for complex dataset analysis in collaboration with bioinformatics platforms & single-cell experts

OUTREACH

- Provide training and participate in scientific events to increase awareness of CRISPR screen tools and methods between regional sites and among end-users.





◀ The support from the Canceropôle

SUPPORT

Funding of personnel & equipment

Starting packages for consumables for collaborative and R&D projects

Project application and follow-up by a Steering Committee

Organisation of events and communication

IMPACT (2020)

2 staff members hired

1 Matching Day organized

12 ongoing projects

66% of the projects led by Young Scientists

5 publications submitted or in preparation

463k€ of additional funding obtained





User's testimonies

«Even though I started a genome-wide CRISPR screen before the implementation of the CRISPR action, I benefited from the expertise of its members for the steps of sequencing isolated sgRNAs as well as for bioinformatics analyzes. Thanks to this, we are currently in the validation of the identified genes. The action members have always been very available, and helpful, and I really recommend contacting them to anyone who has a screening project » Sandrine Marchetti, C3M, Nice



« We are very grateful to the CRISPR Screen action and to the Canceropôle Provence-Alpes-Côte d'Azur, and in particular to the Dr Sandrine Roulland, for sharing not only reagents and protocols but also advices allowing us to perform genome wide crispr/cas9 screen” Emilie Narni, CIML, Marseille





Contacts

Administrative coordination :

Dr. Vanessa Zepponi, Project officer
Canceropôle Provence-Alpes-Côte d'Azur.

Tél : 06 14 61 35 67

Mail : vanessa.zepponi@univ-amu.fr

Scientific Leaders:

Dr. Sandrine Roulland (CIML, Marseille)

roulland@ciml.univ-mrs.fr

Tel : 04 91 26 91 08

Dr. Salvatore Spicuglia (TAGC, Marseille)

salvatore.spicuglia@inserm.fr

Tel : 04 91 82 87 22

Dr. Bernard Mari (IPMC, Sophia Antipolis)

bernard.mari@unice.fr

Tel : 04 93 95 77 77

Dr. Els Verhoeyen (C3M, Nice)

els.verhoeyen@univ-cotedazur.fr

Tel : 04 89 06 43 01

