

# Center Genetic Resources (CGR) of Laboratory Animals

*Federal Research Center  
Institute Cytology and Genetics SB RAS,  
Novosibirsk*

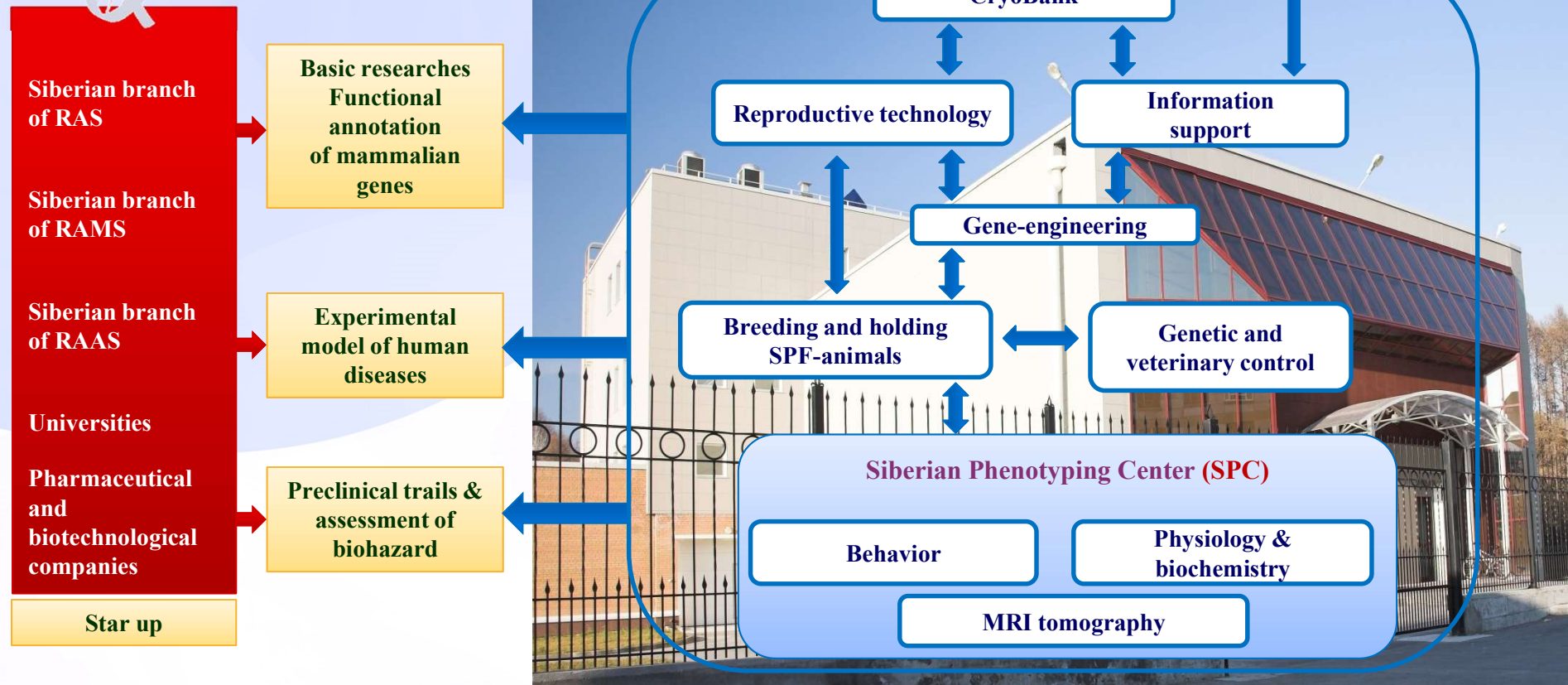


**Total size - 5600 m<sup>2</sup>**

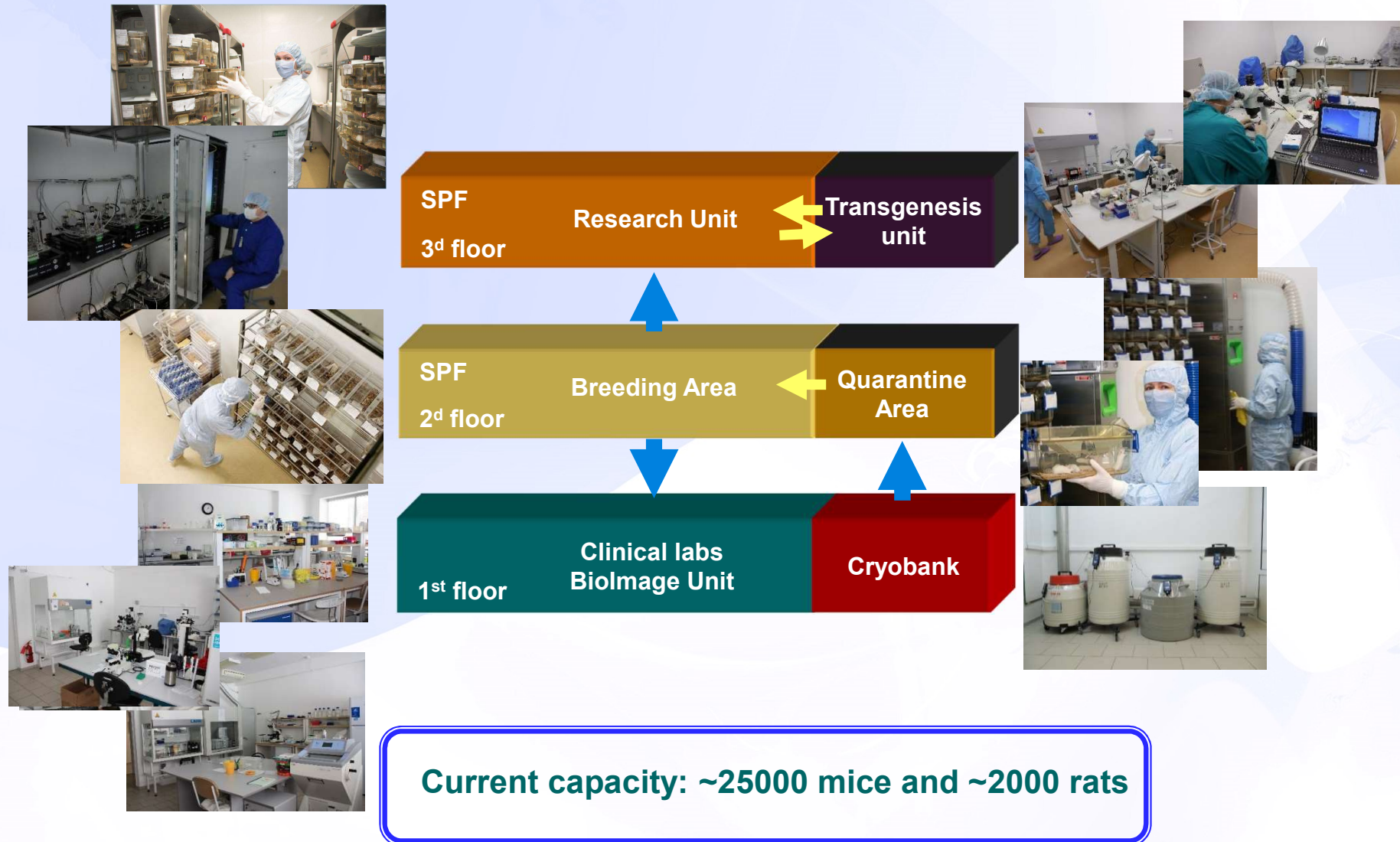
**Size of two barrier areas - 1400 m<sup>2</sup>**



# Technological structure of the Center Genetic Resources of Laboratory Animals



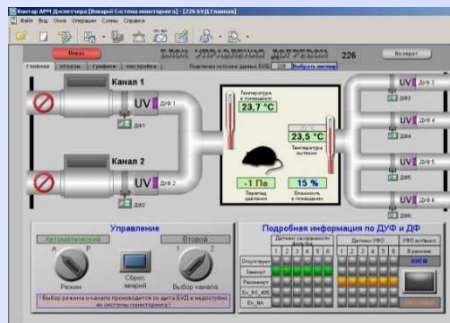
# Functional structure of the Center Genetic Resources of Laboratory Animals





# Core technologies in the Center Genetic Resources of Laboratory Animals

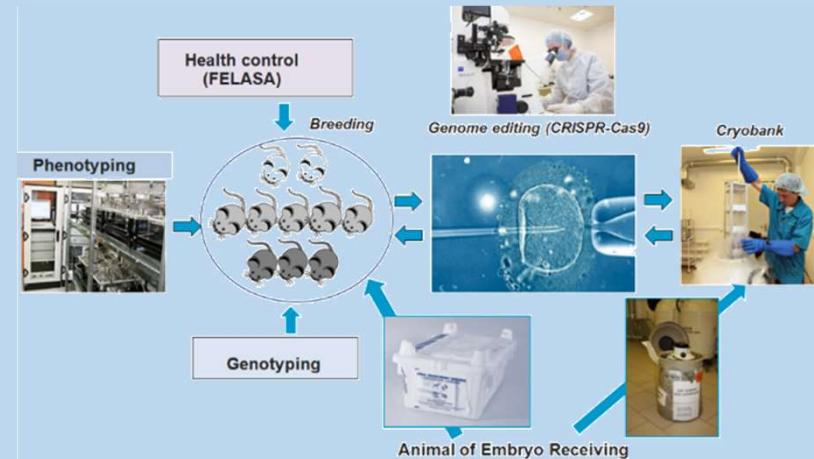
Climate control in mice rooms



Individually ventilated cages



Transgenes, Cryopreservation, Phenotyping



Some of >100 mouse strains



Phenotyping *in vivo* to evident relevancy



## Models of human diseases

### Genetic models

- Depression
- Diabètes
- Obesity
- Immunodeficiency
- Autoimmune encephalopathy
- Hypertension
- Accelerated aging
- Catalepsy
- Parkinson's disease
- etc.



### Experimental models

- Inoculated human glioma
- Adenocarcinoma and other mouse cancers
- Opisthorchiasis
- Cholangiocarcinoma
- Brain ischemia
- Cuprizone induced encephalopathy
- Alcohol induced brain disorder
- Alcohol induced liver disorder
- Alimentary obesity
- Drug induced parkinsonism
- Depression induced by constant light (animal model of SAD)
- etc.

## Diagnostics and Monitoring of Treatment

### Behavioral tests:

- «Open field»
- Elevated plus-maze
- Rota-Rod
- Phenomaster (activity, food & water consumption)
- Laboras
- Startle-reflex
- Sonographe
- etc..



### Physiology:

- Body composition
- Blood pressure
- Implanted thermologger
- Thermovision
- Phenomaster (Oxygen consumption, CO<sub>2</sub> production)



### Bioimaging:

MRI - BioSpec 117/16, Bruker, 11.7 T  
InSyTE, TriFoil imaging



### Clinical laboratory:

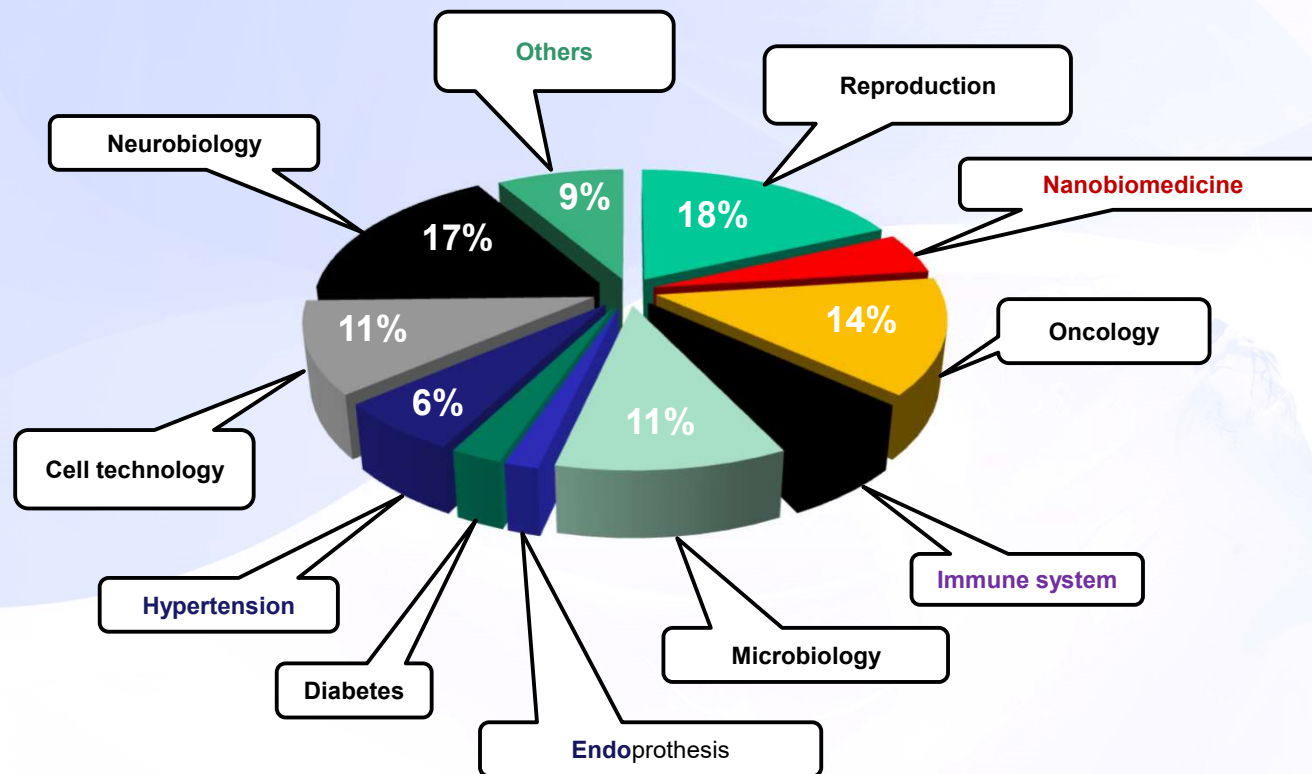
- Blood cells
- Biochemical analyses
- Sperm analysis
- HPLC
- PCR
- ELISA
- SeaHorse (cell energy metabolism)



# External load of the Center Genetic Resources of Laboratory Animals at last 3 years (2017-2019)

Total amount of requests ~ 1200

External users – >50 research institutes and science and pharmaceutical companies

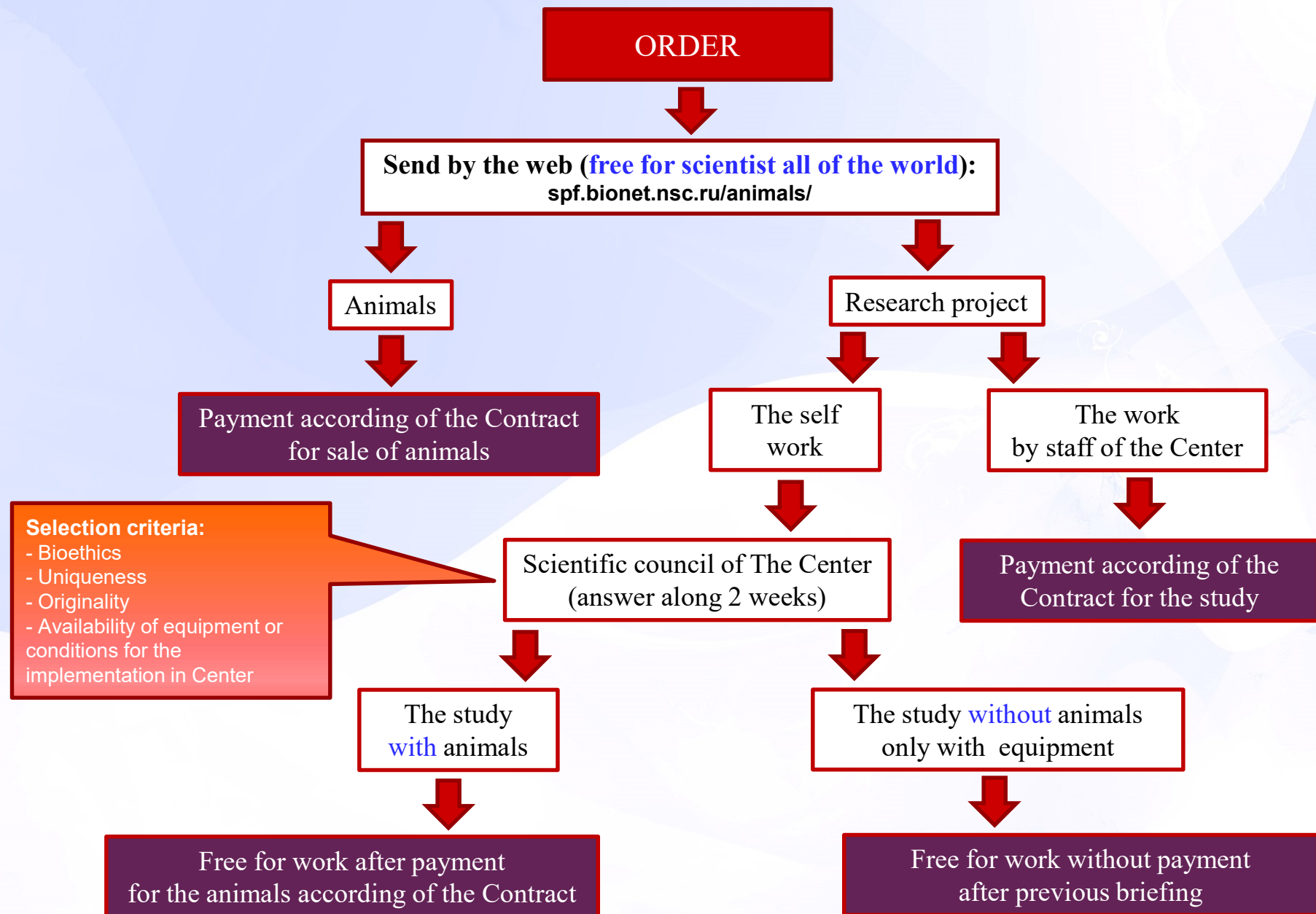


Distribution (%) of research project

- 2.7. Стороны обязуются сотрудничать в процессе выполнения Договора, для чего будут:
- 2.7.1. Регулярно обмениваться информацией о ходе выполнения работ и перспективах дальнейшего сотрудничества;
- 2.7.2. Принимать к исполнению рекомендации, предлагаемые Сторонами и касающиеся решения поставленных задач и методов проведения работ;
- 2.7.3. Если в процессе выполнения исследований выявится целесообразность их проведения, Стороны должны об этом проинформировать друг друга.



# Application regulation of order in the Center Genetic Resources of Laboratory Animals





# Unique Features of the Center Genetic Resources (CGR) of Laboratory Animals

**CGR has full technological list of mouse collection include the support, development and study:**

## ***Breeding***

Assisted reproductive technology (ART)

Cryopreservation

Monitoring of pathogens (full list of FELASA)

Rederivation

Control of Genotype

***Full cycle of transgenes*** from gene to the mouse

## ***Phenotyping***

Wide list of behavioral tests

Body composition

Blood pressure

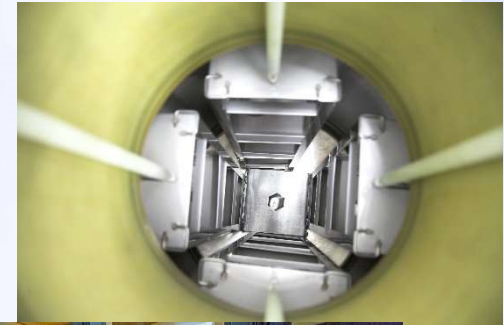
Immunocompetence

Endocrinology

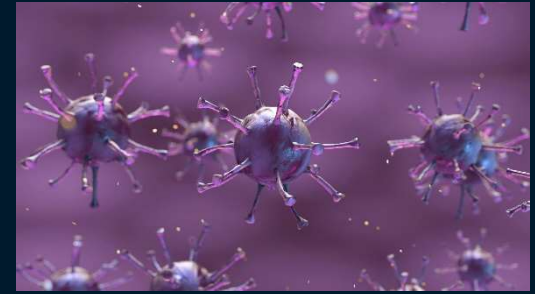
Magnetic resonance imaging

Magnetic resonance spectroscopy *in vivo*

Etc.



# Response to actual challenges - COVID-19



**Request to** Jackson Laboratory (JAX)  
for hACE2 transgenic mouse model of COVID-19

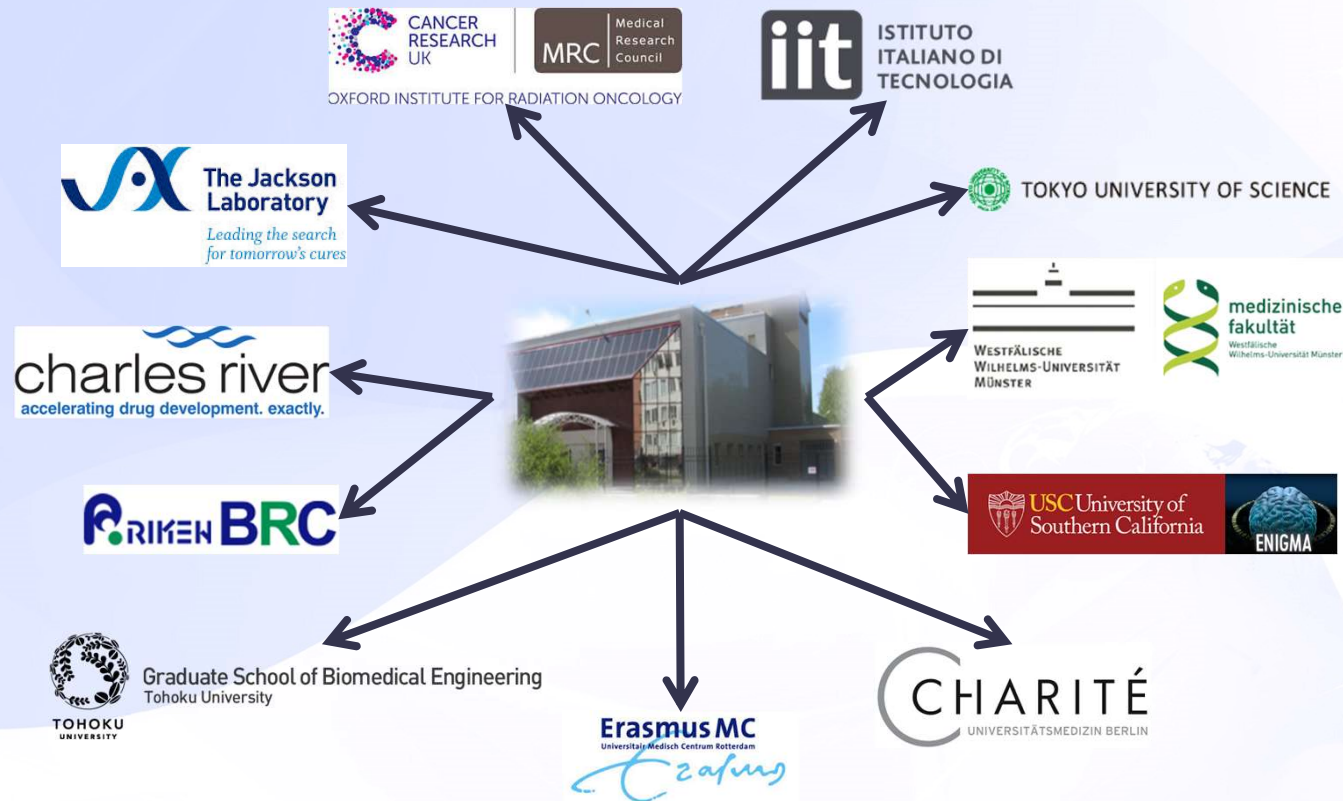
**Producing** of humanized mouse susceptible to COVID-19

**Mouse models** of pneumonia

**Assessment** of lung function under therapy:

- Head over and whole body plethysmography
- Circadian rhythms of oxygen consumption and CO<sub>2</sub> production
- Cold induced maximal oxygen consumption
- Histological study of lung inflammation
- Pro inflammatory cytokines etc.

# International cooperation



# Information about Center Genetic Resources are on sites:

<http://spf.bionet.nsc.ru/>

<http://ckp-rf.ru/usu>

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