RESEARCH TRAINING PROGRAM

I. General Information

Title of the research project:
The role of GABAergic interneurons during focal seizure onset

Name and address of the department:
AmadeoLAB, Via Amadeo, 42, 20133 Milano MI

Student's supervisor:
Prof. Marco Mauri
Co-supervisor: Dr. Marco de Curtis
Tutor in clinical activity: Dr. Paolo Scalmani

II. Description of the project

Background
What is the aim of the project?
What techniques and methods are used?
When did the department start working on this project? (year)
Focal seizures are the expression of perturbed excitability triggered by the pathological synchronization of a functionally altered group of neurons. It is often stated that seizures are due to the disruption of the balance between excitation and inhibition, but this postulation does not consider alternative hypotheses, like the synchronizing role of GABAergic networks.
Previous works demonstrated that GABAergic interneurons have an active role in starting and shaping focal seizure, so the aim of the project is to understand the role of interneuronal GABAergic networks in controlling seizure dynamics. To verify this thesis, we will perform patch-clamp recording (a technique used in electrophysiology to study currents in in living cells) on GABAergic interneurons in mouse brain slices.
The department stated working on this project in 2021.

Type of research project:
☒ Basic science ☐ Clinical research without lab work ☐ Clinical research with lab work

III. Student's involvement

The student will mainly observe	☐ YES ☒ NO
The student will observe the experiments but will be involved in data analysis	☐ YES ☒ NO
The student will take active part in experiments ("lab work")	☒ YES ☐ NO
The student will take active part in clinical examination (clinical research)	☐ YES ☒ NO
The student will be allowed to work with patients	☐ YES ☒ NO

What are the tasks expected to be accomplished by the student?
The student will learn basic laboratory techniques, s/he will help in preparing and performing experiments, in data analysis and interpretation. S/he will learn to prepare solutions, to work in an animal facility, s/he will perform patch-clamp recording.

What is expected from/what will be the general outcome of the student?
☐ To prepare a poster / presentation / scientific report / abstract
☒ The student's name will be mentioned in a future publication
☒ Opportunity to present together with the supervisor the results on a conference
☐ No specific outcome is expected

IV. Requirements

What skills are required from the student?
Ability to work in team, collaboration and communication skills, knowledge of Scientific English.

Is there any special knowledge or a certain level of studies needed?
☒ Subjects passed:
Neurology (required), neurophysiology (required)

☐ Previous experience with:
_____

☒ Certificate of:
Online course "Elementi base per l'approccio dei ricercatori all'utilizzo degli animali a fini scientifici"

☐ None

Are there any legal limitatons in the student's involvement in the project? ☒ YES ☐ NO
If yes, what are the limitations?
As the project involves working on *in vitro* tissue obtained from experimental animals, the authorization by the administration and a certificate of attendance to a course on prevention and risk assessment in an animal facility are needed and steps to achieve both documents are planned.

For the use of students considering participating in the project, further information can be found from the following references:

1. M. de Curtis, L. Librizzi, L. Uva, V. Gnatkovsky, *$GABA_A$ receptor-mediated networks during focal seizure onset and progression in vitro*, Elsevier 2019
2. Devisnky, de Curtis *et al*., Epilepsy, Nature Reviews Disease Primer 2018
3. Librizzi, Losi *et al., Interneuronal Network Activity at the Onset of Seizure-Like Events in Entorhinal Cortex Slices,* J. Neurosci 2017

V. Schedule

Duration of the project:

☐ 1 month ☐ 2 months ☒ 3 months

There are approximately __6____ hours of work per day.

Available months:

☒ January	☒ February	☒ March	☒ April	☒ May	☒ June
☒ July	☒ August	☒ September	☒October	☒ November	☒December

How many students can you accept to the project at the same time? 1

Special remarks:
(e.g., students should bring a stethoscope and a white coat, any vaccinations required, etc.)

Standard personal safety procedures for Covid pandemic

NOTE: a scientific report is required at the end of the program