



# Università degli Studi di Ferrara

RIPARTIZIONE RICERCA  
Ufficio Ricerca Internazionale

**AI MAGNIFICO RETTORE**

**SEDE**

**Iniziative di Internazionalizzazione di Ateneo – Anno 2012**  
**Scheda per la presentazione del progetto**

Il sottoscritto Prof. Luca Nicola Ferraro chiede l'assegnazione di un contributo di € 12800,00 per l'avviamento del progetto sotto descritto, a valere sui fondi di Ateneo 2012 per la promozione di iniziative di internazionalizzazione.

**DESCRIZIONE PROGETTO**

**TITOLO:**

INITIATIVE FOR THE ESTABLISHMENT OF "EUROPEAN NETWORK ON BRAIN RECEPTOR HETEROMERS (ENOB RH)".

**1) Partner stranieri e internazionali:**

- **Karolinska Institute**, Department of Neuroscience, Stockholm, Sweden- Prof. Kjell FUXE and Dr. Dasiel BORROTO ESCUELA.
- **University of Málaga**, Department of Human Physiology and Physical Educacion, Málaga, Spain. - Prof. Zaida DIAZ CABIALE.
- **University of Barcelona**, Department of Experimental and Therapeutic Pathology, Barcelona, Spain. - Prof. Francisco CIRUELA.
- **Jagiellonian University**, Medical College, Department of Toxicology, Faculty of Pharmacy, Krakow, Poland. – Prof. Malgorzata FILIP.
- **University of Heidelberg**, Central Institute of Mental Health (ZI), Institute of Psychopharmacology, Mannheim, Germany. – Prof. Rainer Spanagel.
- **University of Montpellier2**, Neurobiology department of the Institute of Functional Genomics, CNRS, Montpellier, France. – Prof. Laurent FAGNI.

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- **Max Delbrück Center for Molecular Medicine (MDC)**, Berlin, Germany. - Prof. Michael BADER.

## Partner nazionali

- **University of Ferrara**, Department of Medical Sciences. - Prof. S. TANGANELLI.
- **University of Ferrara**, Department of Medical Sciences. - Prof. T. ANTONELLI.
- **University of Ferrara**, Department of Life Sciences and Biotechnology. - Dr. M.C. TOMASINI.
- **University of Ferrara**, Department of Medical Sciences. - Dr. S. BEGGIATO.
- **University of Palermo**, Department of Experimental Biomedicine and Clinical Neuroscience. Prof. Natale BELLUARDO.
- **IRCCS**, Venice. – Prof. Luigi Francesco AGNATI.

## 2) Obiettivi del progetto e risultati attesi:

Fase di avviamento (per la quale si richiede il finanziamento; max 500 parole):

### Objectives

The main aim of the project is to establish the “European Network on Brain Receptor Heteromers (ENOBHR)”. The purpose of the first phase (start-up) is to constitute the “core” of a larger European network involving 20-25 Countries, to apply for a COST (European Cooperation in the field of Scientific and Technical Research) Action (<http://www.cost.eu>). In this first phase we will: *a)* define common ideas and scientific strategy for the understanding of the role of receptor heteromers in the central nervous system; *b)* identify other laboratories of excellence to contact and involve in the project. This will be realized by means of few meetings and visits between the researchers indicated above and will permit to undertake joint initiatives for the submission of research grant applications in response to International/European Community calls.

Due to the number of participants, in case of funding from the University of Ferrara, Prof. M. Bader (Berlin, Germany) will contribute to some meeting expenses (see his letter of intent). This ensures the economic feasibility of the project.

### Background

It has been underlined that receptor heteromers with allosteric receptor-receptor interactions increases the diversity of G-protein coupled receptor recognition and signaling. An alteration in specific receptor-receptor interactions is considered to play a role in pathogenic mechanisms leading to several diseases (Parkinson’s disease, hypertension, schizophrenia, addiction,

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depression). The understanding of the role of these mechanisms in brain functions will have a major impact on medicine. In particular, it will likely lead to novel strategies for drug discovery and treatment of diseases with a benefit for Public Health.

## **Reasons for funding requirement**

By pooling knowledge from various European laboratories of the neuroscience field we can identify and characterize the pathophysiological conditions where brain receptor heteromers are dysfunctional and/or disrupted through ongoing basic and translational research. The funding requested for this start-up phase of the project is necessary for this action since it would make possible the organization of meetings and short-term scientific missions, thus laying the foundation of the “core” of a larger European Network on brain receptor heteromers (ENOBHR) and the submission of competitive European applications. There is a need for an expert network in the brain receptor heteromer in order to increase the quality of research in this novel field. The aim is to make the University of Ferrara a leader part in this field of highest relevance for molecular medicine especially in the CNS. This objective cannot be achieved without the network. Some funds are required to involve in the network other laboratories of excellence.

## **Expected results from the first phase**

1. To promote the constitution and the activities of the network by organizing a start-up meeting period (2 days); during this meeting other laboratories of excellence to involve in the project will be identified.
2. To organize scientific missions of short duration (5 days) during which some researchers and/or PhD students will exchange their scientific skills;
3. To organize a final workshop (2 days) in which common research strategy and multilateral research project proposals will be planed.

Fase successiva a quella di avviamento (per la quale non si richiede il finanziamento; max 500 parole):

## **Objectives**

The purpose of the second phase of the project is:

1. to finalize the activities of the first phase with the involvement of other laboratories of excellence and the preparation of a project to submit for a COST Action;
2. to possibly create a Website as the single most important constantly functioning tool of communication and outreach of the network, containing information about all the activities of the groups and creating a milieu for researchers involved in the project to share their progress, questions, achievements and results. The Website will be available to all researchers affiliated to the University of Ferrara, in order to also improve possible new collaborations.
3. to perform pilot experiments supporting future research project proposals. Major items in our work-plan are: a) Brain receptor heteromers and innovative tools and technologies; b) Brain receptor heteromers and schizophrenia; c) Brain receptor heteromers and Parkinson’s disease; d) Brain receptor heteromers and drug addiction; e) Brain receptor heteromers and depression; e) Brain receptor heteromers and their intercellular transfer.
4. to identify suitable funding sources (national and international).

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## Expected results

From the development of this second phase, we expect to create solid scientific basis to apply for international funding calls such as those banned by European Union (i.e. COST Actions), especially in view of the next Horizon 2020 calls.

## Costs

The costs of the second phase are actually difficult to quantify without first product preliminary data and the establishment of the most convenient strategies (first phase). The researchers involved in the project have all the equipment for developing the proposed program. Possible sources of funding for the second phase of the project are local (University), National (each Country involved; i.e. Italian PRIN; French National Funding Agency for Research; Swedish Medical Council; DFG Deutsche Forschungsgemeinschaft - German Research Foundation, etc...) and International grants (i.e. Human Frontiers Science Program, Parkinson's Disease Foundation; ERA-NET NEURON II; etc...).

Il proponente dichiara che (barrare la casella che interessa):

- il progetto non ha mai ricevuto contributi sul bando di Ateneo per la promozione di iniziative di internazionalizzazione .
- il progetto è già stato finanziato sul bando di Ateneo per la promozione di iniziative di internazionalizzazione – Anno \_\_\_\_\_; si allega relazione sulle attività già svolte, con motivazione del mancato avviamento del progetto e della richiesta di contributo per completare la fase di avviamento.

**3) Il progetto potrà avere ricadute positive sui seguenti indici di internazionalizzazione della didattica e della ricerca richiamati dal Piano Strategico Triennale di UniFe (barrare le caselle che interessano):**

- Sostegno alla mobilità didattica in uscita

per le seguenti ragioni: .....

- Aumento degli studenti stranieri iscritti

per le seguenti ragioni: .....

- Creazione di percorsi didattici internazionali

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per le seguenti ragioni: .....

Creazione reti di eccellenza

per le seguenti ragioni:

The project aimed to establish the “European Network on Brain Receptor Heteromers (ENOBRRH)”. The ENOBRRH network, by promoting a free exchange of new ideas and training opportunities, can help researchers afferent to the University of Ferrara by performing basic and translational research in Neuroscience on BRHs. The value of this action comes from the multidisciplinary composition of the European network involved and the high potential for drug development through novel strategies for drug discovery and treatment of disease based on the special pharmacology of each receptor heteromer. The researchers involved in this project are some of the principal experts in receptor heteromer field, including Prof. Kjell Fuxe and Luigi Agnati that took the first steps by demonstrating receptors-receptor interactions by monoamine and neuropeptides in the early '80. Prof. L. Ferraro has a long-time expertise in the field of receptor-receptor interaction and receptor-heterometers, as evidenced by several scientific publications on this topic in peer-reviewed journals. We have, in this project, expertise in bioinformatics, biochemistry, molecular and cell biology, neurochemistry, in vivo and in vitro (patch-clamp) electrophysiology, proteomic, generation of transgenic rats, *in vivo* and *in vitro* neuropsychopharmacology, neuroimaging (MRI, fMRI and PET), quantitative imaging (FRET, BRET, FCCS, BiFC), animal models of Parkinson's Disease, schizophrenia, depression and drug addiction, and in clinical research in these brain diseases. The immediate benefit will be through sharing of various technologies and know-how and increased possibilities for collaborations between the participants of the network.

Accesso ai canali europei e internazionali di finanziamento della ricerca

per le seguenti ragioni:

The first phase formation of the European network in Ferrara could highly enhance the possibility to get a COST (European Cooperation in Science and Technology) application for a large European network on heteromers. Furthermore, international cooperation will be an important cross-cutting priority of Horizon 2020. Thus, the constitution of the proposed European network will strongly improve our chances to successfully apply to next European calls. Globally, the project is aimed at European scientific/technological advance. It will search for a maximally productive outcome mainly through increased collaborative efforts, knowledge sharing and quality of the scientific publications from the different laboratories of the network and the writing of European research applications. Furthermore, this project will give to the researchers of the University of Ferrara the opportunity to access to funding applications from other Countries (*i.e.* French National Funding Agency for Research; Swedish Medical Council; DFG Deutsche Forschungsgemeinschaft - German

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Research Foundation, etc...) and International grants (i.e. Human Frontiers Science Program, Parkinson's Disease Foundation, etc...).

## 4) Costo del progetto per la sola fase di avviamento:

Costi di mobilità personale italiano

Ruolo	n.	Durata complessiva * (in giorni)	Previsione di spesa €
Professore ordinario	2	2 + 2 days (1 start-up meeting and 1 final workshop)	Total: €1500 2x€350 travel expenses; 2x€400 accommodation and meal expenses
Professore associato	1	5 days: Stockholm (Sweden) 5 days: Barcelona (Spain) 4 days (Laboratories not actually involved in the project, to create new collaborations).	Total: €2650. €250 air ticket; €450 accommodation and meal expenses (Stockholm); €150 air ticket; €400 accommodation and meal expenses (Barcelona); 2x€700 (other Countries).
Personale tecnico			
Ricercatore	1		
Dottorando di ricerca		5 days: Barcelona (Spain)	Total: €550. € 150 air ticket; €400 accommodation and meal expenses.
<b>TOTALE</b>	<b>4</b>	<b>24</b>	<b>€4700</b>

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## Costi di mobilità personale straniero

Ruolo	n.	Durata complessiva * (in giorni)	Previsione di spesa €
Professore ordinario	5	2 + 2 days (1 start-up meeting and 1 final workshop)	Total: €6500 2x€350 air tickets; 2x€300 accommodation and meal expenses (each person)
Professore associato			
Personale tecnico			
Ricercatore	1		Total: €1100 2x€250 air tickets; 2x€300 accommodation and meal expenses
Altro (specificare)			
TOTALE	6	4	Total: €7600

## Costi di mobilità studenti

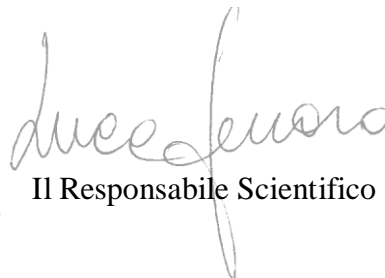
	n.	Durata complessiva * (in giorni)	Previsione di spesa €
Studenti italiani			
Studenti stranieri			
TOTALE			

## Altri costi:

Descrizione attività	Previsione di spesa €
Overheads meeting organization (2 meetings)	€500
TOTALE	

\* (sommare tutte le mobilità)

Ferrara, December 12, 2012

  
Il Responsabile Scientifico

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## **Allegati:**

- dichiarazione di interesse da parte di ciascuno dei partner elencati al precedente punto 1;
- (*solo per i progetti già finanziati su una precedente edizione del presente bando*) relazione indicante le attività già realizzate e le ragioni in base alle quali si richiede un ulteriore contributo per l'avviamento del progetto.

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KAROLINSKA INSTITUTET  
Department of Neuroscience

To:

Whom it may concern

I wish to express my interest in participating in a grant from the University of Ferrara (Dr. L. Ferraro) supporting the constitution of an European network on receptor heteromers.

As we intend to apply for the COST program 2013-14, the formation of the partial European network in Ferrara could help in getting the COST proposal accepted for a large European network on receptor heteromers approved in the next future.

Stockholm , December 7, 2012

Kjell Fuxe

Professor, MD

Department of Neuroscience

Karolinska Institutet

Stockholm

Sweden

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Instytut Farmakologii  
Polskiej Akademii Nauk

INSTYTUT FARMAKOLOGII  
POLSKIEJ AKADEMII NAUK  
ul. Smętna 12  
31-343 Kraków  
**Dyrektor**  
telefon: (12) 662 32 96  
(12) 637 48 93

**Centrala**  
telefon: (12) 662 32 20  
(12) 637 40 22  
fax: (12) 637 45 00  
**e-mail:** ifpan@if-pan.krakow.pl  
www.if-pan.krakow.pl

Kraków, 10.12.2012 r

Dear Dr. Luca Ferraro,

I am available to participate in the formation of the European network on receptor-receptor interaction.

Your sincerely

Małgorzata Filip  
Laboratory of Drug Addiction Pharmacology  
Institute of Pharmacology  
Polish Academy of Sciences  
Kraków,  
Poland

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Luigi Francesco Agnati, Wednesday, No Subject

Page 1 of 1

Delivered-To: frl@unife.it.test-google-a.com  
Authentication-Results: mx.google.com; spf=pass (google.com: domain of frl@unife.it designates 192.167.219.2 as permitted sender) smtp.mail=frl@unife.it  
X-Original-To: frl@unife.it  
Delivered-To: frl@unife.it  
From: "Luigi Francesco Agnati" <luigiagnati@tin.it>  
To: "Luca Ferraro" <frl@unife.it>  
Subject:  
Date: Wed, 5 Dec 2012 12:56:04 +0100  
X-Mailer: Microsoft Office Outlook 12.0  
Thread-Index: Ac3S34CLEU7Hx+WpQuyZ12L/3DZVNw==  
X-Sophos-ESA: [trita.unife.it] 3.6.13.2, Antispam-Engine: 2.7.2.1390750, Antispam-Data: 2012.11.17.35116

To whom may be concerned,

I am really interested in participating in a grant from the University of Ferrara supporting travel and meeting between European researchers in order to promote internationalization initiatives.

The main field of common investigations of our groups is on Rec-Rec Interactions and University of Ferrara has given thanks to Prof. Tanganelli and Ferraro important contributions to the field.

Luigi Francesco Agnati  
Emeritus of Human Physiology University of Modena, Italy  
Adjunct Professor Karolinska Institutet Stockholm, Sweden



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HERZ-KREISLAUFFORSCHUNG  
Bluthochdruck und Nierenkrankheiten

## MDC

MAX-DELBRÜCK-CENTRUM  
FÜR MOLEKULARE MEDIZIN  
BERLIN-BUCH

in der  
HELMHOLTZ-GEMEINSCHAFT e.V.

Prof. Dr. Michael Bader  
MDC Berlin-Buch, Robert-Rössle-Straße 10, 13125 Berlin-Buch

Dr. Luca Ferraro  
Associate Professor of Pharmacology  
Dept. of Life Sciences and Biotechnology,  
University of Ferrara, Italy.  
Via Fossato di Mortara 17-19

Robert-Rössle-Straße 10  
13125 Berlin-Buch

Telefon: +49-30 / 9406-2193  
Sekretariat: -2119  
Telefax: +49-30 / 9406-2110  
E-Mail: [mbader@mdc-berlin.de](mailto:mbader@mdc-berlin.de)  
Internet: <http://www.mdc-berlin.de>

Berlin, den 05.12.2012

### Letter of Intent

Dear Dr Ferraro,

I am happy to participate in the European network you plan to apply for funding at the University of Ferrara. In case of funding from the University of Ferrara, I will contribute to some organizing expenses.

Prof. Dr. Michael Bader

Stiftung des öffentlichen Rechts  
Stiftungsvorstand:  
Prof. Dr. Walter Rosenthal, Cornelia Lanz

Berliner Sparkasse  
BLZ 100 500 00  
Kto. 195 323 1140



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Fax: (+39) 0532 293459  
E-mail: [fnc@unife.it](mailto:fnc@unife.it)



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## Università degli Studi di Palermo

*Dipartimento di Biomedicina Sperimentale e Neuroscienze Etniche (BioNeE)*  
*Direttore Prof. Giovanni Lamma*

PALERMO, 08/12/2012

Dear Luca Ferraro,

I am available to participate in the formation of the European network on receptor-receptor interaction.

Your sincerely

Natale Belluardo

*Sez. di Fisiologia Umana – corso Tukory, 129- 90134 Palermo*  
*Tel. 0916555849 - Fax 09123860714 E-mail: natale.belluardo@unipa.it, giuseppa.mudo@unipa.it*  
*Direzione: 0916553508 - Amministrazione: 0916553502-3501-3503 - Fax 0916553580*  
*e-mail: bionec@unipa.it*

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**Karolinska  
Institutet**

Institutionen för Neurovetenskap  
Dasiel Borroto-Escuela  
Postdoc  
Dasiel.Borroto-Escuela@ki.se

Stockholm, 10<sup>th</sup> of November, 2012.

Dear Dr. Luca Ferraro,

This letter is to certify my intention and willingness to participate in an European Receptor-Receptor Interaction Network.

Sincerely,

Dasiel O. Borroto-Escuela, PhD, MBA.  
Division of Cellular and Molecular Neurochemistry  
Department of Neuroscience  
Karolinska Institutet  
17177 Stockholm  
Sweden

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Francisco Ciruela Alférez, PhD  
*Associate Professor of Pharmacology*

Unitat de Farmacologia  
Departament de Patologia i Terapèutica  
Experimental  
Facultat de Medicina (Campus Bellvitge)  
Av. Feixa Llarga, s/n  
08907 L'Hospitalet del Llobregat  
Barcelona, Spain  
Tel: +34-934024280/+34-934035820  
Fax: +34-934029082  
E-mail: fciruela@ub.edu



Monday, 10 December 2012

Dr. Luca Ferraro  
Dept. of Life Sciences and Biotechnology  
University of Ferrara  
Italy

Dear Colleague,

The purpose of this letter is to acknowledge my support and enthusiastic commitment to participate in the formation of the European network on receptor-receptor interaction.

Yours sincerely,

Dr. Francisco Ciruela

A





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**Departamento de Fisiología  
Facultad de Medicina  
Universidad de Málaga**

To whom it may concern,

I am really interested in participating in a grant from the University of Ferrara (Dr. L. Ferraro) supporting the constitution of an European network on receptor-receptor interactions.

December 7, 2012

Zaida Díaz Cabiale

Associate Professor of Physiology

Faculty of Medicine

University of Málaga, Spain

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**Institut de Génomique Fonctionnelle**

CNRS UMR5203 – INSERM U861 – Université Montpellier I – Université Montpellier II



Laurent FAGNI, Ph.D.  
Research Director CNRS  
Director of the Department of Neurobiology

Dr. Luca Ferraro  
Associate Professor of Pharmacology  
Dept. of Life Sciences and Biotechnology,  
University of Ferrara, Italy.  
Via Fossato di Mortara 17-19

Montpellier, December 9th 2012

Dear Colleague,

I am available to participate in the formation of the European network on receptor-receptor interaction.

Your sincerely

Laurent Fagni

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Zentralinstitut für Seelische Gesundheit



Landesstiftung  
des öffentlichen Rechts

Zentralinstitut für Seelische Gesundheit · J 5 · 68159 Mannheim

To whom it may concern

**Institute of Psychopharmacology**

**Director:**  
**Prof. Dr. Rainer Spanagel**

J5 • D-68159 Mannheim

Telefon: 0621 / 1703 – 6251

Telefax: 0621 / 1703 – 6255

E-Mail: [rainer.spanagel@zi-mannheim.de](mailto:rainer.spanagel@zi-mannheim.de)

Homepage: [www.zi-mannheim.de](http://www.zi-mannheim.de)

Mannheim, den 14.6.2012

I wish to express my interest in participating in a grant from the University of Ferrara (Dr. L. Ferraro) supporting the constitution of an "European Network on Brain Receptor Heteromers (ENOBH)".

Prof. Dr. Rainer Spanagel

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