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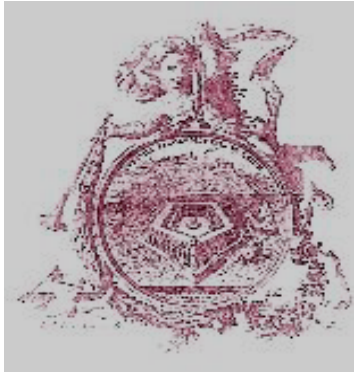
Università degli Studi di Roma

I.C.Em.B.

La Ricerca Bioelettromagnetica in Europa nell'ambito del V Programma Quadro

G. D'Inzeo
ICEmB @ Università "La Sapienza" di Roma

Ancona, 16-19 Settembre 2002



XIV RiNEm
Quattordicesima Riunione Nazionale di Elettromagnetismo

INTERUNIVERSITY CENTRE FOR THE STUDY OF INTERACTIONS between ELECTROMAGNETIC FIELDS and BIO–SYSTEMS

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To Promote, support and coordinate scientific research in the field of the interaction between electromagnetic and bio-systems at molecular, cellular and organism level.

University Units
- Ancona
- Bologna
- Genova
- L'Aquila
- Milan
- Modena
- Naples
- Palermo
- Pavia
- Rome "La Sapienza"

Associated University
- University of Basilicata
- University of Ferrara
- University of Parma
- University of Perugia

Associated Units
- CNR CIB (Mlan)
- CNR ICE (Genoa)
- CNR INeMM (Rome)
- CNR IREA (Naples)
- ENEA (Rome)
- IGEA (Carpi, Mo)
- IRST (Trento)
- ISS (Rome)
- RAI (Research Center, To)
- TiLab (Turin)

International Projects

WHO EMF Project

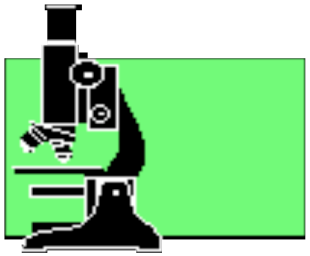
1996 – 2001 (extended to 2006)
WHO and 40 institutions
(National Governments and International Organizations)

- review of literature on EMF's biological effects
- identification of research gaps to fill or full-fill
- creation of an integrated plan for new research projects
- health risks assessment based on results
- support to the standardization of provisions
- advisory for National governments and non governmental bodies

Aimed at: Governments, ICNIRP and independent scientific institutions
Finds: 600 thousand USD each year

Answers

- Answers come from various approaches:
  - Dosimetry



  - Laboratory studies (humans, animals, cells)

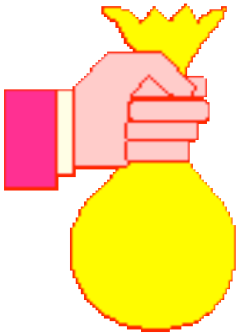
  - Epidemiology

Who is doing the research?

- Agencies and Foundations (WTR,Verum, etc.)
- Universities and Research Lab.
- Companies (Motorola, FT, DT, TiLab, etc.)

Who is sponsoring the research?

- Companies (Motorola, FT, TiLab etc.)
- States (Finland, France, Australia, Italy, UK etc.)
- Organisations (FGF, Elettra 2000, etc.)
- European Union

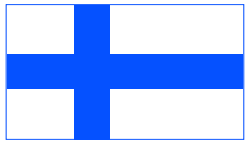
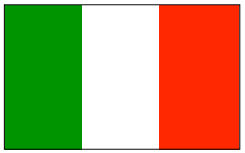
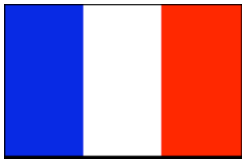


International Projects

COST 244 and 244 bis – 1997-2000
EU: DG XIII
Study: EMFs biomedical effects
Funds: 800 k€
Aimed at: 360 researcher from 137 public and private institutions

COST 281 – 2001-2004
EU: DG Science
Study: Potential Health Effects from Emerging Wireless Communication Systems
Funds: 600 k€

National programmes

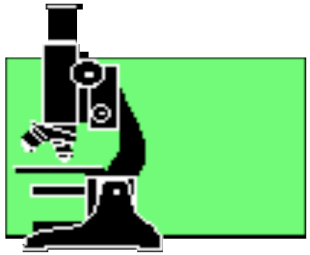
- Finland 
- Italy: MURST, Elettra 2000 
- Germany: FGF
- France : COMOBIO 

EU Call for proposals

- 5th FrameWork Program
  - Theme 1: Improving the quality of life and management of living resources
    - Key action 4**: Environment and health**
    - § 4.2.1**.** Epidemiological and biomedical **studies to determine possible effects linked to noise,** non-ionizing radiation**, particularly** from cellular phones. (~ 20 M)

Proposals to the EU (first call)

- ca. 12 projects submitted on 8 June 1999
- Accepted projects at Feb. 2000:
  - IARC epidem. study
  - PERFORM A
  - REFLEX
  - CEMFEC



International Projects - V F.P.

INTERPHONE

International Case control Studies of Cancer in Relation to Mobile Telephone Use

2000– 2003

Participating Nations: Australia, Canada, Denmark, Finland, France, Germany, Israel, Italy, Japan, New Zealand, Norway, Sweden, UK, USA

Coordinator: Elisabeth Cardis (IARC)

Italy: Susanna Lagorio and Paolo Vecchia (ISS, Rome /ICEmB)

- **Case-control study: subjects with tumor/controls related to the exposure to EMF emitted by mobile phones (glioma, meningioma, acoustic neurinoma and parotid tumor).**
- **Dosimetry: assessment of exposure during conversation**

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International Projects - V F.P.

REFLEX

Risk Evaluation of Potential Environmental Hazards from Low Energy EMF Exposure using Sensitive in vitro Methods
2000– 2003

Participating Nations: Austria, Finland, France, Germany, Italy, Spain, Switzerland

Coordinator: Franz Adlkofer (Germany)
Italy: Ferdinando Bersani (Univ. Bologna / ICEmB)

- **In vitro experiments high and low frequency**
- **Genotoxic effects, cellular differentiation, gene expression, apoptosis, proliferation, embryo differentiation.**

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Risk Evaluation of Potential Environmental Hazards From Low Energy Electromagnetic Field Exposure Using Sensitive *in vitro* Methods

A project funded by the European Union under the programme
"Quality of Life and Management of Living Resources",
Key Action 4 "Environment and Health":
QLK4-CT-1999-01574

Research Period

February 2000 until August 2003 (43 months)

Funding

EU Commission	Euro	2.059.450
Swiss Government	Euro	506.774
Finnish Government	Euro	191.265
VERUM Foundation	Euro	522.629

Workpackage 1 → **Direct and indirect genotoxic effects**

Workpackage 2 → **Effects on differentiation and function of embryonic and neuronal stem cells**

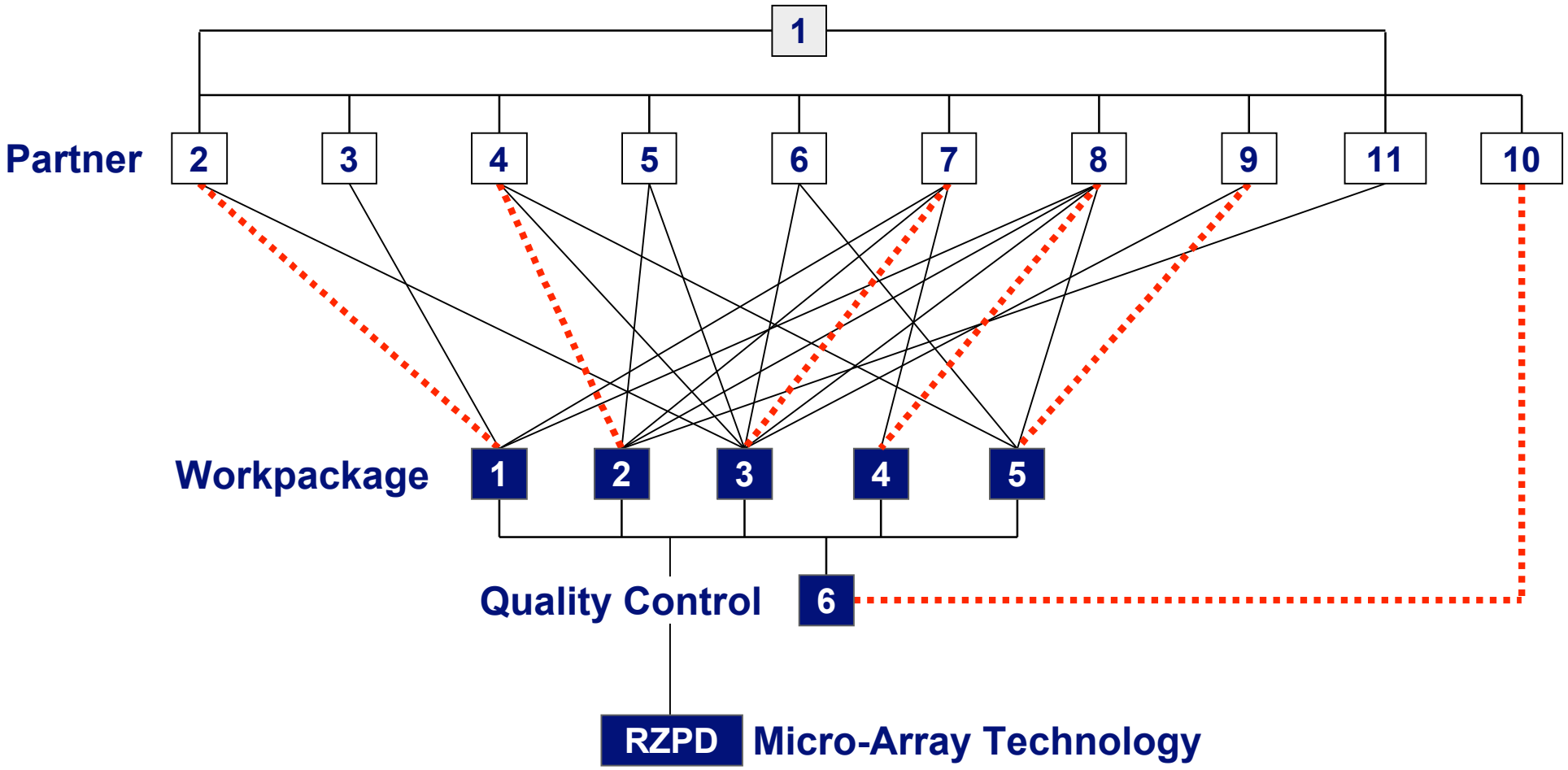
Workpackage 3 → **Effects on gene expression and protein targeting**

Workpackage 4 → **Effects on the immune system**

Workpackage 5 → **Effects on transformation and apoptosis**

Workpackage 6 → **Quality control**

Coordination and Management Committee



International Projects - V F.P.

CEMFEC

Combined Effects of EMF with Environmental Carcinogens
2000– 2002

Participating Nations: Belgium, Finland, Germany, Italy

Coordinator: Jukka Juutilainen (Finland)
Italy: Maria Rosaria Scarfi' (CNR-IREA / ICEmB)

- **In vivo: combined rat exposures to RF (900 MHz) and MX; assessment of parameters related to carcinogenesis**
- **In vitro: same conditions for MURINI fibroblasts exposure with MX and vinclozolin; assessment of oxidative stress, proliferation, apoptosis, gene expression**

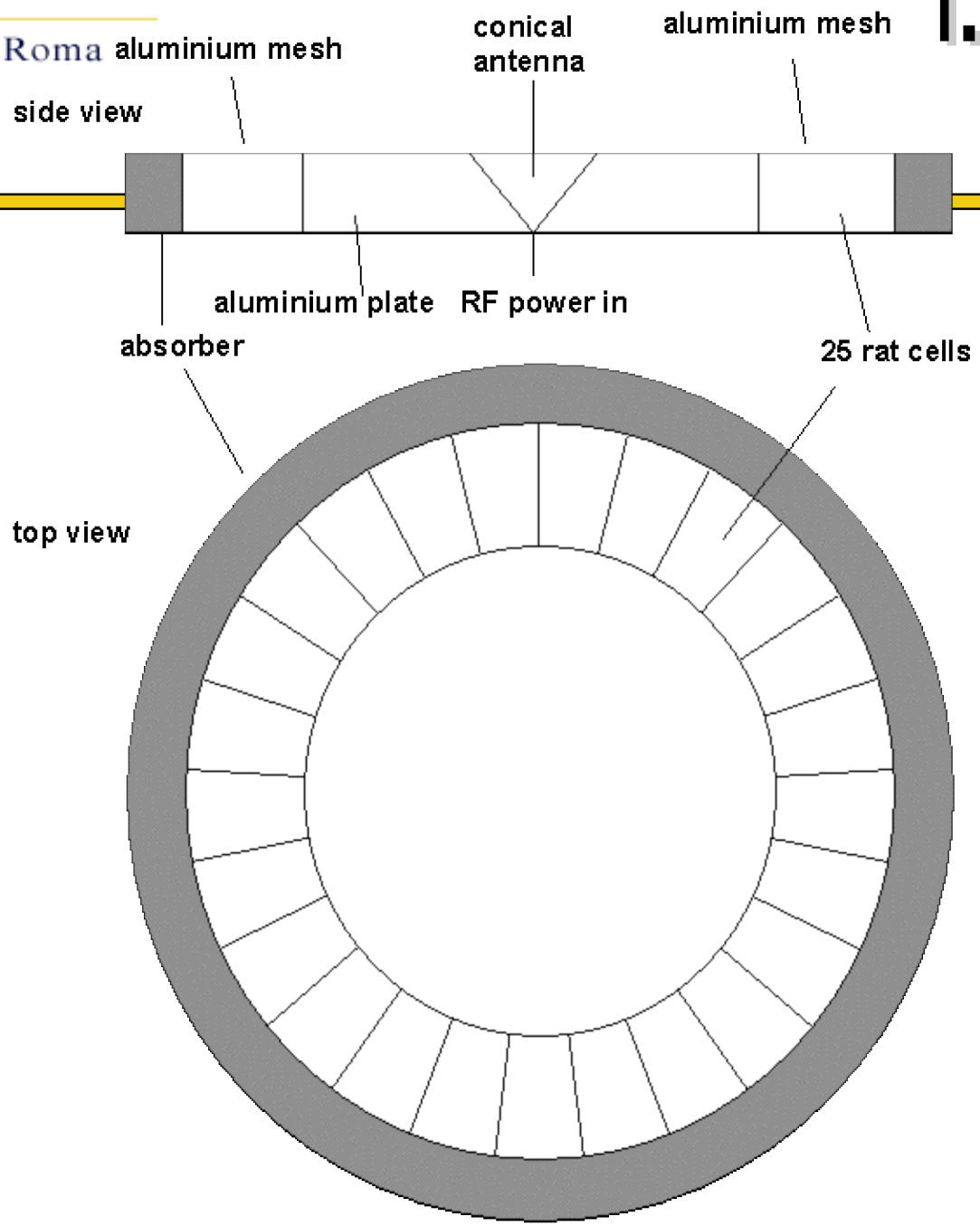
In vivo study

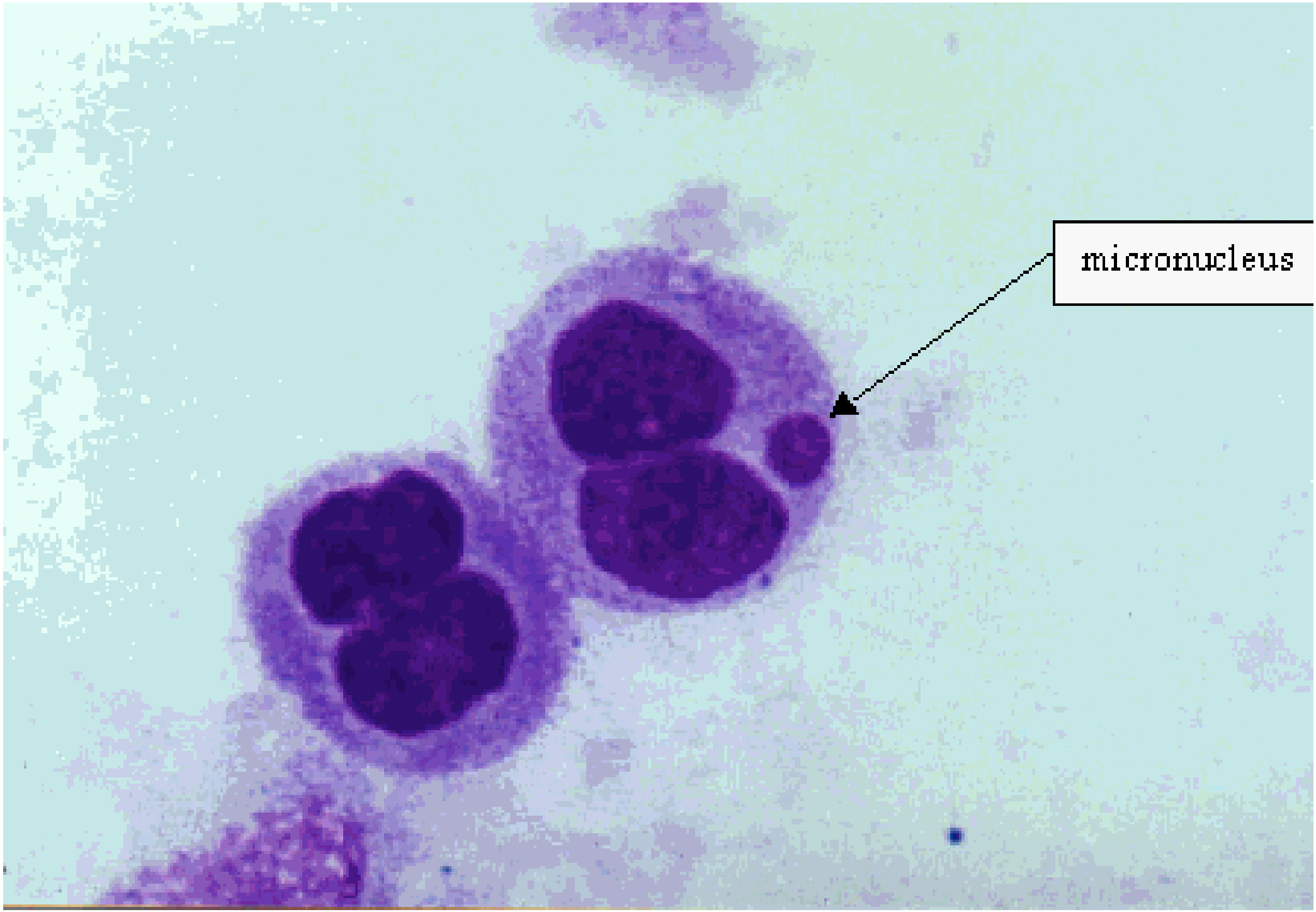
Group		Number of animals
1	Cage-control	72
2	MX +sham RF exposure	72
3	MX+ RF (0.3 W/kg)	72
4	MX+RF (1 W/kg)	72
	Total	*288*

- Female Han:Wistar rats
- RF exposure 2 h/d
- GLP (Good Laboratory Practice)
- Samples for genotoxicity (micronuclei, comet assay)

CEMFEC

Exposure system for animals




micronucleus

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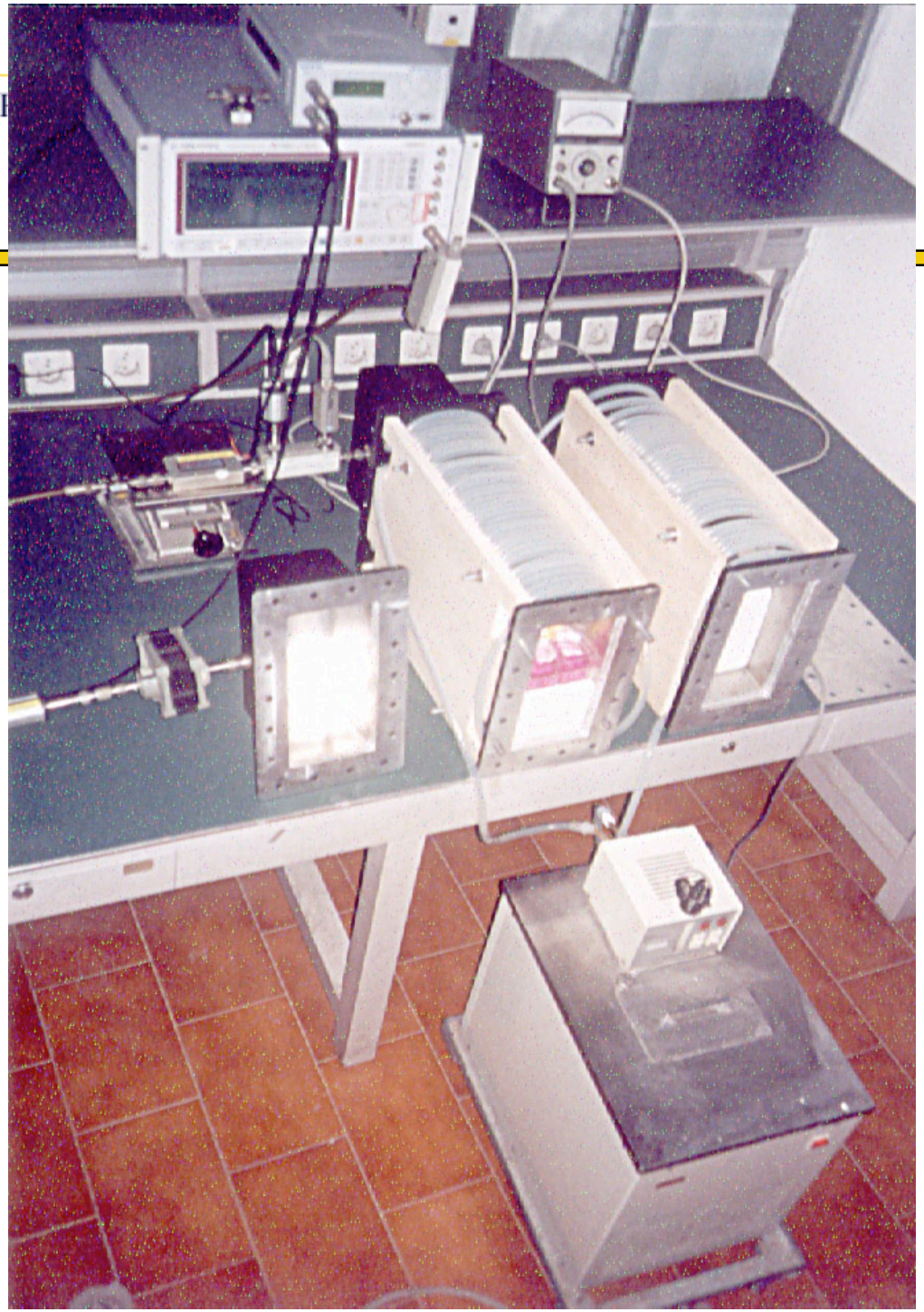
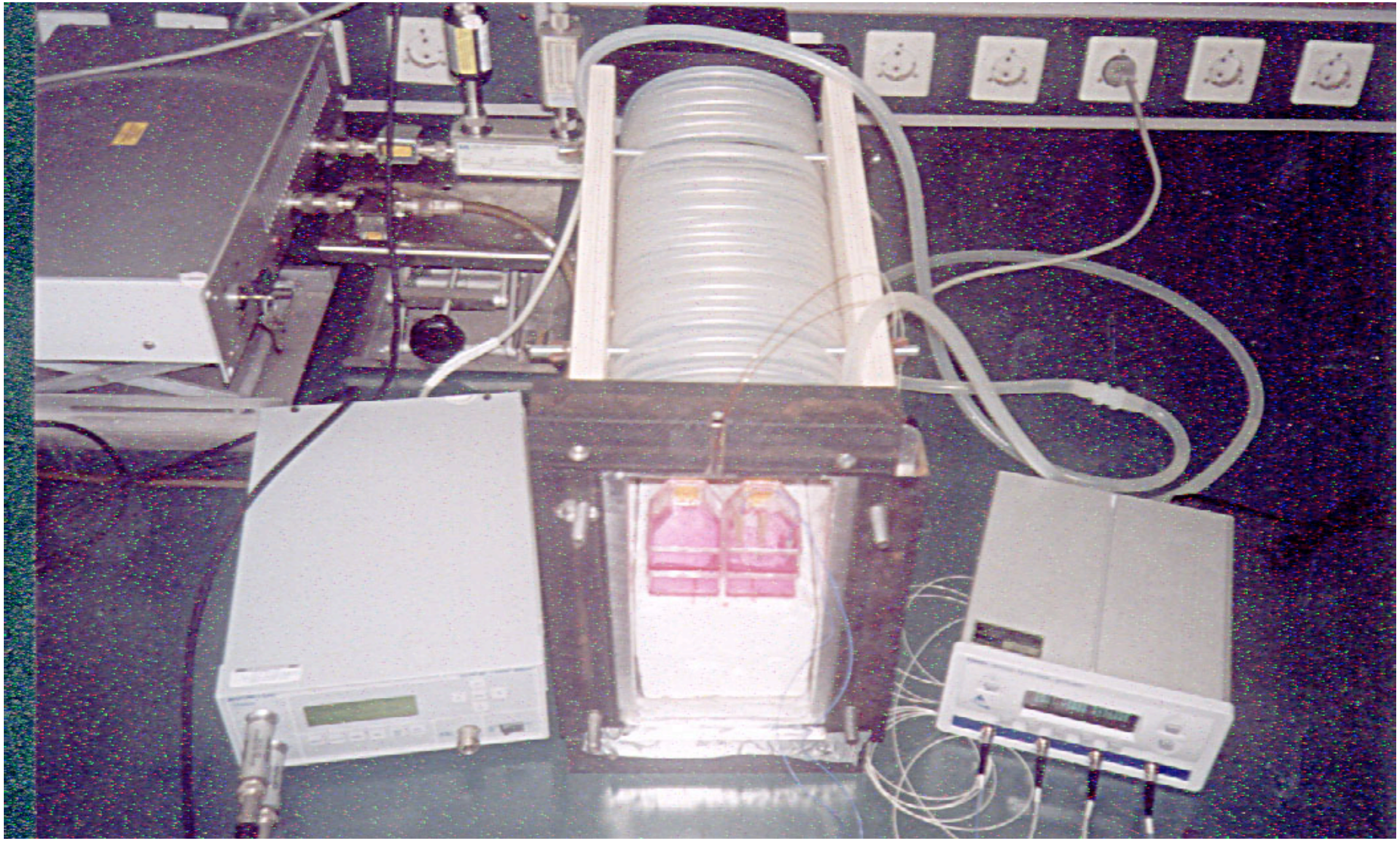




International Projects - V F.P.

PERFORM-A

In vivo Research on Possible Health Effects Related to Mobile Telephones and Base Stations (Carcinogenicity Studies in Rodents)

2001– 2004 (EU / GSMA and MMF)

Participating Nations: Austria, Finland, France, Germany, Greece, Italy, Switzerland

Coordinator: Clemens Dasembrock (Germany)
Italy: Germano Oberto (RCG-RMB, Ivrea)

- **Linphoma induction in transgenic rodents following exposure at 900 MHz GSM (1hr/7 days, 24 months) .**

International Projects - V F.P.

THz-BRIDGE

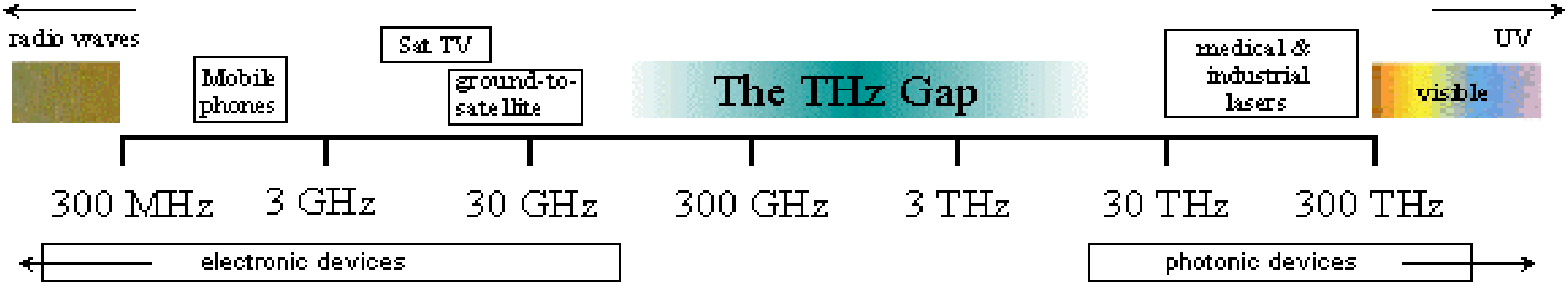
THz radiation in Biological Research:
Investigation on Diagnostics and study of possible Genetic Effects
2001– 2004

Participating Nations: Germany, Greece, Israel, Italy, UK

Coordinator: Gianpiero Gallerano (ENEA/ICEmB) - Italy

- **30 GHz - 30 THz**
- **Biological material (DNA and enzyme proteins) spectroscopy**
- **Genotoxic effects on membrane permeability**

The THz spectral region



- New applications in the fields of material science, telecommunications, biomedicine.
- Biomedical applications are based on the specific spectroscopic characteristics of bio-molecules, which may be used to identify bonds and functions, and can be applied to high-contrast imaging.
- Very little is known of the effects of THz radiation in biological systems. Despite the fact that there is not a wide public exposition to THz radiation with the present state of the technology, a timely assessment of potential hazards at specific occupational sites is required.

International Projects - V F.P.

CLINIPORATOR

A new adaptive generator for DNA electrotransfer in vivo for gene therapy
2000– 2003

Participating Nations: Belgium, Denmark, France, Germany, Italy, Slovenia, Sweden

Coordinator: Luis Mir (France)
Italy: Ruggero Cadossi (IGEA /ICEmB)

- **Development of electric signals aimed at obtaining the maximum cellular permeabilization at minimum damage (liver, muscle, heart, cutis)**

International Projects

PERFORM-B

In vitro and in vivo replication studies related to mobile telephones and base stations

2001– 2004 (GSMA and MMF + National Support)

Participating Nations: Finland, France, Italy (Elettra 2000), Switzerland, UK

Coordinator: Bernard Veyret (France)
Italy: Carmela Marino (ENEA / ICEmB)

- **in vivo: behavioral effects**
- **in vitro: genotoxic effects and on ODC**

International Projects - V F.P.

RAMP 2001

Risk Evaluation of Potential Environmental Hazards from Low Energy EMF on Neuronal Systems from Modeling to Tissues
2002– 2005

Participating Nations: France, Germany, Italy, Sweden, UK

Coordinator: Bruno Bianco (Univ. Genoa / ICEmB) - Italy

- **In vitro experiments high frequency on neurons, neuronal signaling, tissues**
- **Particular attention to modeling and to interdisciplinary approach.**

International Projects - V F.P.

GUARD

Risk Evaluation of Potential Hazards from Electromagnetic Energy Coming from Mobile Phones on Ear Apparatus
2002– 2005

Participating Nations: France, Greece, Hungary, Italy, Lituania, Russia, UK

Coordinator: Paolo Ravazzani (CNR-CIB / ICEmB) - Italy

- **In vitro/In vivo experiments at high frequency on effects of fields coming from mobile phones on ear internal structures**
- **Experiments on animals and human volunteers**

International Projects

CTIA-FDA CRADA CONTRACT

Genotoxic Effects of Electromagnetic Fields Coming from Mobile Phones using micronuclei technique
2001– 2003

Participating Nations: Germany, Italy, USA

Coordinator: Maria Rosaria Scarfì (CNR- IREA, Naples / ICEmB) - Italy

- **Use of Micronuclei technique for evaluation of potential hazards**