

## Consultation on possible topics for future activities for integrating and opening existing national research infrastructures

Title	
Title of the proposal -open reply-(compulsory)	European PeptLab Infrastructure (EPLI): design, synthesis and analysis of peptides.
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Organisation -open reply-(compulsory)	
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Is your proposal representing your own personal view or are you responding on behalf of your organisation as a whole? -single choice reply-(compulsory)	Personal view
Description of the research infrastructures covered and the trans-national access and /or services provided	
<p>Indicate the type of research infrastructures to be covered by the proposed topic, and list the research infrastructures in Member States, Associated Countries and Third Countries, that would provide transnational access and/or services to researchers, with brief descriptions of the state-of-the-art equipment and services offered to users that make them rare or unique in Europe. Outline the specific areas of research and scientific communities normally served by the infrastructures, as well as new areas opening to users, if any. Indicate what would be the overall access modalities necessary to be developed. Text of maximum 4000 characters including spaces.</p>	
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<p>This project is focused on a large unmet need: a pan-European infrastructure coordinating and integrating competences and, most importantly, access to facilities finalized to support peptide-based research projects in life and material sciences both at the academic and industrial level. Within these projects, peptides will be fundamental molecules for drug discovery, diagnostics development, innovation in environmentally friendly catalysis. Objective of this proposal is the establishment of the European Infrastructure of Peptide Chemistry &amp; Biology to open the most excellent Laboratories in the peptide field in the different Member States and in some associated countries (PeptLab@country): - The Interdepartmental Laboratory of Peptide &amp; Protein Chemistry &amp; Biology, University of Florence, Italy</p>	

workshops, - establishment of effective dissemination of project results. Transnational access activities - remote access to sample analysis services for molecular modeling and physical-chemical analyses in order to guide the design and the selection of peptides, - hands-on access to top-level instrumentations for production of peptides, modified peptides and peptidomimetics. Joint Research Activities - development of higher performance methodologies for liquid- and solid-phase synthesis of biomolecules, - development of multidisciplinary integrated analyses for selection and design of biomolecules potentially useful for drug discovery and diagnostic development. Management activities, aimed at the correct organization of the infrastructure and at sustaining the advancement of the project monitoring for the achievement of the deliverables in the expected time.

### Need for European integration

Explain why this proposed topic would require a European (rather than a national or local) approach. Describe how resources provided by EU would be mobilised. Indicate how account is taken of other national or international activities, and any resources that would complement an EU contribution. Text of maximum 3000 characters including spaces.

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This project needs to be carried out at the European level because it would simply not find all the necessary skills, know-how, facilities and competences in one single country. This is proven by the fact that the research and development currently performed on peptides, modified peptides, and peptidomimetics already takes place with the participation of entities from several European and non-European countries, including some of the participants in the current application. In carrying out the work at the European level, European PeptLab will not only achieve the necessary critical mass, but will be able to cope better with the pressing needs for the harmonization of risk assessment procedures in EC member states (CEC 2003). In addition, collaboration at the European level will add value to the work performed, and will improve the knowledge, science and technology that are shared among entities. Also, visibility, diffusion and impact of the achievements will be increased by the subsequent disseminations and exploitations plans of the projects, which will take place at a European level as well. An additional aspect of added value is that, because of the close interdependence of the partners in achieving the proposed objectives of the European PeptLab project, a tight network will be established. These new networks will create new opportunities for cross-disciplinary education and training of young investigators from different European countries. This is expected to foster transfer of knowledge and technology to the different partner countries, thereby promoting European excellence and competitiveness. Furthermore, given the potential impact of the results of the project on different aspects of human health (identification and validation of therapeutic targets, improvement of new drugs, new molecules with high technological relevance), the project is expected to enhance the competitiveness of European pharmaceutical and biotechnological industry through the exploitation of the findings and their applications to related areas relevant to human health. This is also expected to result in new opportunities of employment in Europe.

### Expected impact

Describe the expected impact of the proposed activities on the scientific communities, on the functioning of the research infrastructures, and on the development of the European Research Area (including balanced territorial development). Highlight the contribution to socio-economic impacts, including for promoting innovation and developing appropriate skills in Europe. Text of maximum 3000 characters including spaces.

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European PeptLab will have a long-term integrating effect on operations & interactions of research infrastructures in life science and material science with the perspective of establishing a unique Centre of Peptides in Europe, thus contributing to structuring the European Research Area. The most important impact of this proposal is that international leader groups in the field of synthesis, purification and characterization of peptides and peptidomimetics are joining their properties and efforts for creating the first reference infrastructure in Europe which will provide resources, technologies, know-how, and labs to all the scientific community. European PeptLab Infrastructure will offer transnational access to external users coming from research centres, industries, universities, and SMEs in order to promote: - improved access to top-level and expensive facilities, databases, common protocols, standardized procedures and strategies for the design, the synthesis, the purification, and the identification of peptides and their analogues, as fundamental tools for the study of biologically relevant interactions among biomolecules, - use of new and advanced software for the molecular modeling and physical-chemical analysis of biomolecules, - development of an advanced procedure for proteomic-driven molecules selection, - investment in capacity building and technology transfer to ensure the access to modern technologies for infrastructures, - implementation of key joint research projects aimed at improving the service provided by existing infrastructures, - improvement of the service provided by existing infrastructures, which are still lacking in the field of peptides, boosting the capability of the research community to investigate on bio- and bio-mimetic molecules, - use of modern and advanced IT tools to facilitate outreach to the public at large and educational

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## Scope and activities

Describe the overall objectives of the activity. Describe the benefit that the proposal would bring about in terms of integrated provision of infrastructure related services. When appropriate, describe how the network would integrate with the relevant e-Infrastructures. Text of maximum 2000 characters including spaces.

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In the last decade more and more peptides have been discovered as lead biomolecules of R&D projects in the biomedical, material science, and catalysis fields. Therefore, in order to help European and affiliated countries being competitive in bringing innovation in peptide and protein science, it is needed to join specific competences and dedicated instrumentations of some of the recognised European laboratories working in the field. Some of these laboratories that can be identified by the effective members of the European Peptide Society will have the overall objective to create a reference European PeptLab Infrastructure (EPLI) for the European scientific community to guarantee to the European scientists a facilitated access for the design, synthesis, purification, identification, and characterization of peptides and proteins as fundamental tools for the research and development of biologically relevant biomolecules and materials. Moreover, the EPLI will contribute to set up and validate common practices and protocols for supplying high-quality services in peptide production and physical-chemical characterization. EPLI will integrate the existing research infrastructures through a balanced combination of activities and a coordinated joint management. The coordination of the EPLI will take place through networking activities to share the common background and the specific know-how of each partner, and to optimally deliver infrastructure services and access also aimed to education in this field. The services supplied by the EPLI through transnational access activities, will be instrumental for industries, SMEs, and research centers devoted to the use of peptides as biomolecules for the development of diagnostics, therapeutics, and materials. Moreover, the EPLI through joint research activities will be involved in the improvement of the methodologies at the basis of the synthesis and production of complex peptides and specifically modified small proteins.

Indicate the Networking Activities that could be foreseen to foster a culture of co-operation between the research infrastructures and scientific communities. Indicate the Joint Research Activities that could be foreseen to improve, in quality and/or quantity, the services provided by the infrastructures. Text of maximum 4000 characters including spaces.

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European PeptLab will assure integration with other existing research infrastructures through a balanced combination of activities, i.e. 1) Networking for a) knowledge dissemination to global scientific community b) Sharing high-quality facilities & innovative instrumentations c) Improving or set up methodologies 2) Transnational access to major scientific instrumentations, sample analysis, compounds collections 3) Joint research activities, for development of innovative strategies, methods, protocols. The project objective will be reached through the close combination of the following activities: Networking activities - connection of partners by the creation of a website, of annual meetings, of specialized trainings, and of workshops, - creation of a website for publicizing the activity of the infrastructure, for posting the 4-months calls for users, for reporting the results of the users project evaluation, for scheduling a calendar of the provided services, and for further reporting the results of the supplied services, to give the possibility to users to insert feedbacks, - development of database for registering: all the installations and reporting the expertise of the personnel involved, the condition of the instrumentations, and the users feedbacks on supplied services; all the users and the submitted projects tracking the life of a request and the actions taken by the infrastructure, - development of common standards for the report of scientific results, - development of common protocols for scientific characterization of peptides and for high quality definition of European PeptLab synthetic products purity standards, - promotion of coordinated actions amongst related projects, - favor of prompt and effective communication within the European PeptLab consortium and between the consortium and the scientific community outside the project, - organization of annual meetings for partners to check and renew the infrastructure protocols and for outlining the advancement of the infrastructure, - organization of annual scientific trainings for partners and users on innovative technologies in peptide production and design, - report of the advancement of joint researches in

was funded by the Dept. of Chemistry (AM Papini) and Pharmaceutical Sciences (P. Rovero) in 2004. PeptLab@UniFi combines expertise in synthesis, physico-chemical characterization, and immunology of peptides and their post-translational modifications. Molecular modeling and molecular spectroscopy (in collaboration with the European Laboratory of Non-linear Spectroscopies, LENS), peptide synthesis and immunological characterization allows PeptLab@UniFi to perform a translational research from bench-to bedside aimed to validation of peptide-based diagnostics for immune-mediated diseases. PeptLab@UniFi is equipped with state-of-the-art instruments for solid-phase peptide synthesis (single and multiple; small, medium and large scale, manual or automatic, conventional and microwave assisted), small and medium scale HPLC purification and analysis, UPLC, SDS-PAGE, Mass Spectrometry. - The PeptLab platform into SOSCO of the University of Cergy-Pontoise, France is organized by A.M. Papini thanks to the Chaire d'Excellence 2009-2013, granted by the French Agence Nationale de la Recherche (ANR). With the project PepKit (999.998,00 Euros) AM Papini organised PeptLab@UCP combining expertise in organic synthesis of modified amino acids (sugar, glycolipids, fluorinated molecules, etc.) with peptide synthesis, purification, characterization, immunochemistry in the interest of SMEs in Région Ile de France. Final aim of the ANR Chaire d'Excellence is the European PeptLab Infrastructure objective of this proposal. - The Research Group of Peptide Chemistry, sponsored jointly by the Eötvös L. University and the Hungarian Academy of Sciences, has an international reputation since the mid-1960s in synthetic peptide chemistry, structure/biological function studies, microanalysis of peptides and proteins and immunochemistry. The research group has modern equipment for synthesis, purification and characterization of peptides, peptide chimera and bio-conjugates including a state-of-the-art laboratory for microanalysis. Further facilities include electrophoresis, CD, UV, FT-IR spectroscopy, ELISA and FACS. - The Parc Científic de Barcelona groups participating in the European PeptLab project have a solid experience in peptide synthesis and its chemical mechanisms as well as in peptide based drug discovery, gained at either the pharmaceutical industry or through their academic research and their projects in collaboration with pharmaceutical and biotech companies. - The Laboratory of Pharmacognosy & Chemistry of Natural Products in the University of Patras is very active in synthesis and structure-activity studies on bioactive peptides, synthesis of heterocyclic non-natural amino acids, structural bioinformatics and design/simulation and NMR conformational analysis of biomolecules. The participation of the Laboratory in a second Network of laboratories and in various competitive Programs of the General Secretariat of Research and Technology of Greece, the European Union, and other internal constitutions, had as result the completion of the infrastructure with high technology equipment, for the design and the analysis of macromolecules.

#### Scientific domains served by the research infrastructures

Select the scientific domain(s) served by the research infrastructures -multiple choices reply-( <b>compulsory</b> )	Environmental and Earth Sciences - Biological and Medical Sciences - Engineering, Material Sciences and Analytical Facilities
Indicate the main scientific domain served -multiple choices reply-( <b>compulsory</b> )	Biological and Medical Sciences

#### Key potential partners

Indicate a list of key potential partners. Text of maximum 3000 characters including spaces, with 1 line per potential partner (participant organisation name, country and contact person)

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AM Papini is Treasurer of the European Peptide Society (EPS, [www.eurpepsoc.com](http://www.eurpepsoc.com), Statutes registered at Notary Biagioli, Prato, Italy): In EPS are represented all the excellences, competences and facilities for peptide chemistry and biology present in Europe and associated countries. Equipment and competences to synthesize, characterize, and identify peptides and evaluating their biological properties (for drug and diagnostics development), physico-chemical properties, and materials properties can be found and selected by the EPS Effective members. In particular the EPS Executive Committee, which is composed by: F Hudecz (President), Department of Organic Chemistry Eötvös Loránd University Hungary; AM Papini (Treasurer), Department of Chemistry University of Florence and Chaire d'Excellence 2009-2013 ANR Department of Chemistry University of Cergy-Pontoise ([www.peptlab.eu](http://www.peptlab.eu)), Italy and France; D Tourwé (Secretary), Department of Organic Chemistry Vrije Universiteit Brussel, Belgium; S Lavielle (Scientific Affairs Officer), UMR 7203 Laboratoire des BioMolécules UPMC Paris France; P Cordopatis (Communication Affairs Officer), Faculty of Pharmacy University of Patras Greece; and the following countries' delegates representing their country's peptide society: Medical Univ Vienna's Centre for Physiol & Pharmacol, Austria, C Gruber; Lonza Braine SA Braine-l'Alleud, Belgium, D. Rekae; Organic Chem Inst Bulgarian Acad of Science, Bulgaria, I Stoineva; Carbohydrate Peptide & Glycopeptide Res Lab Ruđer Bošković Inst, Croatia, A Jakas; Organic Inst Chem & Biochem Acad of Sciences Czech Republic, V Cerovsky; Novo Nordisk, Denmark, T Hoeg-Jensen; Univ of Eastern Finland, Finland, A Narvanen; Inst des Biomolécules Max Mousseron Univ Montpellier II, France, F Cavelier; Organic & Bioorganic Chem Dep

institutions in particular, - provision of access to specialized, unique European peptide infrastructure, strengthening the role of Europe in this highly promising field. - Education aimed to young researchers working both in an academic and industrial environment. The achievements of the project in the field of peptide science may raise the know-how in the growing market for better drugs, diagnostics and materials with a high technological added value. European PeptLab will contribute to productive changes in this area. The expected progress due to the combined activities will lead to the proposed infrastructure, which is expected to have a significant impact in reinforcing the competitiveness of European science, in particular the basis for pharmaceutical and material science industry, as it puts forward one of the newest and potentially most promising field of research for life sciences. Furthermore, concerning costs and performance, the future projects, which will intend to use European PeptLab technology, will strongly benefit from the developments achieved in the present p

#### Projects previously funded under FP7 and FP6

Only for those proposed topics that correspond to the follow-up of FP7 or FP6 funded Integrating Activities, please provide specific additional information on: the project(s) previously or currently funded and the level of funding; the main results and expected achievements of the funded project(s); the progress foreseen in the activities proposed beyond FP7. Text of maximum 4000 characters including spaces.

-open reply-(optional)