



Société Chimique de France

Montpellier

Marcoule

# Chemistry Week 2012

BALARD DAYS

SCF CONGRESS (DCO)



3<sup>rd</sup> - 7<sup>th</sup>  
December

Programme

# Perspectives in Chemistry: Steps Towards Complex Matter From Supramolecular Chemistry towards Adaptive Chemistry

Pr Jean-Marie Lehn - Prix Nobel de Chimie 1987  
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Supramolecular chemistry is actively exploring systems undergoing self-organization, i.e. systems capable of spontaneously generating well-defined supramolecular architectures by self-assembly from their components, on the basis of the molecular information stored in the components and read out at the supramolecular level through specific non-covalent interfacial algorithms, thus behaving as programmed chemical systems.

Supramolecular chemistry is intrinsically a dynamic chemistry in view of the lability of the interactions connecting the molecular components of a supramolecular entity and the resulting ability of supramolecular species to exchange their components. The same holds for molecular chemistry when the molecular entity contains covalent bonds that may form and break reversibly, so as to allow a continuous change in constitution by reorganization and exchange of building blocks. These features define a Constitutional Dynamic Chemistry (CDC) covering both the molecular and supramolecular levels.

CDC introduces a paradigm shift with respect to constitutionally static chemistry. The latter relies on design for the generation of a target entity, whereas CDC takes advantage of dynamic constitutional diversity to allow variation and selection so as to achieve adaptation.

In the process of reaching higher levels of complexity, CDC gives access to the generation of networks of dynamically interconverting constituents connected either structurally (molecular and supramolecular arrays) or reactionnally (set of connected reactions) or both. They define a class of constitutional dynamic networks (CDNs), presenting agonistic and antagonistic relationships between their constituents, that may couple to thermodynamic or kinetic processes and respond to perturbations by physical stimuli or to chemical effectors.

The merging of the features: - information and programmability, - dynamics and structural diversity, -constitution and selection, points to the emergence of adaptive and evolutive chemistry, towards systems of increasing complexity.

**Keywords:** constitutional dynamics, selection, complex systems, dynamic networks.

## References

- Lehn, J.-M., **Supramolecular Chemistry: Concepts and Perspectives**, VCH Weinheim, 1995.
- Lehn, J.-M., **Toward complex matter: Supramolecular chemistry and self-organization**, Proc. Natl. Acad. Sci. USA, 2002, 99, 4763.
- Lehn, J.-M., **From supramolecular chemistry towards constitutional dynamic chemistry and adaptive chemistry**, Chem. Soc. Rev., 2007, 36, 151.
- Lehn, J.-M., Chapter 1, in **Constitutional Dynamic Chemistry**, ed. M. Barboiu, Topics Curr. Chem., 2012, 322, 1-32

# The chemistry-medicine continuum: strategies for eradicating AIDS, treating Alzheimer's and overcoming Cancer resistance

Pr Paul A.Wender

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## ABSTRACT

Studies in our laboratory are focused on the design, synthesis and evaluation of molecules that exhibit unique modes of action for unmet medical needs, new tools for real time cellular and animal imaging, small molecule immunotherapy, and novel drug delivery strategies based on "molecular transporters". These programs all draw on the introduction and development of new reactions and synthetic strategies (e.g., PNAS 2011, 6721; Nature 2009, 197; Accts 2008, 40). Representative projects include bryostatin which we initiated 25 years ago and is now reaching clinical importance for cancer (Nature Chem. 2012; J. Amer. Chem. Soc. 2011, 9228; PNAS 2011, 6721; Oncotarget 2012, 58; Israel J. Chem. 2011, 453; Experimental Hematology 2009, 122) and for treating cognitive dysfunction including Alzheimer's disease (Neurobiology of Disease 2009, 332); prostratin (Science 2008, 649) and bryostatin analogs (Nature Chemistry 2012, 705) now in pre-clinical development for eradicating HIV/AIDS; and molecular transporters (PNAS 2000, 13003; Drug Discovery Today: Technologies 2011, e49) for use in drug and probe delivery (Nature Medicine 2000, 1253), real time imaging in animals (PNAS 2007, 10340); siRNA delivery (PNAS 2012, 13171; J. Am. Chem. Soc. 2009, 16401), and overcoming resistant cancer (Gynecologic Oncol. 2012, 118; PNAS 2008, 12128), now in preclinical development. This lecture will focus on studies directed at transformative therapies for AIDS, resistant cancer, and Alzheimer's disease including the design of tools for drug and probe delivery.



# Chemistry Week 2012

— BALARD DAYS  
— SCF CONGRESS (DCO)

## Monday, December 3

**8.45 am – 6.10 pm**

### SCIENTIFIC COUNCILS OF BALARD RESEARCH INSTITUTES

[RESTRICTED EVENTS]

**8.45 am – 12.15 am**

**Faculty of Pharmacy | Montpellier**

**IBMM, Institut des Biomolécules Max Mousseron**

*Lunch on site*

**2.00 pm – 4.50 pm**

**Faculty of Pharmacy | Montpellier**

**IBMM, Institut des Biomolécules Max Mousseron**

**12.00 pm – 6.10 pm | ENSCM | Montpellier**  
**ICGM, Institut Charles Gerhardt de Montpellier**

**7.30 pm | Maison des Étudiants | University Montpellier I DINNER ICGM, IBMM, IEM**

**8.00 pm | Marcoule | DINNER ICSM**

## Tuesday, December 4

**8.30 am – 6.30 pm**

### SCIENTIFIC COUNCILS OF BALARD RESEARCH INSTITUTES

[RESTRICTED EVENTS]

**8.30 am | ENSCM | Montpellier**

**ICGM, Institut Charles Gerhardt de Montpellier**

**1.30 pm – 6.30 pm | ENSCM | Montpellier**

**ICGM, Institut Charles Gerhardt de Montpellier**

**8.30 am | ICSM | Marcoule**

**ICSM, Institut de Chimie Séparative de Marcoule**

**2.00 pm – 5.00 pm**

**Faculty of Pharmacy | Montpellier**

**Poster session: IBMM, Institut des Biomolécules Max Mousseron**

**9.00 am | Faculty of Pharmacy | Montpellier**

**IBMM, Institut des Biomolécules Max Mousseron**

**2.00 pm – 5.00 pm | ICSM | Marcoule**

**ICSM, Institut de Chimie Séparative de Marcoule**

**9.30 am | IEM | Montpellier**

**IEM, Institut Européen des Membranes de Montpellier**

**2.00 pm – 5.15 pm | IEM | Montpellier**

**IEM, Institut Européen des Membranes de Montpellier**

*Lunch on site*

**7.30 pm | Le petit Jardin Restaurant | Montpellier**

**DINNER** - Reception of the scientific council to the Pôle chimie Balard

## Wednesday, December 5

**9.00 am – 12.00 am**

**PRES SUD de FRANCE | Montpellier**

### **SCIENTIFIC COUNCIL OF THE POLE CHIMIE BALARD**

*Lunch on site*

Introduction:

**Pr Michel Avérous - Dr Marc Taillefer**

**2.00 pm – 3.00 pm | ENSCM | Montpellier**

### **CLOSING CONFERENCE OF THE BALARD DAYS & OPENING OF THE SCF CONGRESS**

**Pr Jean-Marie Lehn**, Nobel Prize for Chemistry 1987, Strasbourg University.

*Perspectives in Chemistry: Steps Towards Complex Matter From Supramolecular Chemistry towards Adaptive Chemistry.*

Registration for the autumn days of the DCO: <http://dco2012.ups-tlse.fr/>

**3.00 pm – 6.00 pm | ENSCM | Montpellier**

### **AUTUMN DAYS OF THE DCO**

(Organic Chemistry Division of the French Chemical Company – SCF)

**3.00 pm – 3.50 pm**

**Fabien Gagosz**, Polytechnic school, Palaiseau - France - ACROS Prize.

*When gold encounters Alkynes and Allenes.*

*Coffee Break*

**4.20 pm – 5.10 pm**

**Pierre Deprez**, Galapagos Company, Romainville - France - DCO - Industrial Prize.  
*Selective Androgen Receptor Modulators (SARM): Challenges Towards Identification of the Clinical Candidate GLPG0492.*

**5.10 pm – 6.00 pm**

**Pr Jonathan Clayden**, Professor of Organic Chemistry, Manchester University, UK.  
*Conformational Communication and Control.*

**7.30 pm | Chez Boris | Montpellier**

### **RECEPTION OF THE DCO**

(speakers of December 5, 6 and 7<sup>th</sup>)

## Thursday, December 6

**9.00 am – 12.00 am | ENSCM | Montpellier**

### **AUTUMN DAYS OF THE DCO**

(Organic Chemistry Division of the French Chemical Company – SCF)

**9.15 am – 10.05 am**

**Pr Troels Skrydstrup**, Interdisciplinary Nanoscience Center and Department of Chemistry, Aarhus University, Denmark.  
*Efficient Metal Catalysis with Low Molecular Weight Gases.*

**10.05 am – 10.25 am**

**Dr Marie-Hélène Larraufie**, Pierre et Marie Curie University, Paris, France - DCO - Thesis Prize.  
*Development of New Radical Cascades and Multi-Component Reactions.*

*Coffee Break*

Introduction: **Pr Jean Martinez**

**11.00 am – 12.15 am | ENSCM | Montpellier**

### **CLOSING CONFERENCE OF THE SCF CONGRESS & OPENING OF THE AFTERNOON HONORIS CAUSA PAUL WENDER**

**Pr Paul Wender**, Stanford University, USA.  
*The chemistry-medicine continuum: strategies for eradicating AIDS, treating Alzheimer's and overcoming Cancer resistance.*

Concluding words: **Dr Marc Taillefer**

**1.00 pm – 8.00 pm | Faculty of Pharmacy | Montpellier  
AFTERNOON HONORIS CAUSA PAUL WENDER**

**1.00 pm – 3.00 pm**  
**Lunch Buffet**

**3.00 pm – 5.30 pm**  
**CONFERENCES**



**3.00 pm – 3.45 pm**  
**Pr Erick Carreira**, Laboratory of Organic Chemistry, at the ETH Zürich, Suisse.  
*Chemistry and Biology of Natural Products of Human Origin.*

**3.45 pm – 4.30 pm**  
**Pr Chaitan Khosla**, Departments of Chemistry, Chemical Engineering and Biochemistry, Stanford University, USA.  
*Chemistry & Biology of an Inflammatory Disulfide Bond Switch.*

*Coffee Break*

**4.45 pm – 5.30 pm**  
**Pr Justin Du Bois**, Department of Chemistry, Stanford University.  
*Turning Toxins into Tools for the Study of Ion Channels.*

**5.30 pm | Faculty of Pharmacy | Amphithéâtre A**

**CEREMONY HONORIS CAUSA  
Pr PAUL WENDER**

Under the Presidency of Pr Philippe Augé,  
President of the University Montpellier 1

*Musical Welcoming*

**Philippe Augé**  
President of Montpellier 1 University

**Laurence Vian**  
Director of Faculty of Pharmacy

**Jean Martinez**  
Professor at the Faculty of Pharmacy,  
Director of IBMM, Vice-President of  
Montpellier 1 University

*Musical Break*

“Doctor Honoris Causa” distinction Ceremony  
**Pr Paul Wender – Talk**

*Musical closing Ceremony*

**7.00 pm | Cocktail**

**8.00 pm | DINNER**

**Friday, December 7**

**9.00 am – 1.00 pm | ENSCM | Montpellier**

**2012 YOUNG RESEARCHER'S DAY OF THE SCF LANGUEDOC-ROUSSILLON**  
Organized by the “Club des Jeunes SCF-LR”

**9.00 am – 9.05 am**  
Welcoming words and introduction of the SCF

**11.00 pm – 12.45 pm**  
4 Presentations by Ph.D. students and postdoctoral fellows (10 min + 5)

**9.05 pm – 10.40 pm**  
6 presentations by Ph.D. students and postdoctoral fellows (10 min + 5)

1 presentation *Prix de Thèse SCF-Languedoc Roussillon* (15 min + 5)  
**Dr Anthony Martin**

*Coffee Break*

**12.45 am – 12.55 am**  
Awards ceremony (2 prizes awarded by the Balard Foundation for the best oral presentations)

**12.55 am – 1.00 pm**  
Concluding words



Société Chimique de France

## Un porte-parole pour tous, un tremplin pour chacun

**La Société Chimique de France** est une association à but non lucratif, reconnue d'utilité publique. Son objectif est la représentation des chimistes aux niveaux local, national, international, et la promotion de la chimie dans ses aspects scientifiques, éducatifs et appliqués, avec une triple mission institutionnelle, d'expertise et de réseau.

La SCF est organisée en entités couvrant les principaux champs disciplinaires et l'ensemble du territoire : 9 divisions scientifiques et 17 groupes thématiques, relayées par 15 sections régionales et leurs clubs de jeunes.

La DCO permet aux chimistes organiciens de promouvoir

leur discipline mais aussi d'élargir leurs champs d'investigation à la biochimie, la catalyse homogène, la synthèse asymétrique, les biotechnologies, les matériaux... Les bureaux SCF régionaux (ici le bureau Languedoc-Roussillon) s'occupent quant à eux de la promotion locale de l'ensemble des disciplines de la chimie. Divisions et sections sont ainsi complémentaires.

Les rencontres annuelles de la DCO sont un temps fort pour les jeunes doctorants qui rencontrent leur pairs et leurs ainés pour échanger sur leur thématique et questionner leurs maîtres.

[www.societechimiquedefrance.fr](http://www.societechimiquedefrance.fr)

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Une chimie au service de l'homme  
et de son environnement

**Le Pôle chimie Balard**, Pôle d'Excellence du PRES Sud de France, existe depuis 2007. Il a pour mission de fédérer la communauté de la chimie en Languedoc-Roussillon, dans les domaines de la formation, de la recherche et du transfert de technologies. Membres Fondateurs : les Universités Montpellier 1 & 2, l'ENSCM, le CNRS et le CEA. Quatre Instituts intégrés sont regroupés au sein d'une Fédération de Recherche CNRS : IBMM, ICGM, IEM, ICSM.

Le futur campus chimie Balard réunira formation, recherche, incubateur, plateaux-techniques et hôtel d'entreprises, sur un site de 35 000 m<sup>2</sup> à Montpellier en 2016. Financement : Etat, Région Languedoc-Roussillon, partenaires.

[www.polechimie-balard.fr](http://www.polechimie-balard.fr)

### Pôle chimie Balard | Fondation Balard

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**La fondation universitaire Balard** créée par le PRES Sud de France ([www.pres-univ-montp.fr](http://www.pres-univ-montp.fr)) en juillet 2010 à l'initiative du Pôle chimie Balard, a pour mission de soutenir financièrement le Pôle dans sa stratégie de développement. Les partenaires publics sont les Universités Montpellier 1 & 2, et l'ENSCM. Les partenaires privés sont Total, Sanofi, le CEA, les laboratoires Idenix et l'Union des Industries Chimiques.

[www.fondation-balard.fr](http://www.fondation-balard.fr)



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