

Vers une intégration systémique des chimies des peptides et des agrégats de lipides

MURILLO SANCHEZ Sara¹, BEAUFILS Damien²,
PASCAL Robert², RUIZ MIRAZO Kepa¹

1) Biophysics Unit (CSIC-UPV/EHU), Leioa and Department of Logic and Philosophy of Science, Donostia-San Sebastián, Spain

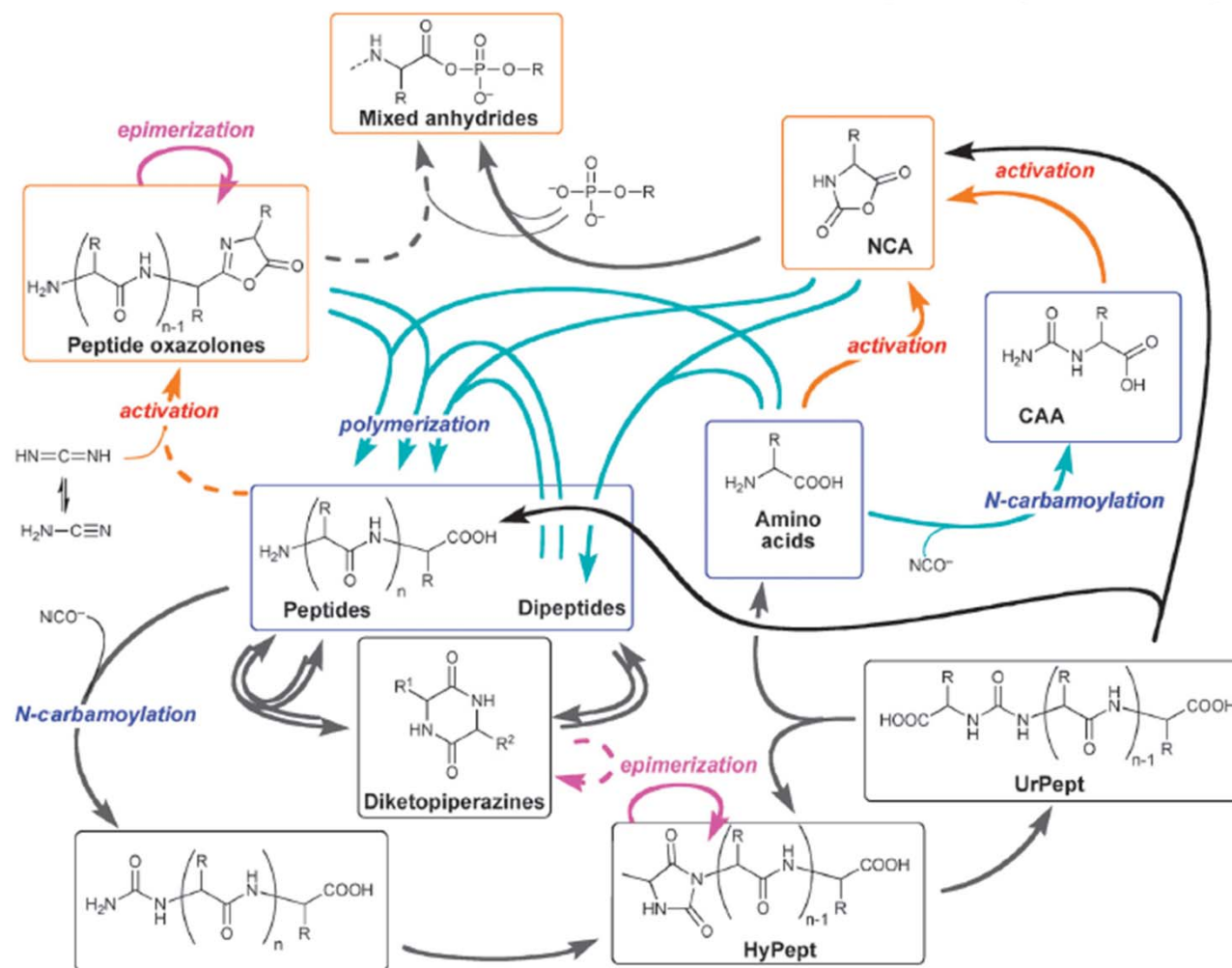
2) IBMM, CNRS – Université de Montpellier, France

Chimie prébiotique des peptides

Pathways for the formation and evolution of peptides in prebiotic environments†

Grégoire Danger,^a Raphaël Plasson^b and Robert Pascal^{*c}

The Royal Society of Chemistry 2012

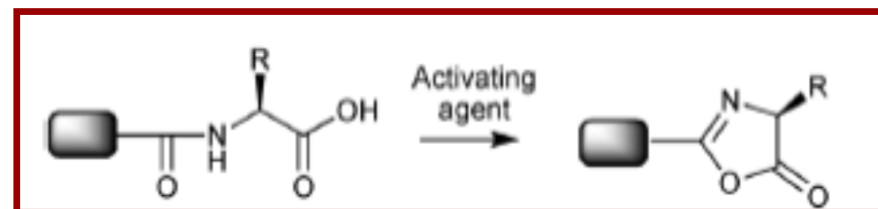
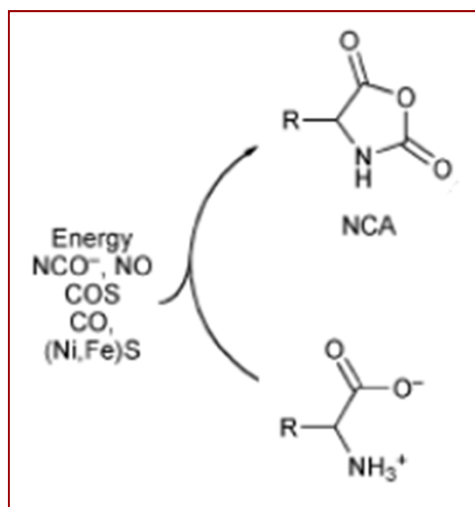
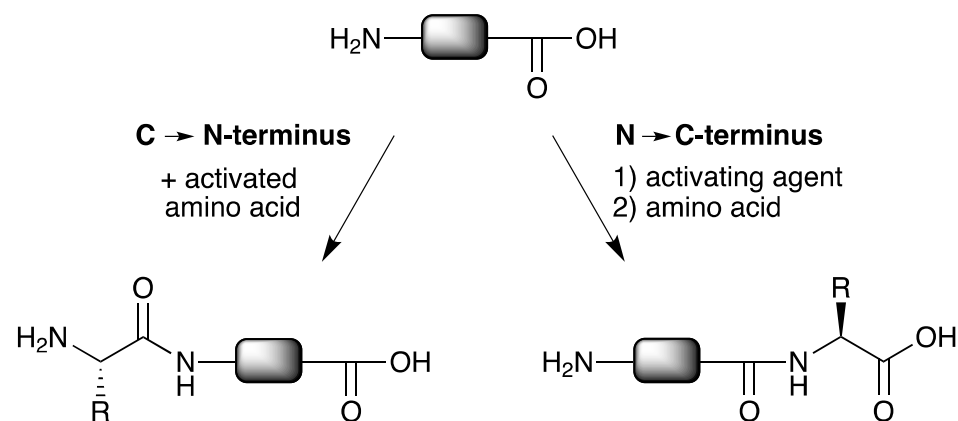


Chimie prébiotique des peptides

Pathways for the formation and evolution of peptides in prebiotic environments†

Grégoire Danger,^a Raphaël Plasson^b and Robert Pascal^{*c}

The Royal Society of Chemistry 2012

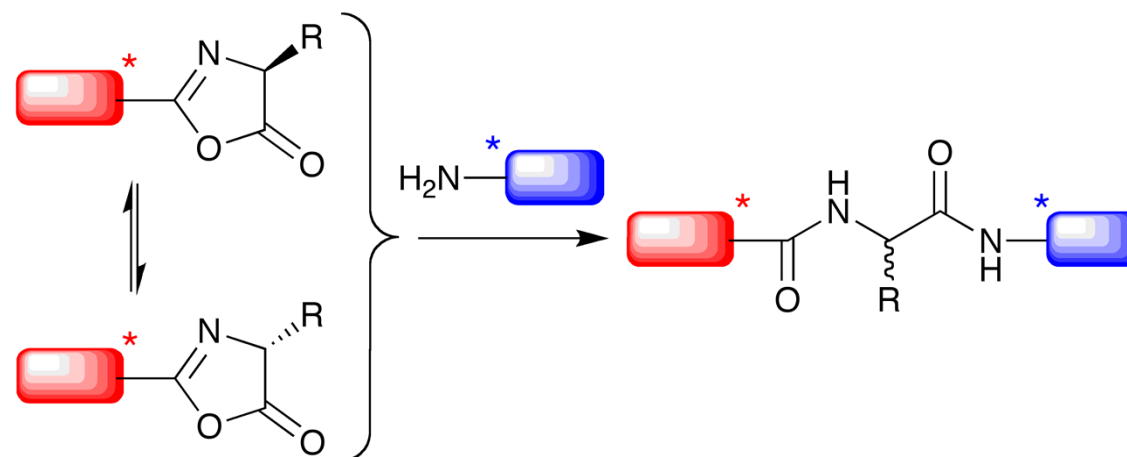


Chimie prébiotique des peptides

Diastereoselectivity in prebiotically relevant 5(4*H*)-oxazolone-mediated peptide couplings†

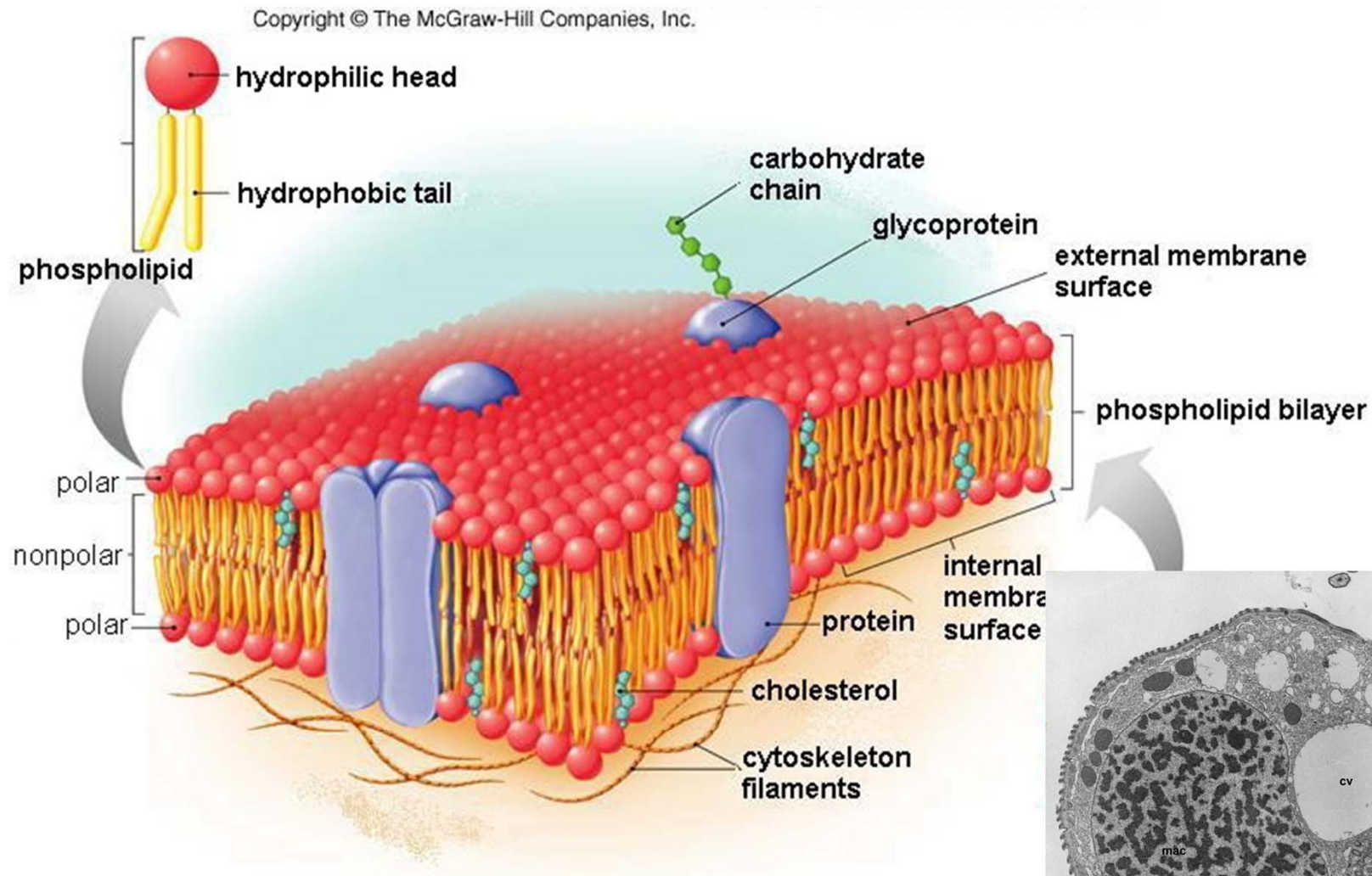
Damien Beaufile, ^a Grégoire Danger, ^b Laurent Boiteau, ^a Jean-Christophe Rossi ^a and Robert Pascal* ^a

The Royal Society of Chemistry 2014

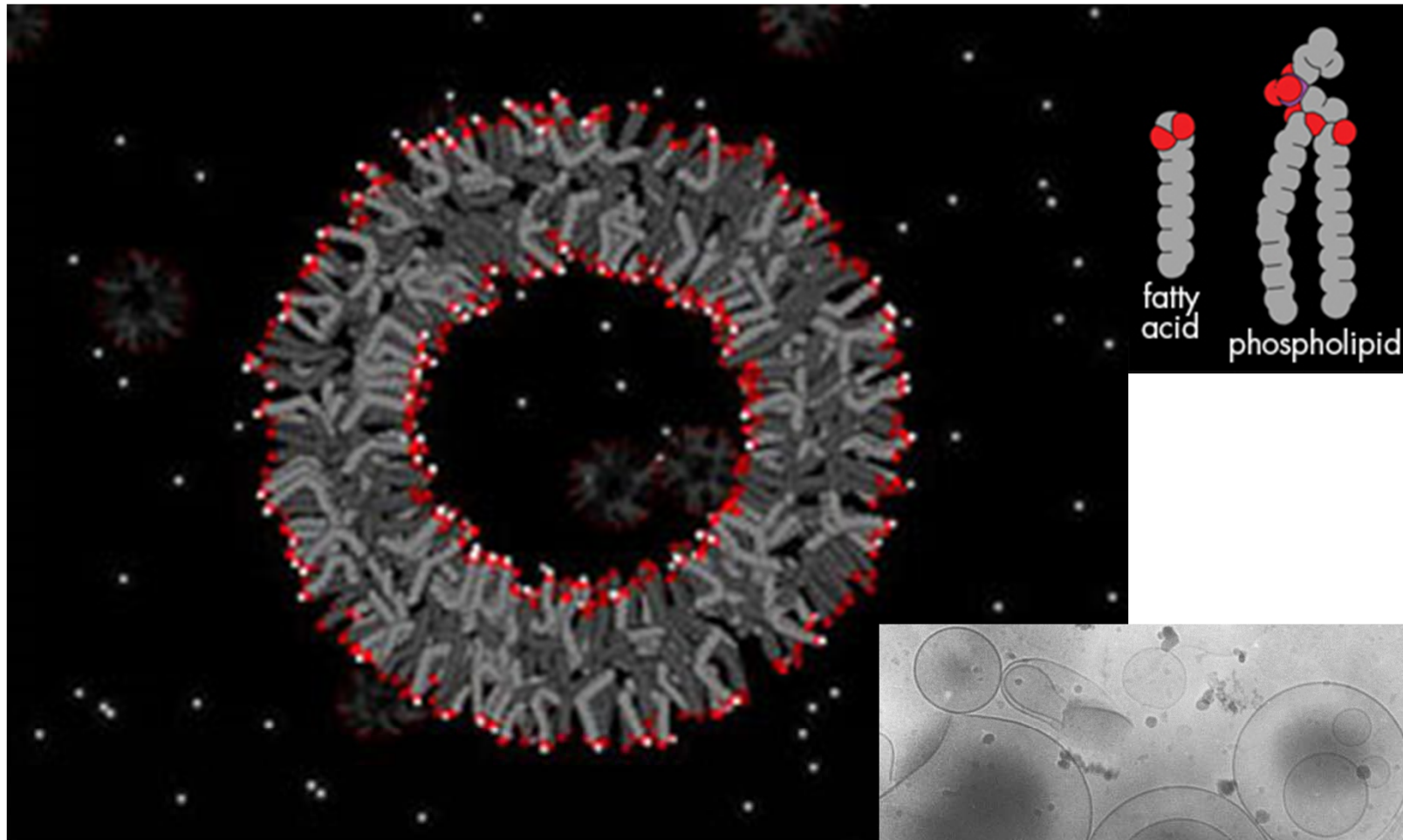


Entry	Xaa	Final diastereomeric ratio ^a (homochiral/heterochiral)
1	L-Ala	59/41 (L,L- 1a /L,D- 1a)
2	D-Ala	56/44 (L,L- 1a /L,D- 1a)
3	L-Val	58/42 (L,L- 1b /L,D- 1b)
4	L-Leu	70/30 (L,L- 1c /L,D- 1c)

Biophysique des membranes de lipides

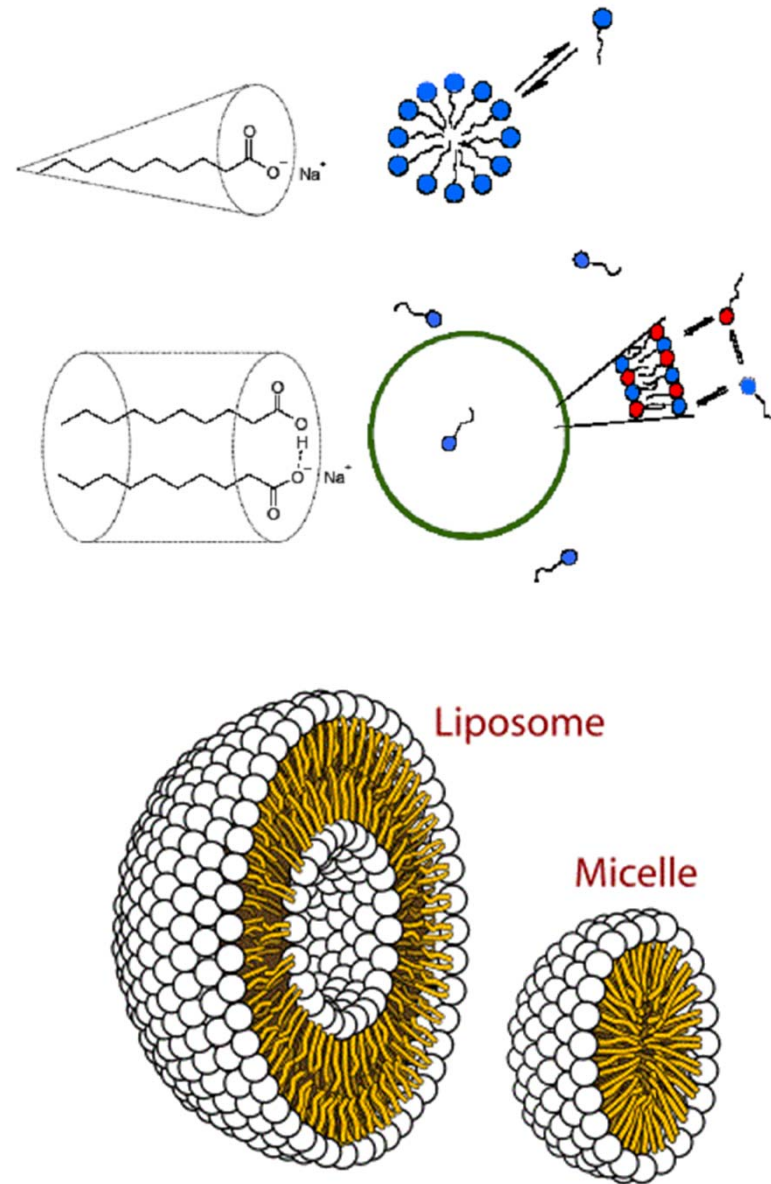
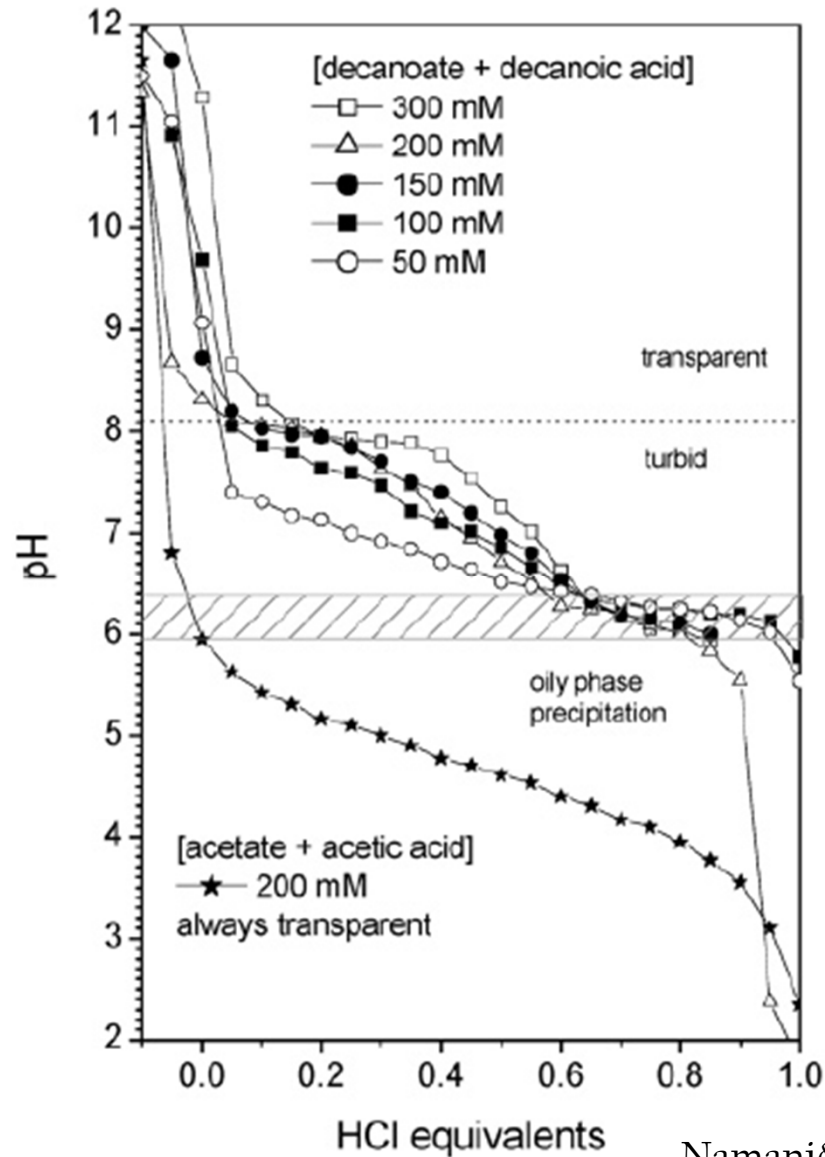


Biophysique des membranes de lipides



<http://molbio.mgh.harvard.edu/szostakweb/movies.html>

Biophysique des membranes de lipides



Chimie prébiotique des peptides

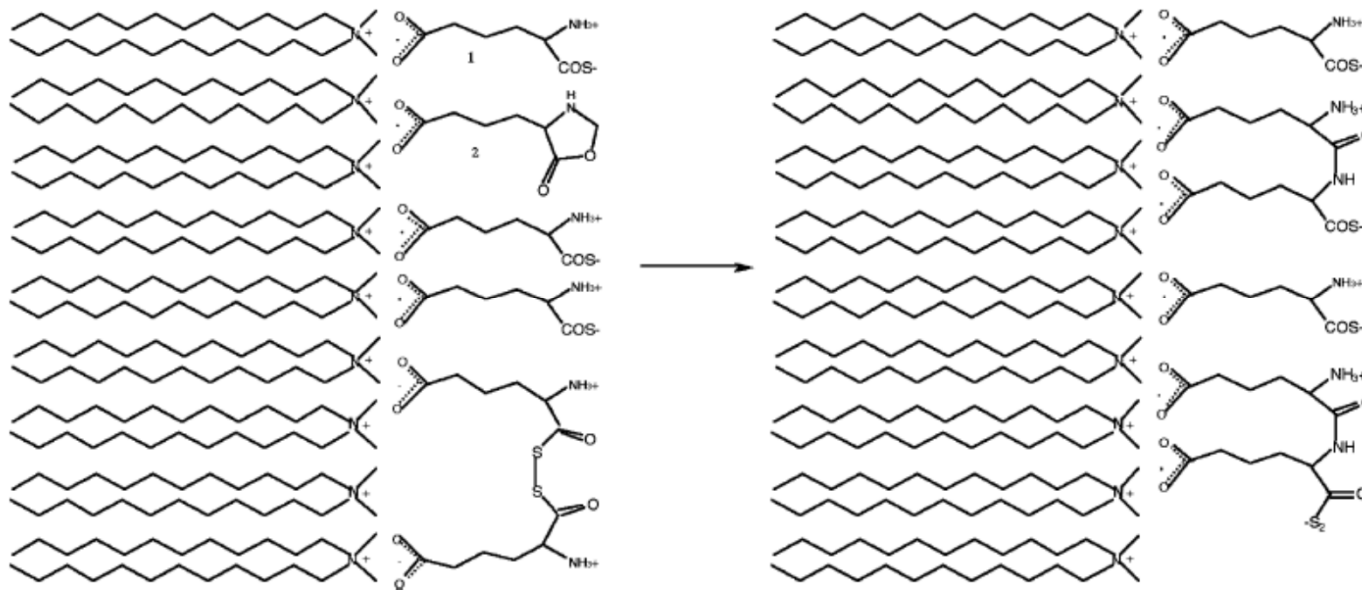
+

Biophysique des membranes de lipides

Chimie prébiotique des peptides + Biophysique des membranes de lipides

Oligomerization of Thioglutamic Acid: Encapsulated Reactions and Lipid Catalysis Orig Life Evol Biosph (2007)

H. H. Zepik • S. Rajamani • M.-C. Maurel • D. Deamer

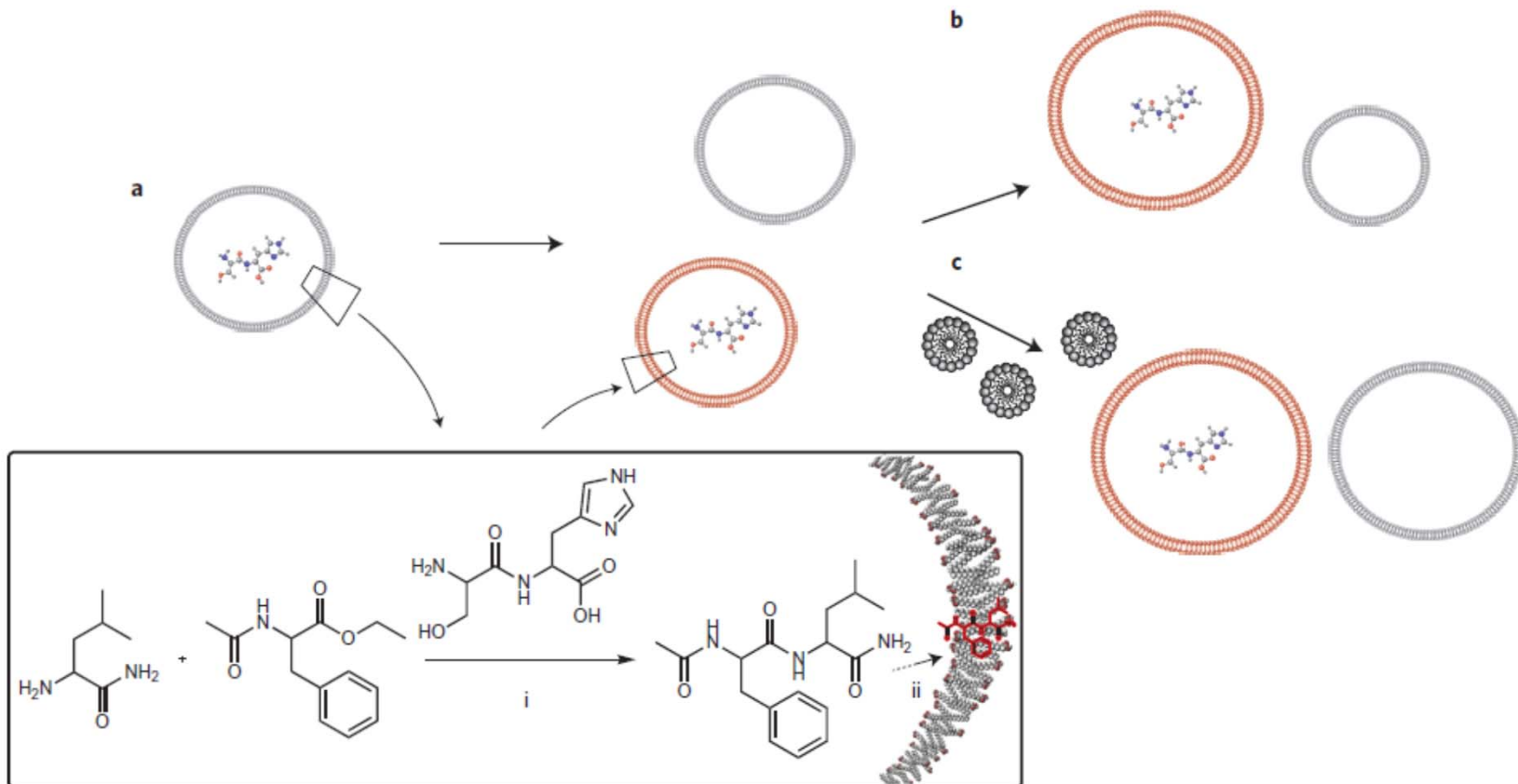


Chimie prébiotique des peptides + Biophysique des membranes de lipides

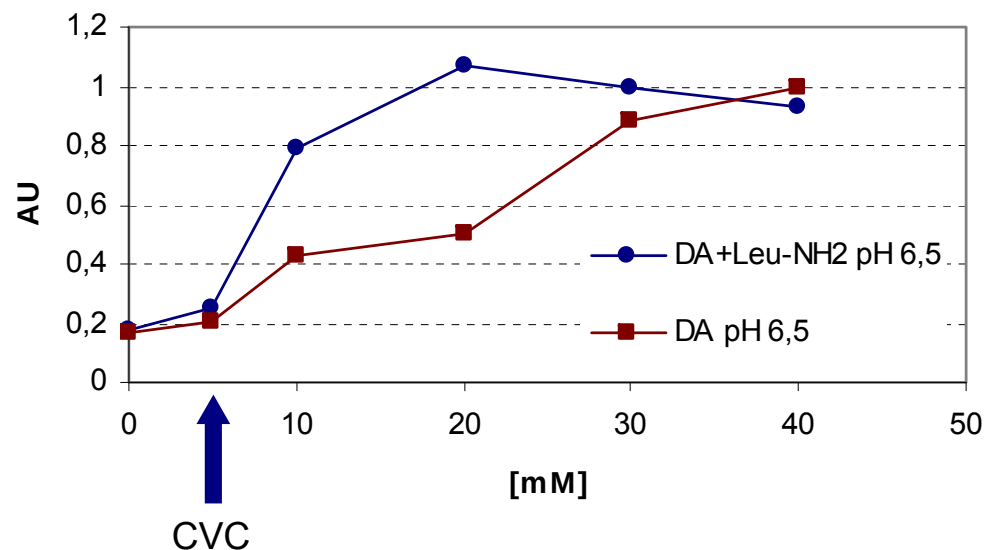
Competition between model protocells driven by an encapsulated catalyst

NATURE CHEMISTRY | VOL 5 | JUNE 2013

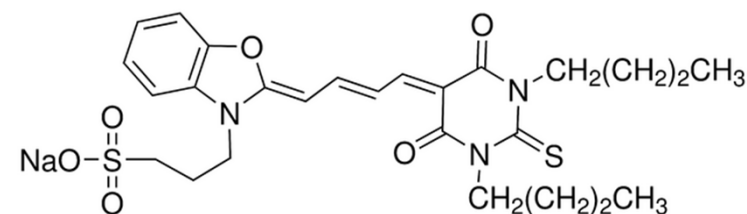
Katarzyna Adamala^{1,2} and Jack W. Szostak^{1*}



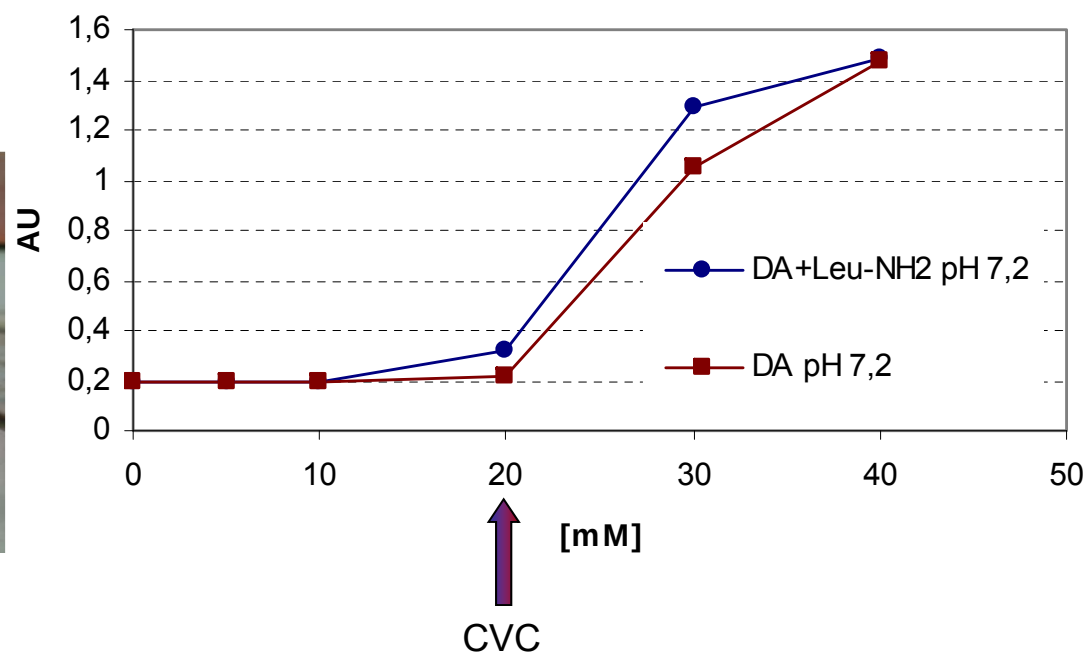
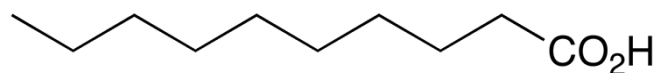
Membranes d'acide décanoïque concentration vésiculaire critique (CVC)



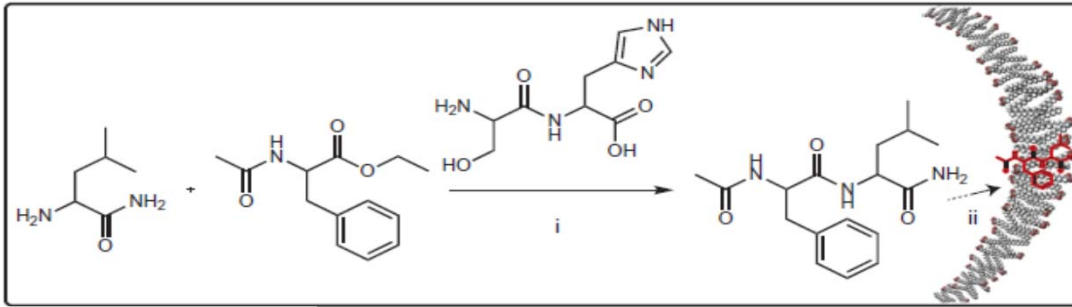
Merocyanine 540 [5 μ M]



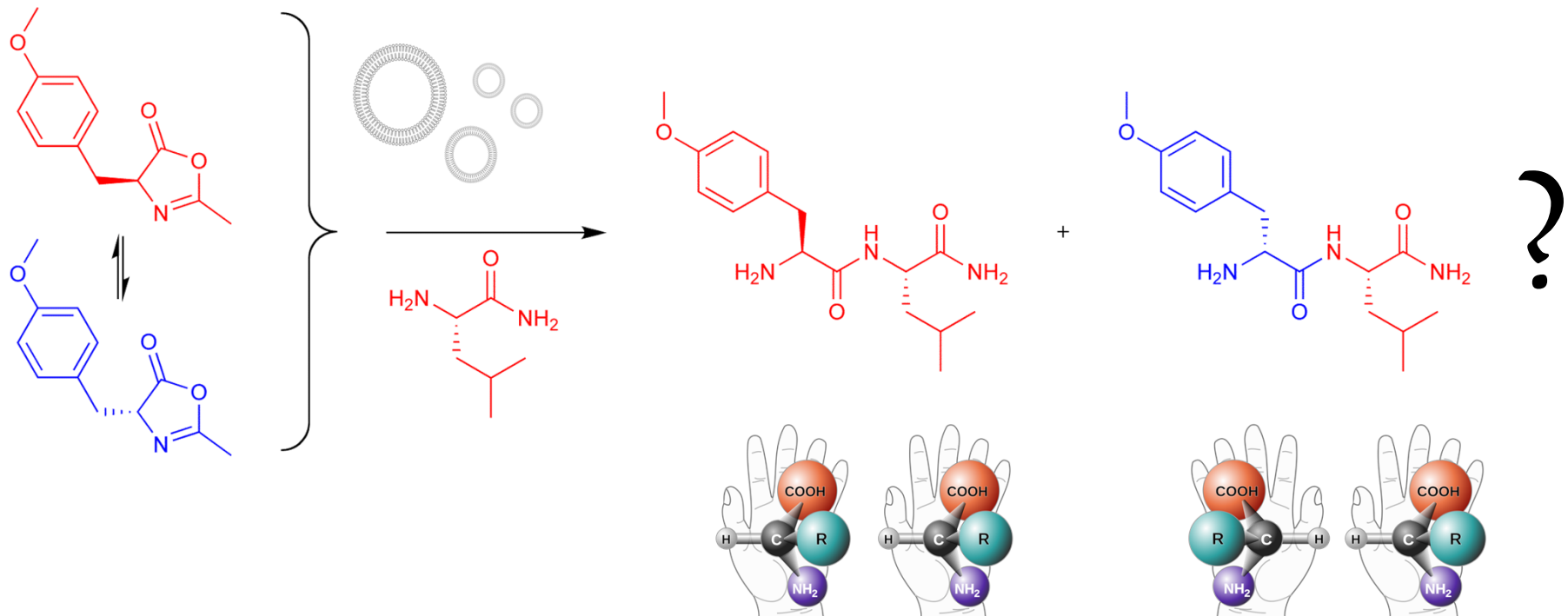
$$AU = \text{Abs}_{570} / \text{Abs}_{530}$$



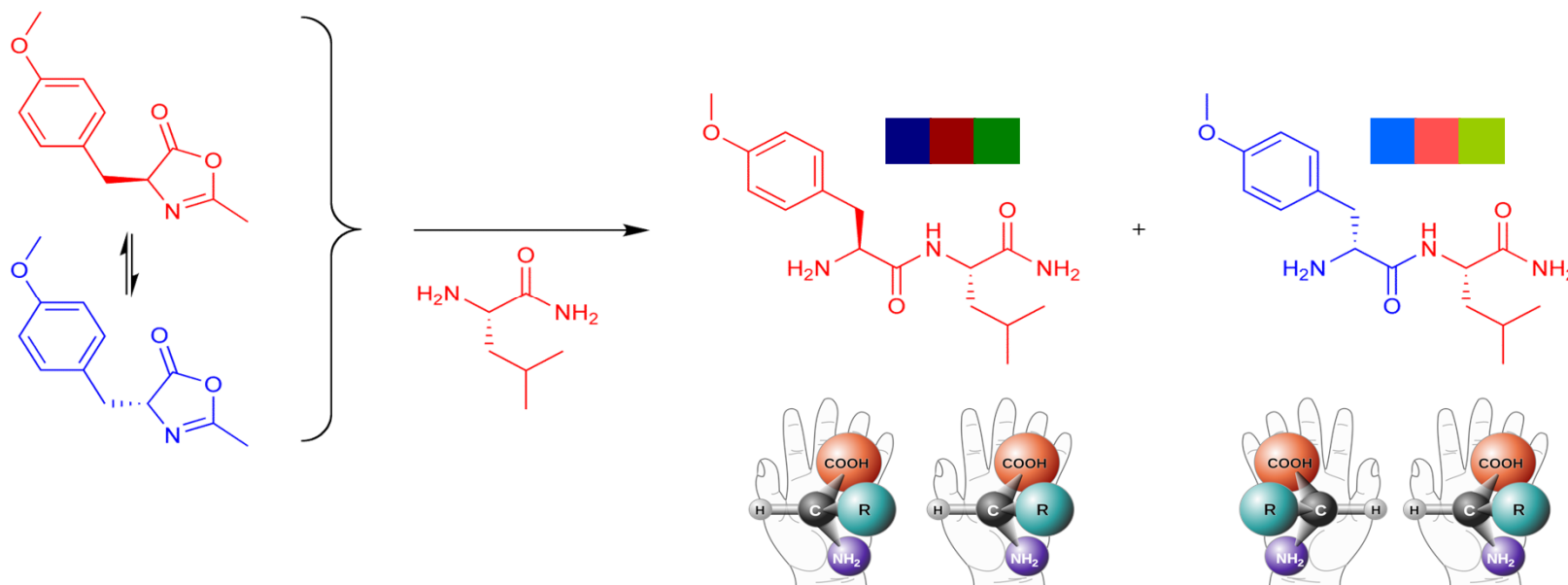
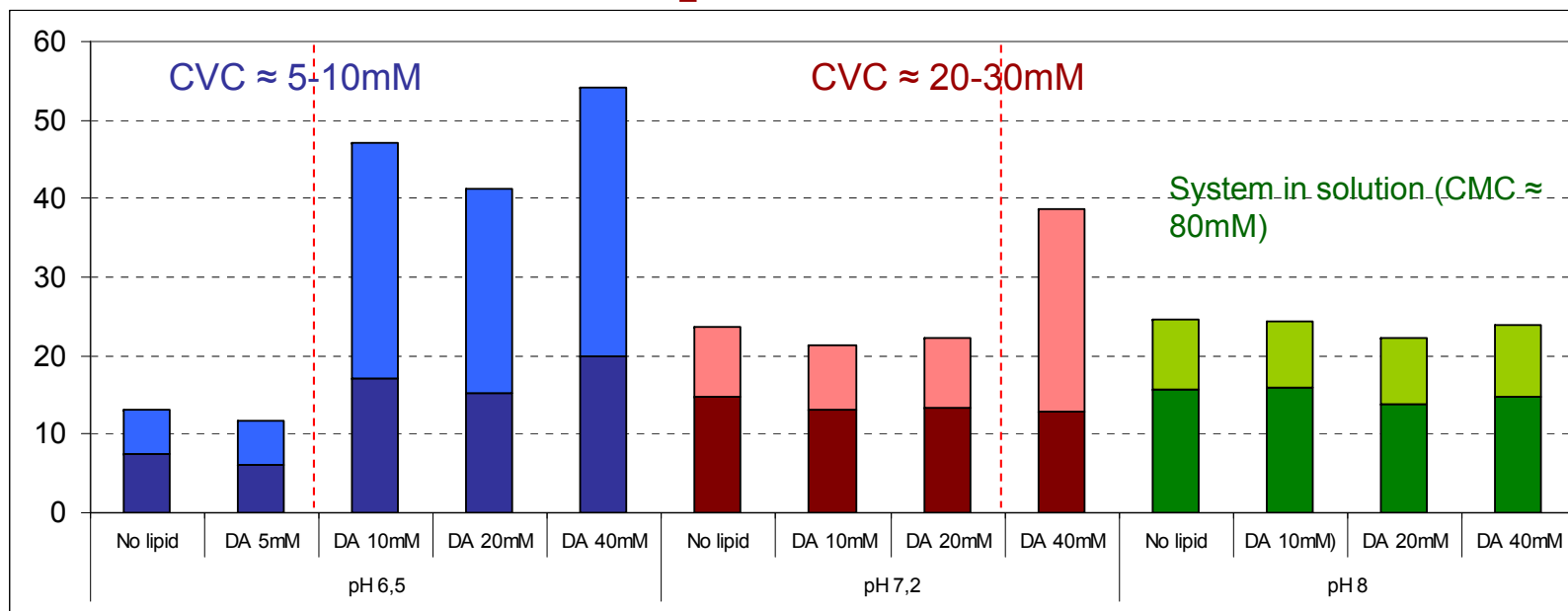
Chimie prébiotique des peptides + Biophysique des membranes de lipides



Adamala et al.,
2013

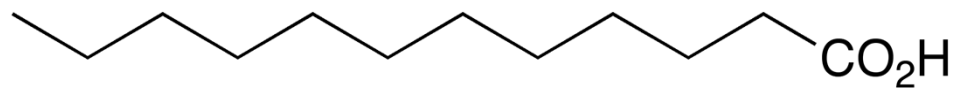
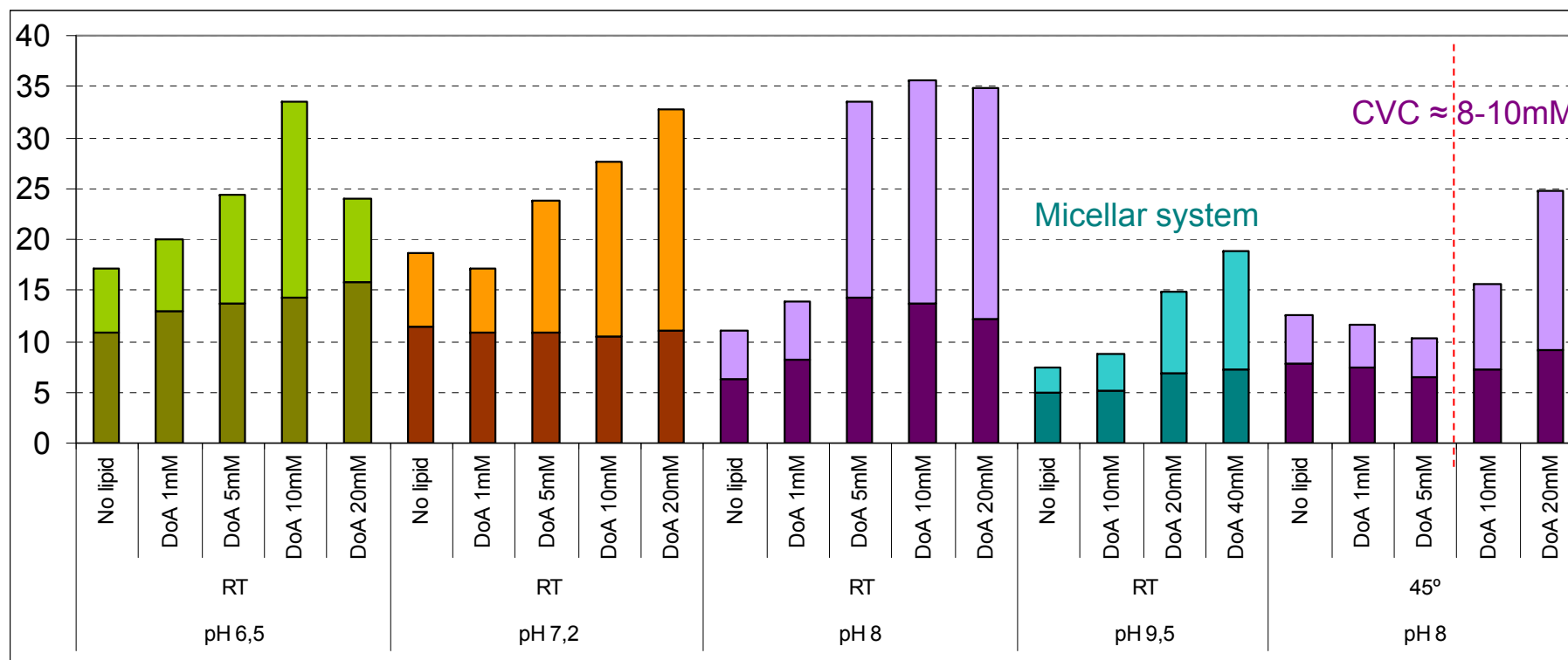


Formation de dipeptide : acide décanoïque. Analyse par HPLC

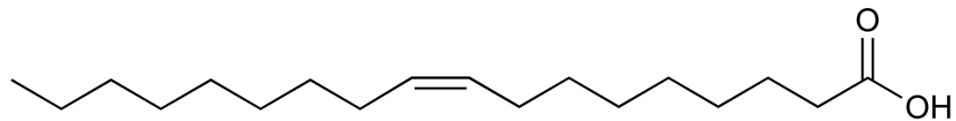
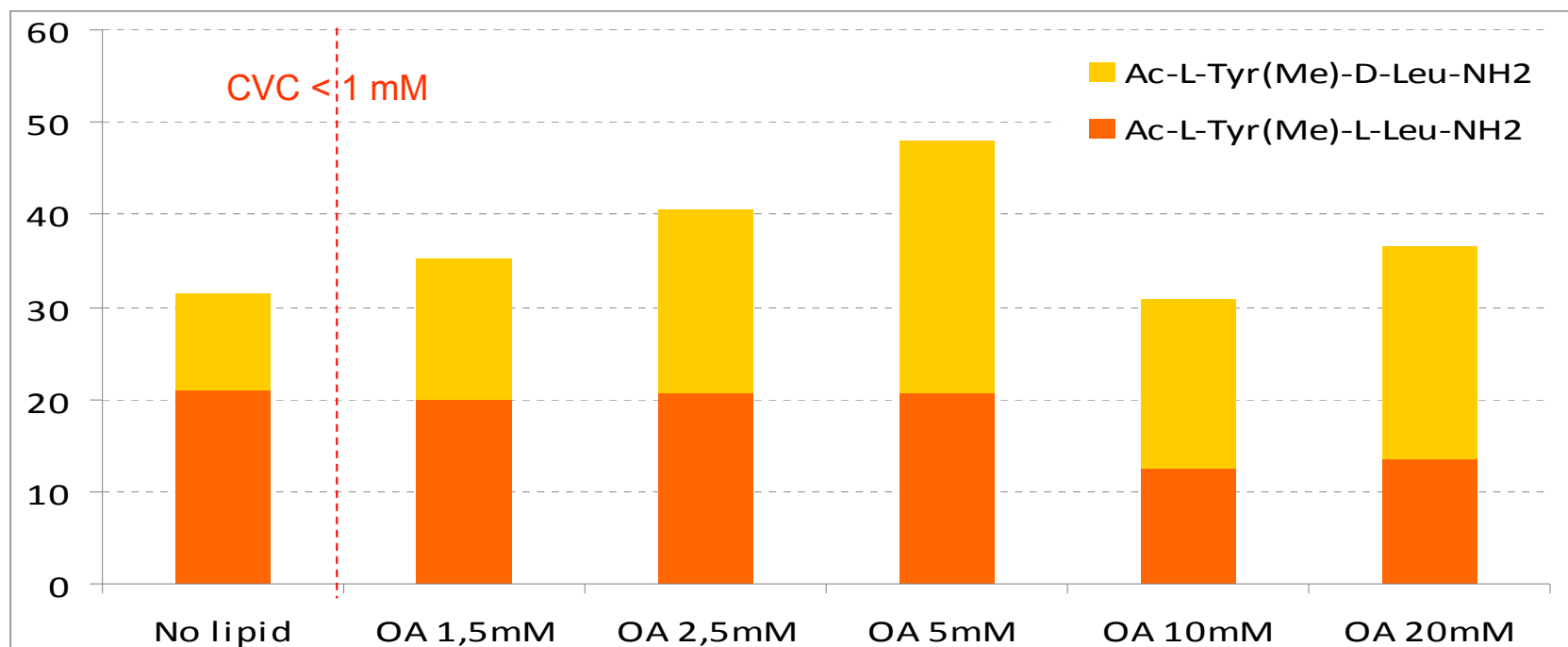


Formation de dipeptide : acide dodécanoïque.

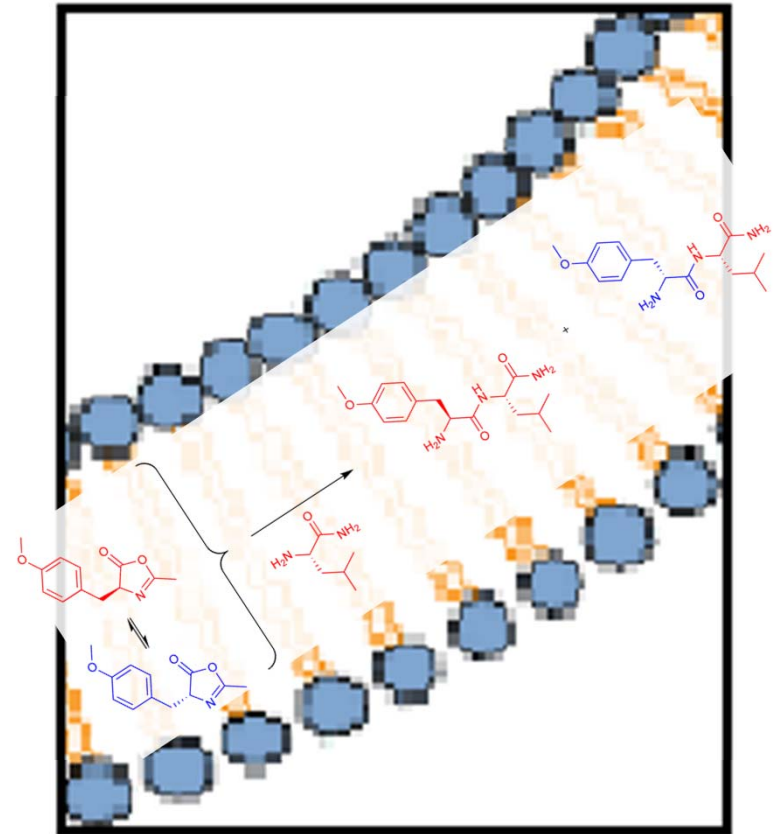
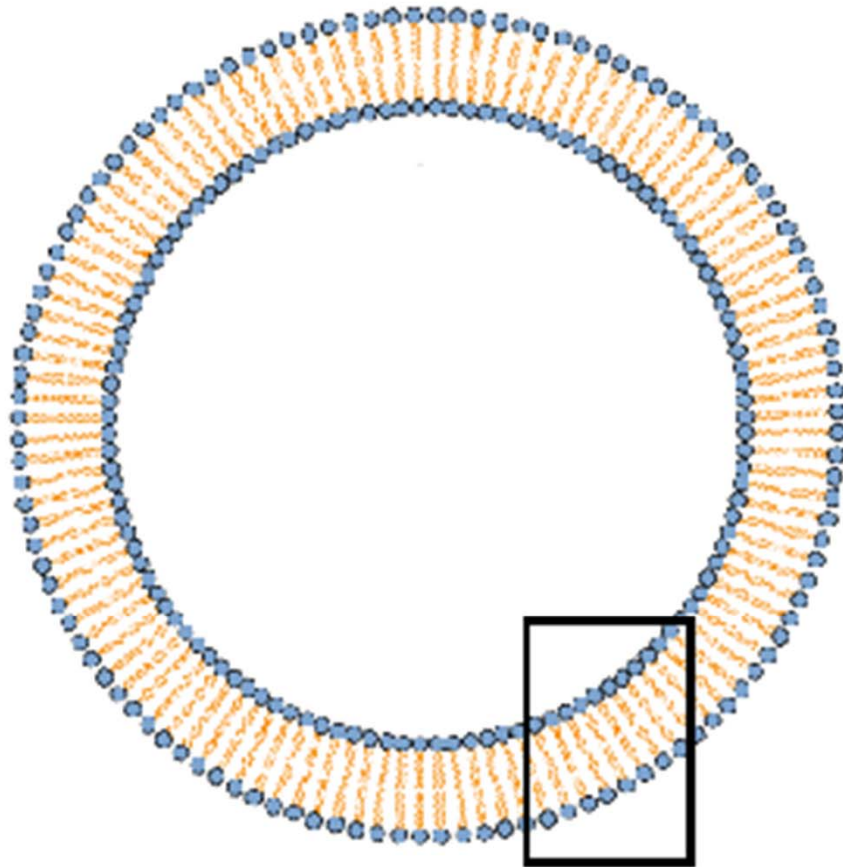
Analyse par HPLC



Formation de dipeptide : acide oléique. Analyse par HPLC



Où se déroule la réaction ?



Remerciements :

-CMST COST Action CM1304:

Emergence and Evolution of Complex
Chemical Systems



-IBMM/CNRS Université de Montpellier:

Damien Beaufigli

Ziwei Liu

Laurent Boiteau

Jean-Christophe Rossi

Robert Pascal



- IAS Research & Biophysics Unit (CSIC/
UPV-EHU). :

Kepa Ruiz-Mirazo



Universidad
del País Vasco

Euskal Herriko
Unibertsitatea



Vers une intégration systemique des chimies des peptides et des agrégats de lipides

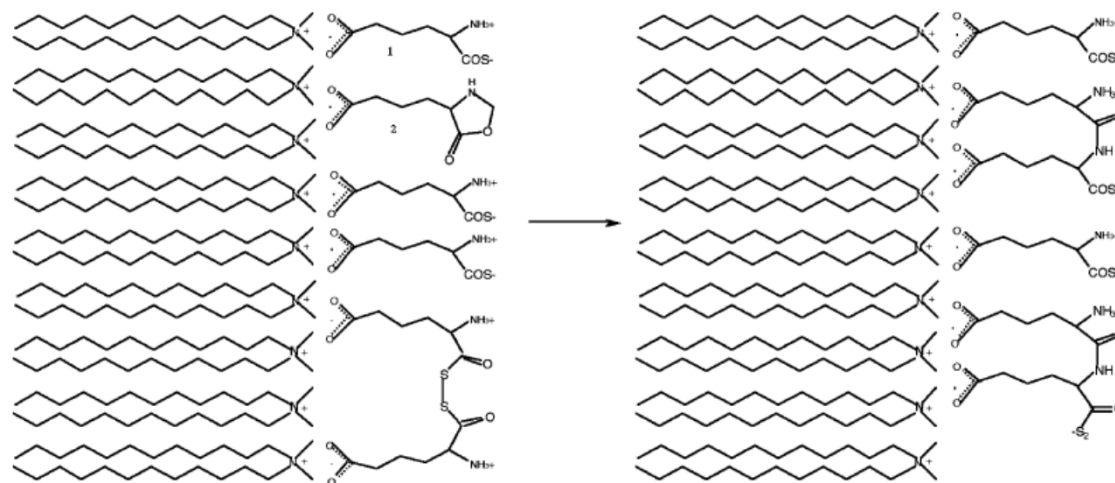
Merci pour votre attention!

MURILLO SANCHEZ Sara¹, BEAUFILS Damien², PASCAL
Robert², RUIZ MIRAZO Kepa¹

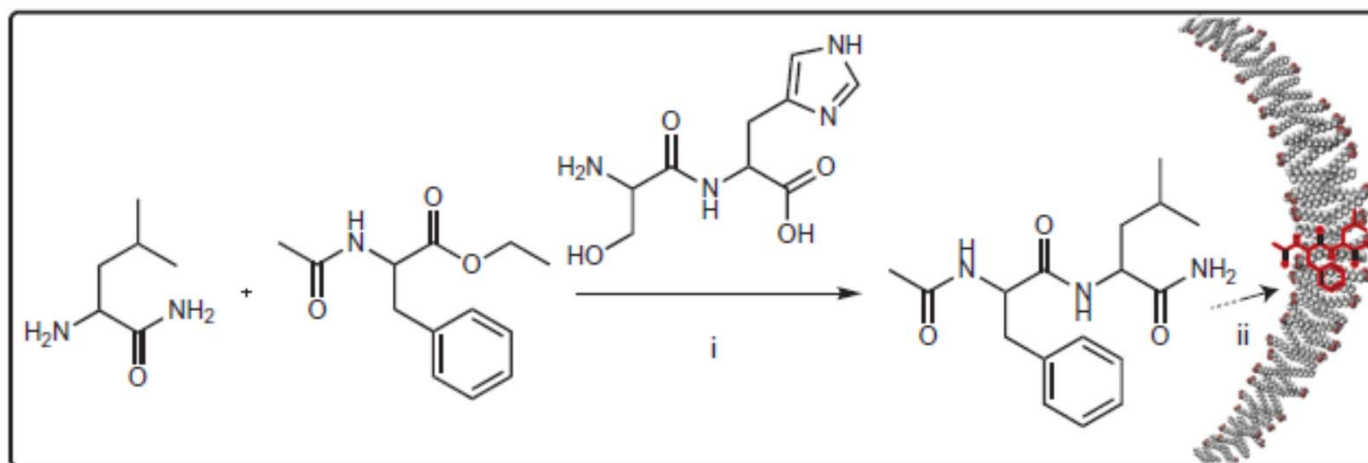
*1) Biophysics Unit (CSIC-UPV/EHU), Leioa and Department of Logic
and Philosophy of Science, Donostia-San Sebastián, Spain*

2) IBMM, CNRS – Université de Montpellier, France

Location of reaction



Zepik et al., 2007



Adamala et al., 2013

Chimie prébiotique des peptides + Biophysique des membranes de lipides

Transmission of photo-catalytic function in a self-replicating chemical system: *in situ* amphiphile production over two protocell generations† The Royal Society of Chemistry 2014

A. N. Albertsen,^a S. E. Maurer,^b K. A. Nielsen^a and P.-A. Monnard^{*a}