

**MASTER 2 Research**  
**Fragrances & Fine Chemistry**

UNIVERSITÉ  
CÔTE D'AZUR 



# Co diploma MASTER 2 Chemistry









# Grasse



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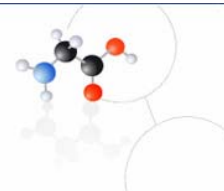


# MASTER 2 Research

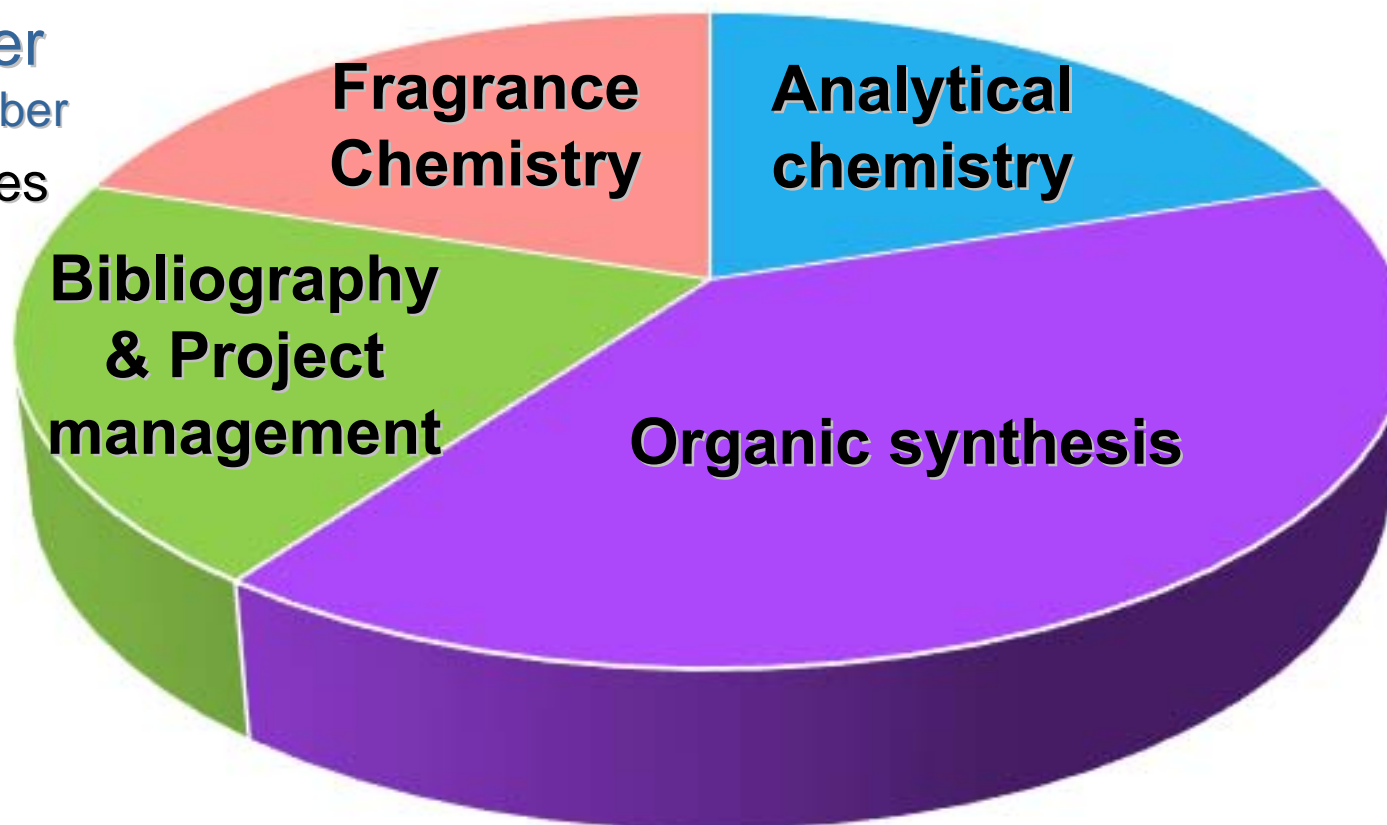
## Fragrances & Fine Chemistry



Département  
de **CHIMIE**  
Nice



1<sup>st</sup> Semester  
October-December  
English courses

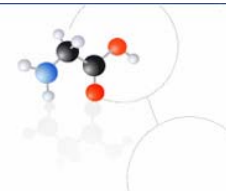


# MASTER 2 Research

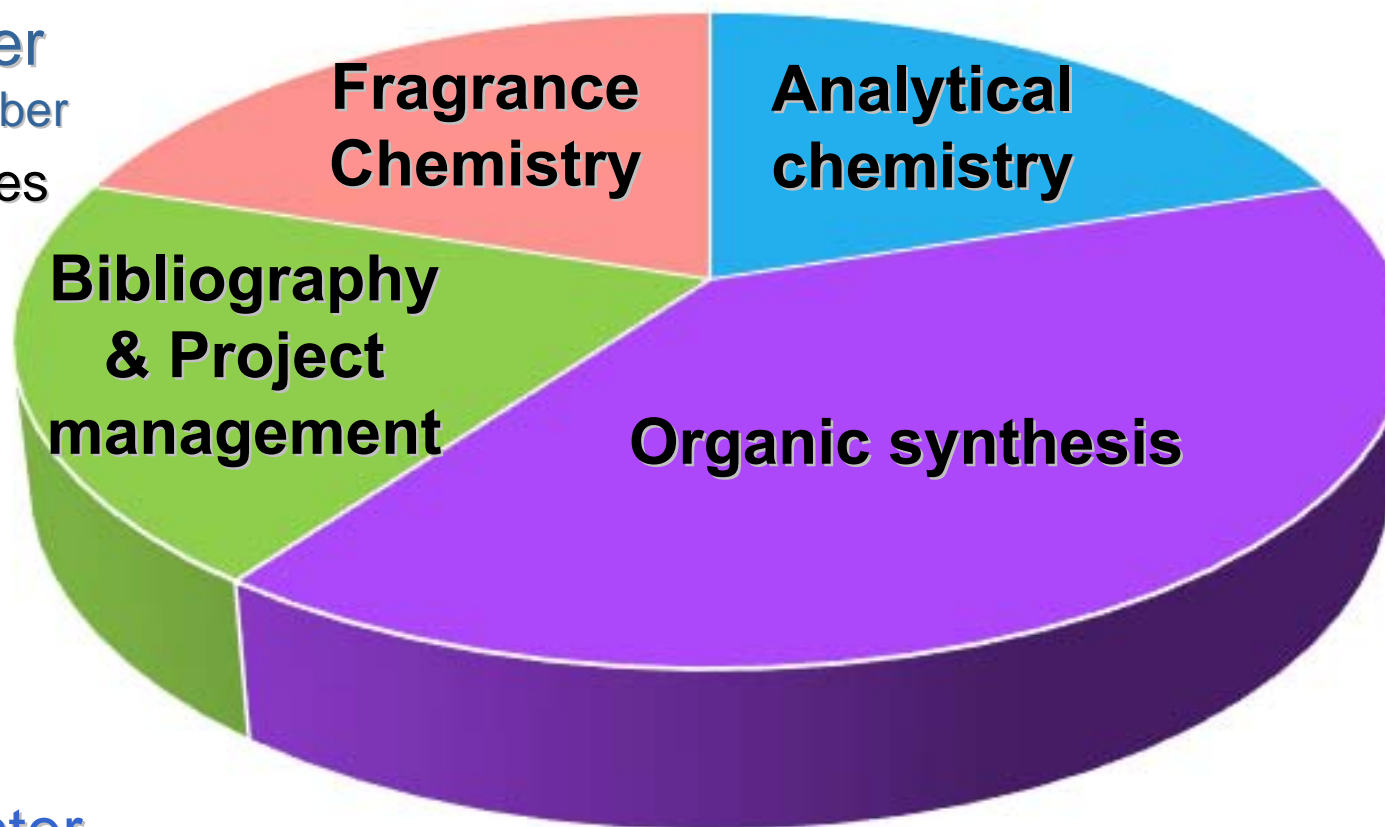
## Fragrances & Fine Chemistry



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1<sup>st</sup> Semester  
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2<sup>nd</sup> Semester  
January-June

**Practical activity**



# Host laboratories



<http://www.unice.fr/icn/>

Laboratoire  
Physique de la Matière Condensée



<http://lpmc.unice.fr/>



<http://www.cepam.cnrs.fr/>



<http://www.unice.fr/ecomers/>



<http://www.unice.fr/icn/>

Fragrance chemistry

Origin of Life

Eco-Friendly Materials and Polymers

Bioactive molecules

Catalysis & Fine Chemistry

Fluorescent Probes

Marine Natural Products

Bioinspiration

Decorporation

# Bioactive molecules

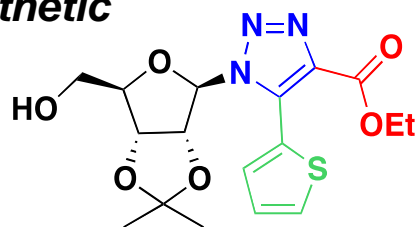
## Therapeutic Innovation

Bioactive  
Molecules

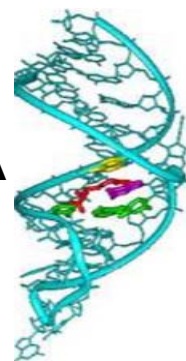
New  
Biological  
Target

New Mode  
of Action

**Synthetic**



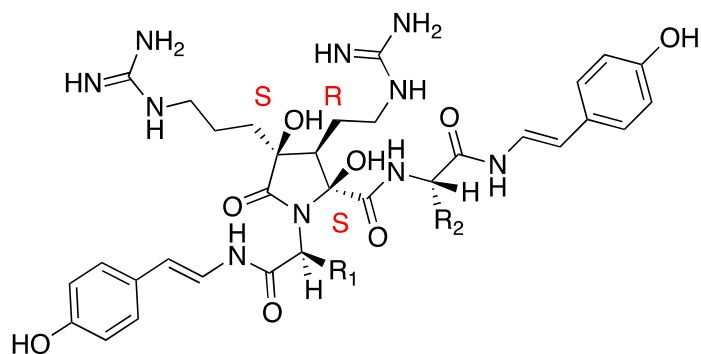
RNA



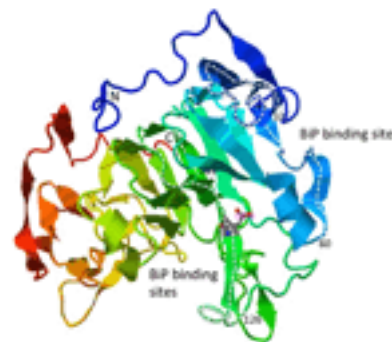
Induce stress in  
cancer cells

Selective targeting of  
cancer stem cells

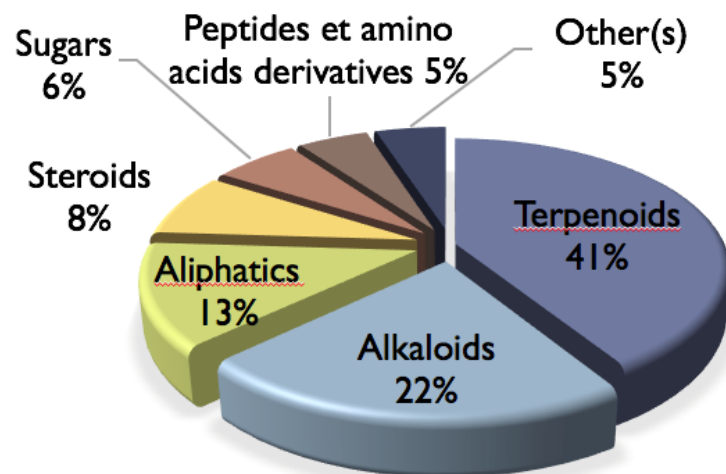
**Natural**



Proteins



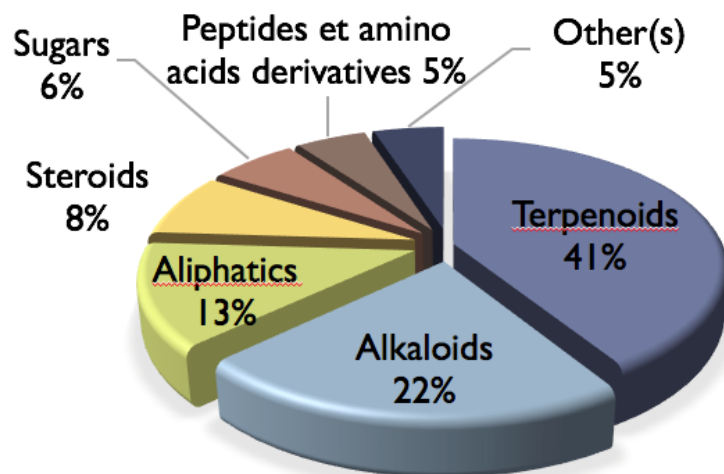
## Classes of molecules from marine environment



## → Applications:

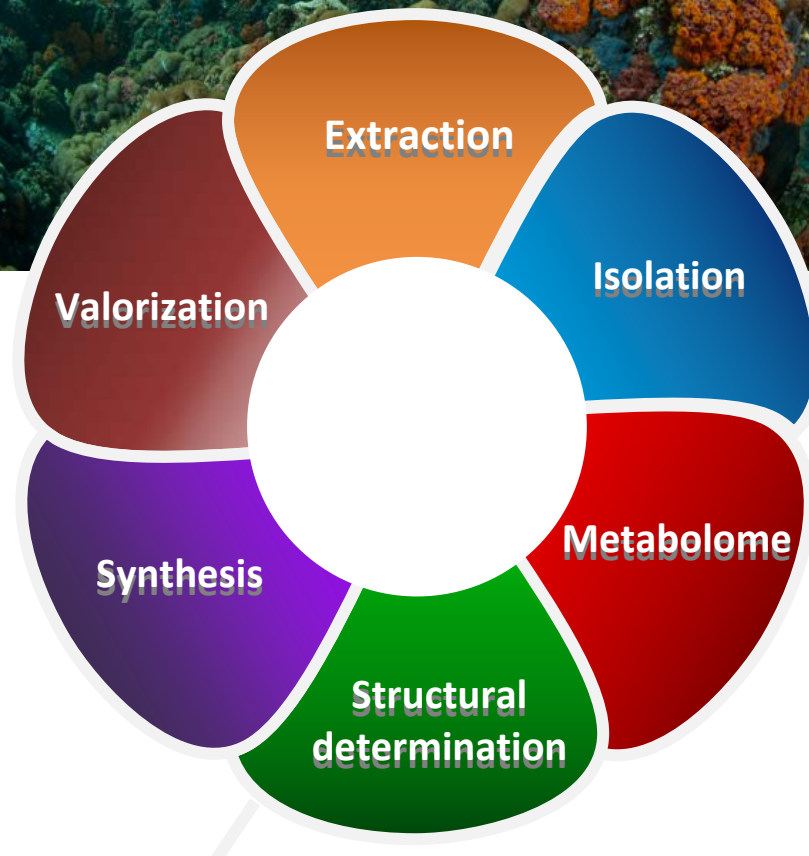
- Pharmaceutical
- Environmental (antifoulings)
- Cosmetics

## Classes of molecules from marine environment



## → Applications:

- Pharmaceutical
- Environmental (antifoulings)
- Cosmetics



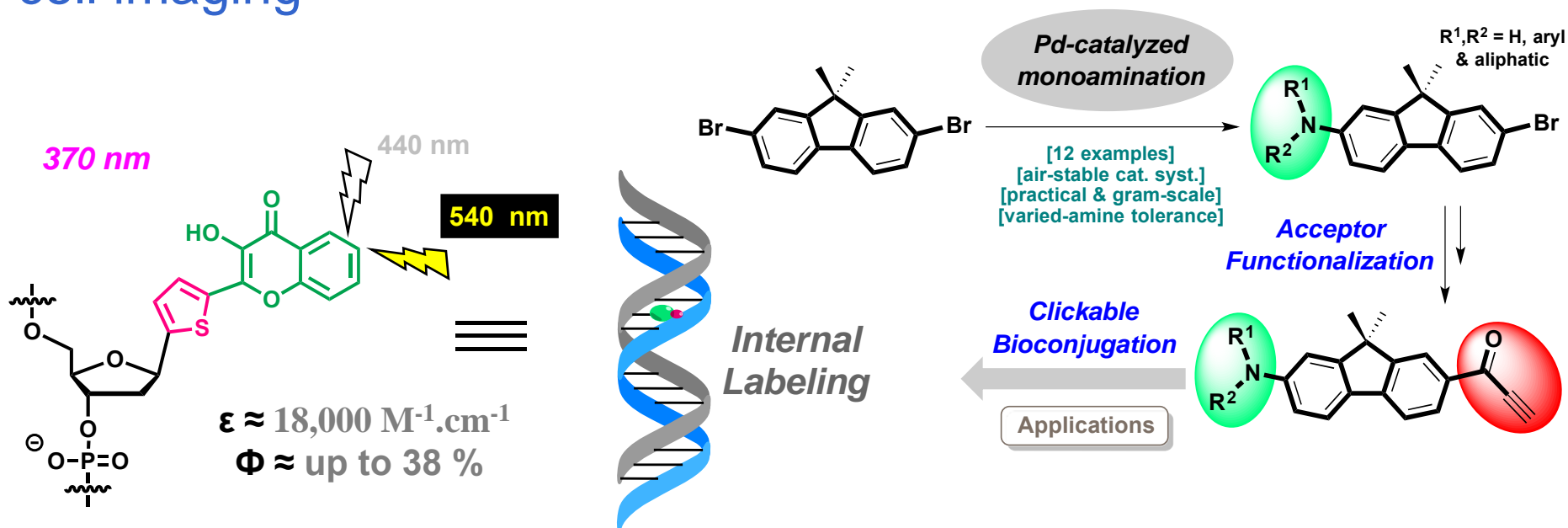
# Fluorescent Probes

## Objective

To understand nucleic acid / protein and nucleic acid / nucleic acid assemblies.

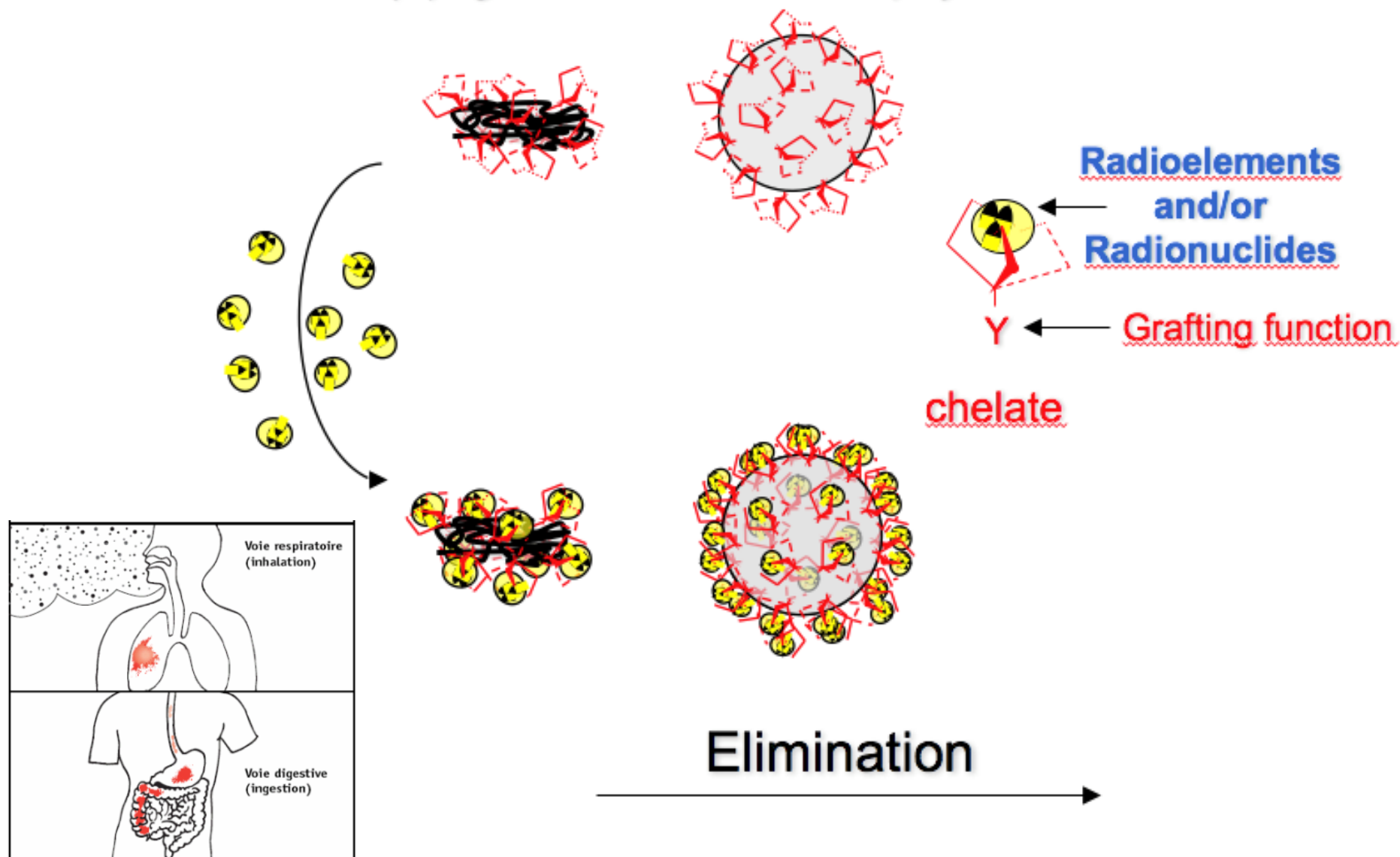
## How ?

Synthesis of dedicated fluorescent tools for in vitro studies and cell imaging



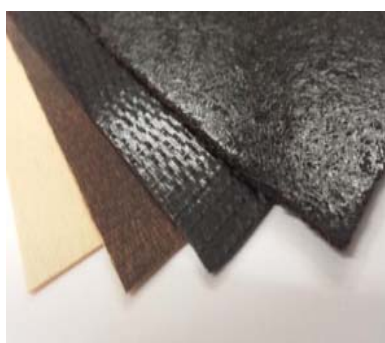
# Decorporation

(in)organic macromolecules or polymers



# Eco-Friendly Materials and Polymers

- \*Biobased and/or eco-friendly **polymers** and **(nano)composites**
- \***Valorization** of :
  - second generation biomass
  - co-products from industry and bioraffineries
- \***Recycling** and circular economy



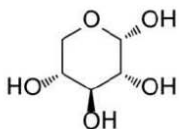


# Eco-Friendly Materials and Polymers

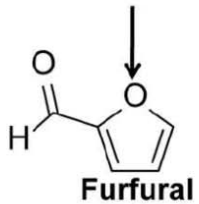
## Biorefinery Ligno-cellulosic biomass



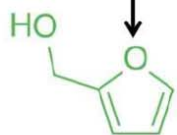
Hemicellulose



Xylose



Furfural



Furfuryl Alcohol (FA)

POLYMER  
COATING / VARNISH

Radical polymerization

Cationic polymerization:

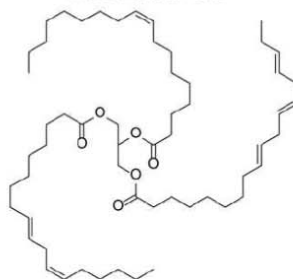
- Catalyst :
- Brønsted Acid: HCl...
- Lewis Acid:  $TiCl_4$ ...

Ex :  $BF_3 \cdot NH_2Et$  catalyst

PRINCIPAL REACTIVITY  
Epoxy/Alcohol

## Vegetable oils example of linseed oil

Linseed oil



Fatty Acid Composition (%):

- Palmitic: 5.5



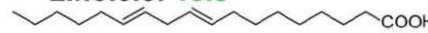
- Stearic: 3.5



- Oleic: 19.1



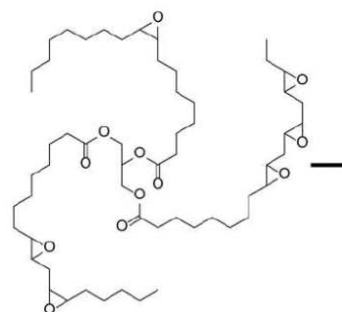
- Linoleic: 15.3



- Linolenic: 56.6



Functionalization:  
Chemical or enzymatic way



Epoxidized linseed oil (ELO)

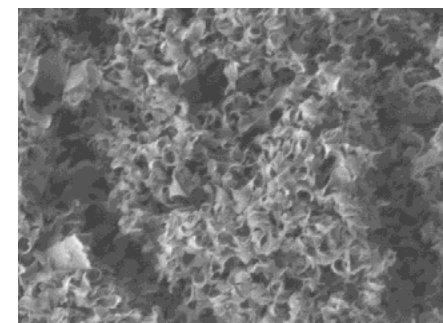
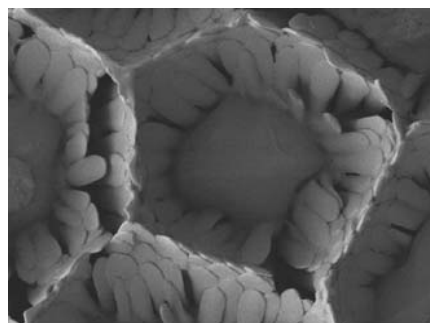
Anionic/Nucleophilic polymerization:

- Catalyst:
- Brønsted Base: NaOH...
- Lewis Base: tertiary Amine...

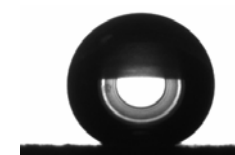
THERMOSET

# Bioinspiration

Inspiration from natural surfaces (Animal and vegetal)



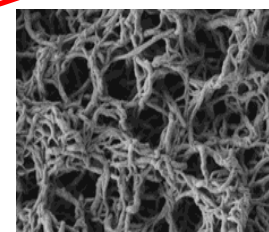
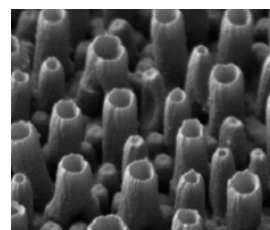
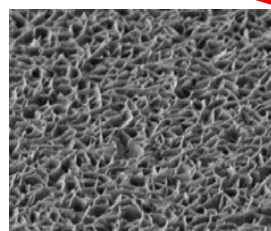
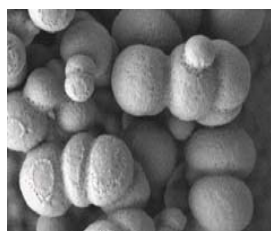
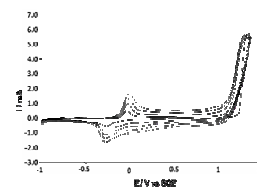
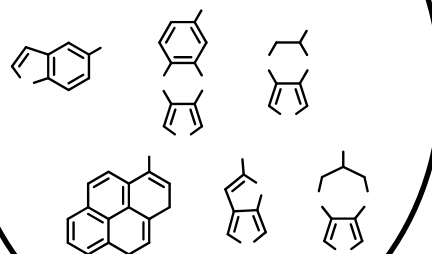
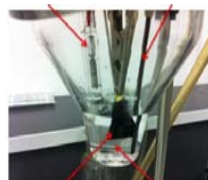
Applications for Surface Elaboration :



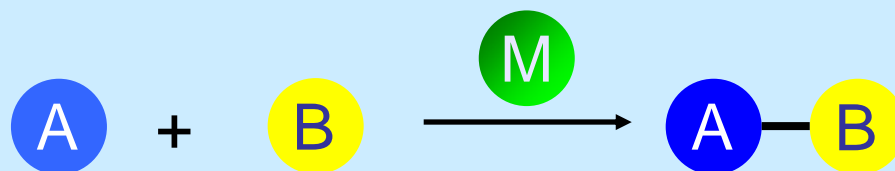
## Surface characterizations

## Electropolymerization

## Chemistry



# Catalysis & Fine Chemistry



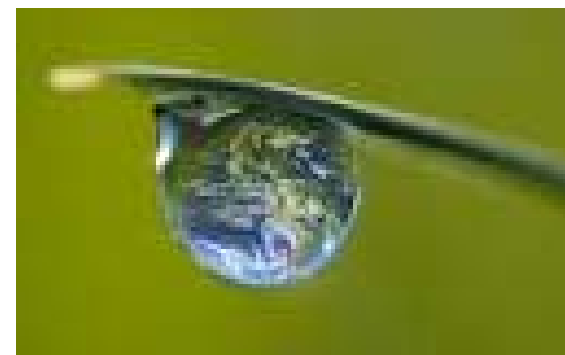
- ✓ Sustainable development
- ✓ Development of selective methods: C-C, C-O, C-N, C-F...
- ✓ High production, optimization of process



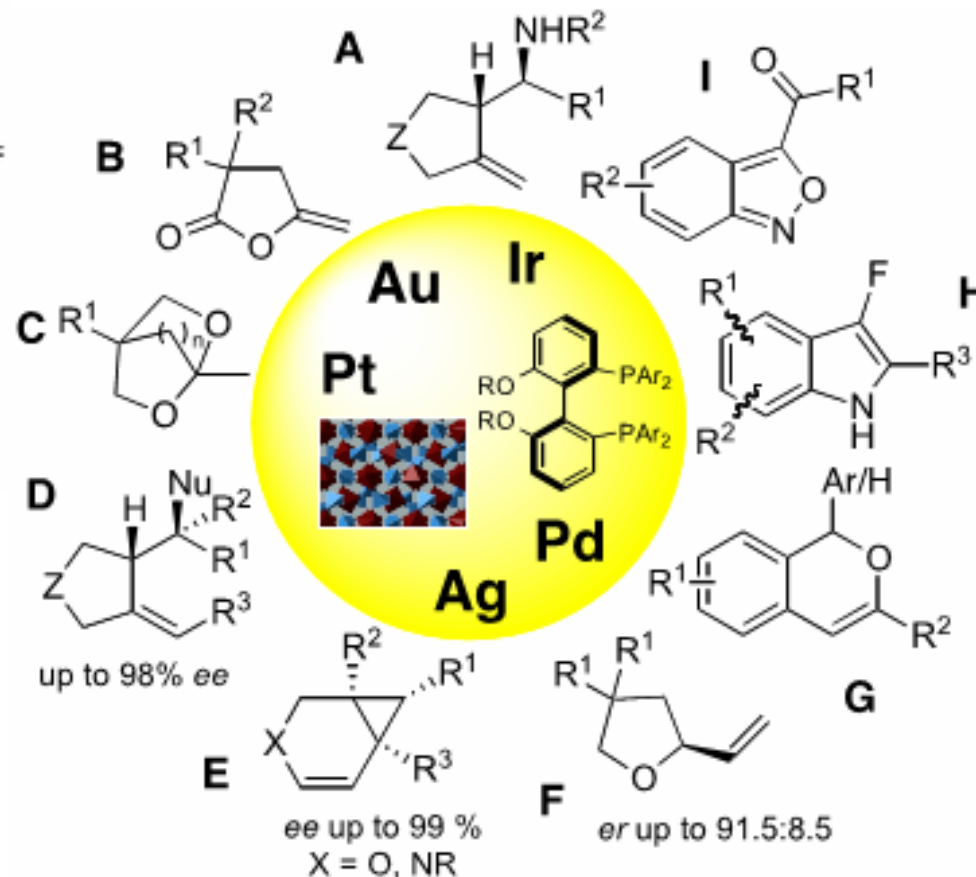
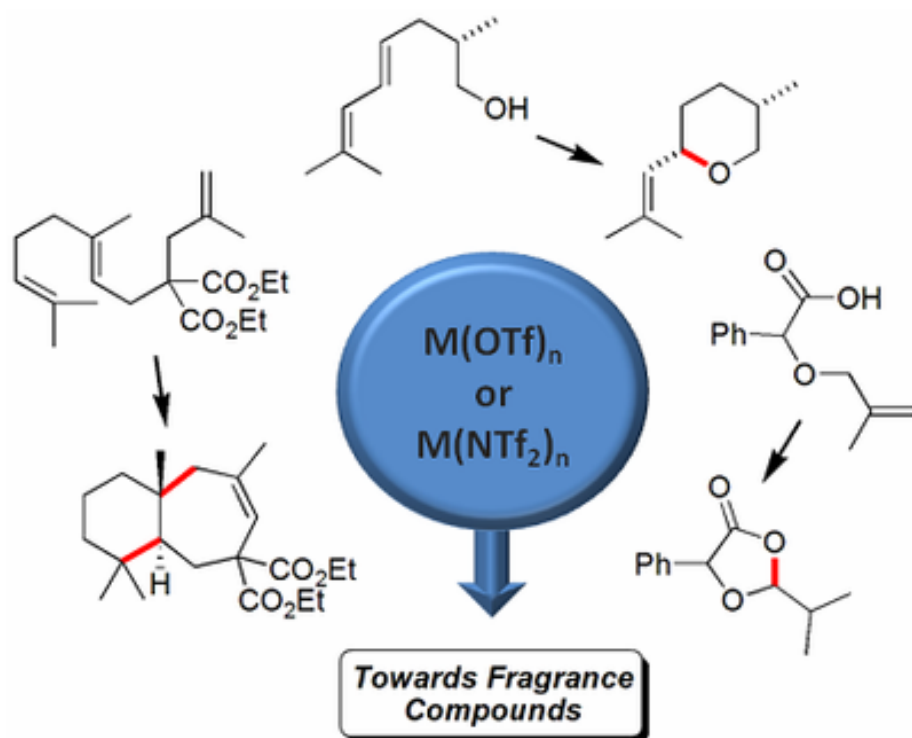
Recyclable catalyst



Chiral catalyst



Water-soluble catalyst



# Fragrance chemistry

## Characterisation of the odorants of natural raw materials : Chemical and Sensorial Analysis of Volatiles



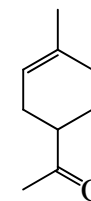
Mimosa



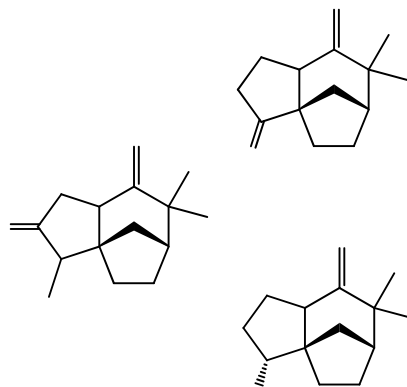
Violet



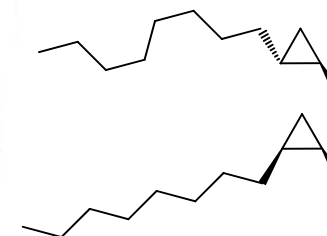
Atlas Cedarwood



Vetiver



Frankincense



## Characterisation of pheromones : Chemical Analysis & Behavioral studies

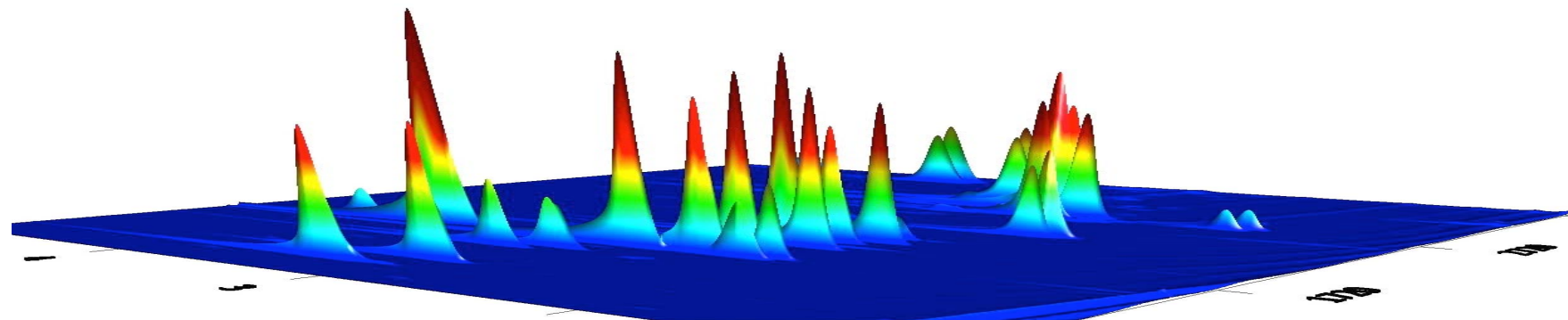
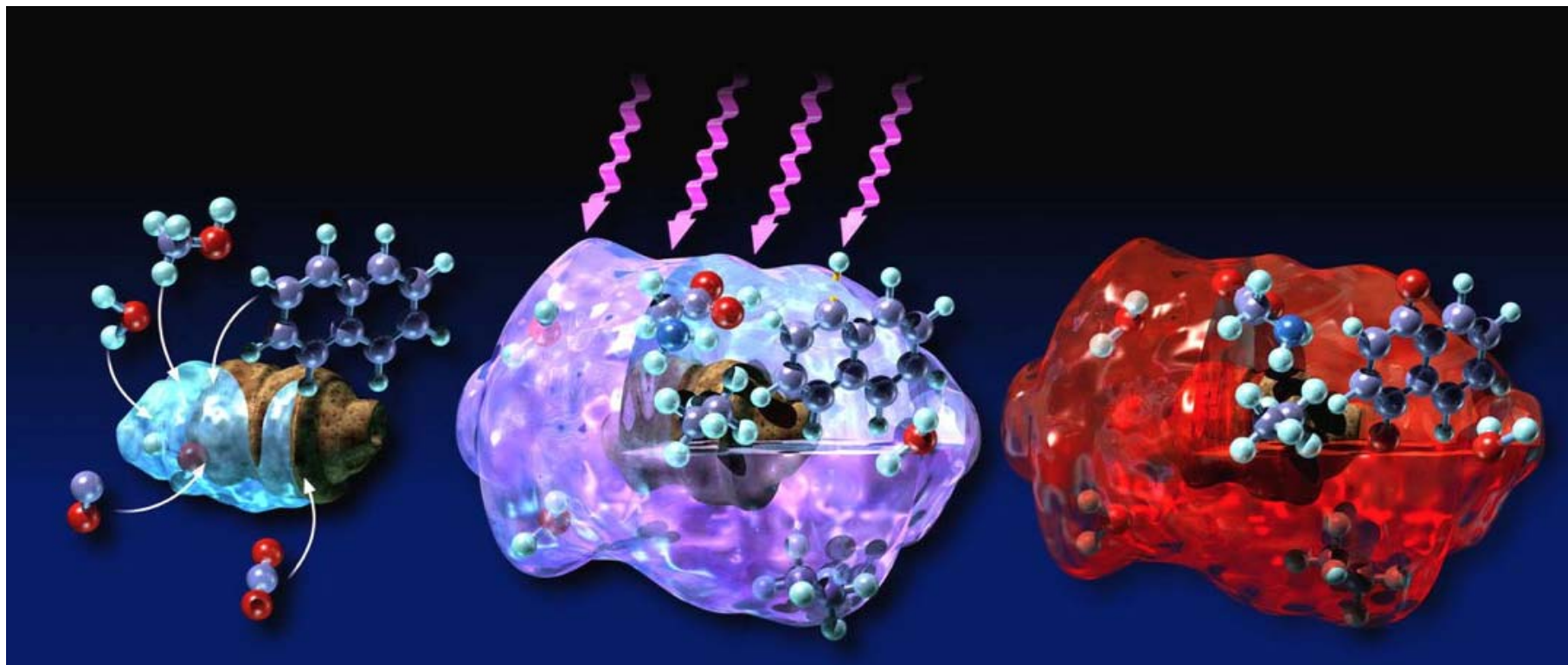
Human model :



Murine model :



# Origin of Life





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