Knowledge capture mechanisms studies as a tool to facilitate European Blue Biotech analysis
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In collaboration with Sophie Arnaud-Haond (Ifremer France),
Jesus M.Arrieta (CSIC-UIB Spain),
Antoine Schoen and Patricia Laurens (Université Paris-Est, IFRIS, France).
Knowledge Capture Mechanisms (KCM) are very similar to "Allosteric reaction" involving different parameters, control and feed back control. Analysis of KCM, at the core of technology transfer, contributes to a better understanding of interactions between University and Industry, Technology and Knowledge.

The present communication is focused on KCM involving Marine Genetic Resources and results obtained by Sophie Arnaud-Haond et al. It will present a research project and preliminary results describing some examples of knowledge transfer pathways.

Knowledge Capture Mechanisms

Knowledge Platform

Technology Platform

scientific papers
analysis
data mining etc

patents
patent analysis
data mining etc

« allosteric like »
Marine Biotechnology

- From Marine to Blue
- From Devices to Biology
- From « University » to « Industry »

- $MGR$ (marine genetic resources)
MGRs

- Marine Biodiversity and Gene patents
- Sophie Arnaud-Haond, Jesus M. Arrieta, Carlos M. Duarte.
- Science 2012: 331: 1521-1522
Patents Screening (Sophie Arnaud et al)

- Annotated by hand for marine sp.

- Base de donnée de brevets associés à des séquences d’origine marine

- Origin of patents claims traced using Patentscope (World Intellectual Property Office database)

- GenBank Patent Database (GenPAT)
Results

Arrieta JM, Arnaud-Haond S and Duarte CM. Unpublished result
<table>
<thead>
<tr>
<th>Country</th>
<th>Marine organism patent claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
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<tr>
<td>Germany</td>
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<td>Norway</td>
<td>9</td>
</tr>
</tbody>
</table>


Daniel Pardo. Kiel Submariner 9 May 2012
Knowledge Capture Mechanisms (approach)

- Key words extraction from Patents: an image of technology Platform
- Authors (A)/Inventors (I) identification
- A & I scientific production (WoS)
- Key words extraction from Scientific publication: an image of knowledge platform
Expectation

• MGRs Technology Platform vs Knowledge Platform
• Mapping
• Blue Biotechnology Landscape
KCM/MGRs Case Study Project

• Germany Key Player
  (149 patents)
• BASF (54 patents)
BASF at a glance

BASF is the world’s leading chemical company – The Chemical Company.

With about 111,000 employees, six Verbund sites and close to 370 production sites worldwide we serve customers and partners in almost all countries of the world.

In 2011, BASF posted sales of €73.5 billion and income before special items of approximately €8.4 billion.
We combine economic success, social responsibility and environmental protection. Through science and innovation we enable our customers in almost all industries to meet the current and future needs of society.

Our products and system solutions contribute to conserving resources, ensuring healthy food and nutrition and helping to improve quality of life.
We have summed up this contribution in our corporate purpose:

We create chemistry for a sustainable future.
KCM/MGRs Case Study Project

• BASF

Technology Key Words identified
A/I identified
Analysis in progress
WO 2007093776
as an example

- **Inventor(s):**
  - NAPIER JOHNATHAN [GB]; SAYANOVA OLGA [GB]; VENEGAS CALERON MONICA [GB] +

- **Applicant(s):**
  - BASF PLANT SCIENCE GMBH [DE]; NAPIER JOHNATHAN [GB]; SAYANOVA OLGA [GB]; VENEGAS CALERON MONICA [GB] +
The invention relates to nucleic acid derived from *Perkinsus marinus* which encodes a 9-elongase, a ?8-desaturase and a ?5-desaturase enzyme. All of the coding sequences can be transcribed as a single transcript.
*Perkinsus marinus* is a prevalent pathogen of oysters, causing massive mortality in oyster populations. The disease it causes is known as "Dermo" (or, more recently, as "Perkinsosis"),[1] and is characterized by proteolytic degradation of oyster tissues. Due to its negative effect on the oyster industry, parasitologists interested in helping oyster farmers are trying to find novel strategies to combat the disease. *P. marinus* are found in marine water, and grow especially well in warm waters during the summer months. Its genome has been sequenced by TIGR, but as of Nov, 2010 no publication describing this can be found in PubMed. The size of the genome is estimated to be ~86 megabases.
elongase (plural elongases)

- 1. (biochemistry) Any enzyme that catalyzes the elongation of an aliphatic chain, but especially one that elongates a fatty acid
Technology Key Words

Perkinsus marinus
9-elongase, Δ8-desaturase and a Δ5-desaturase enzyme
Fatty acids and triacylglycerides
transgenic plants …..
Knowledge Key Words

• **Professor Johnathan Napier**
• Biological Chemistry Department, Rothamsted Research,, Harpenden, Hertfordshire
The role of D6-*desaturase* acyl-carrier specificity in the
efficient synthesis of long-chain polyunsaturated fatty acids in *transgenic plants*

Olga Sayanova, Noemi Ruiz-Lopez, Richard P. Haslam and Johnathan A. Napier*

Department of Biological Chemistry, Rothamsted Research, Harpenden, Herts, *UK*
Data

- Patents in genbank
- Identification of patents on marine genes
- Germany - largest patent holder in Europe
- BASF, largest patent holders from Germany: 68 distinct patents (with relevant information) and 112 distinct inventors
Data Analysis

• 112 inventors in the 68 BASF patents
• 86 distinct scientific papers, where one of these 112 inventors appear as coauthor (374 in total) & where BASF is one of the signing institutions
• Analysis of this data as Graphs / Networks
• institutions & institutions, institutions & kw; authors & kw
Network analysis of Scientometric Data

• Data Mining

• GEPHI
BASF scientific collaborations developed by researchers mentioned as inventors in BASF marine biotech patents
BASF scientific research carried out by Researchers mentioned as inventors in BASF marine biotech patents
BASF scientific research carried out by researchers mentioned as inventors in BASF marine biotech patents - researchers
Research project Road Map

- BASF fine tuning
- Germany
- Europe