

# Demonstration of health promoting effects of fish protein hydrolysates by animal testing



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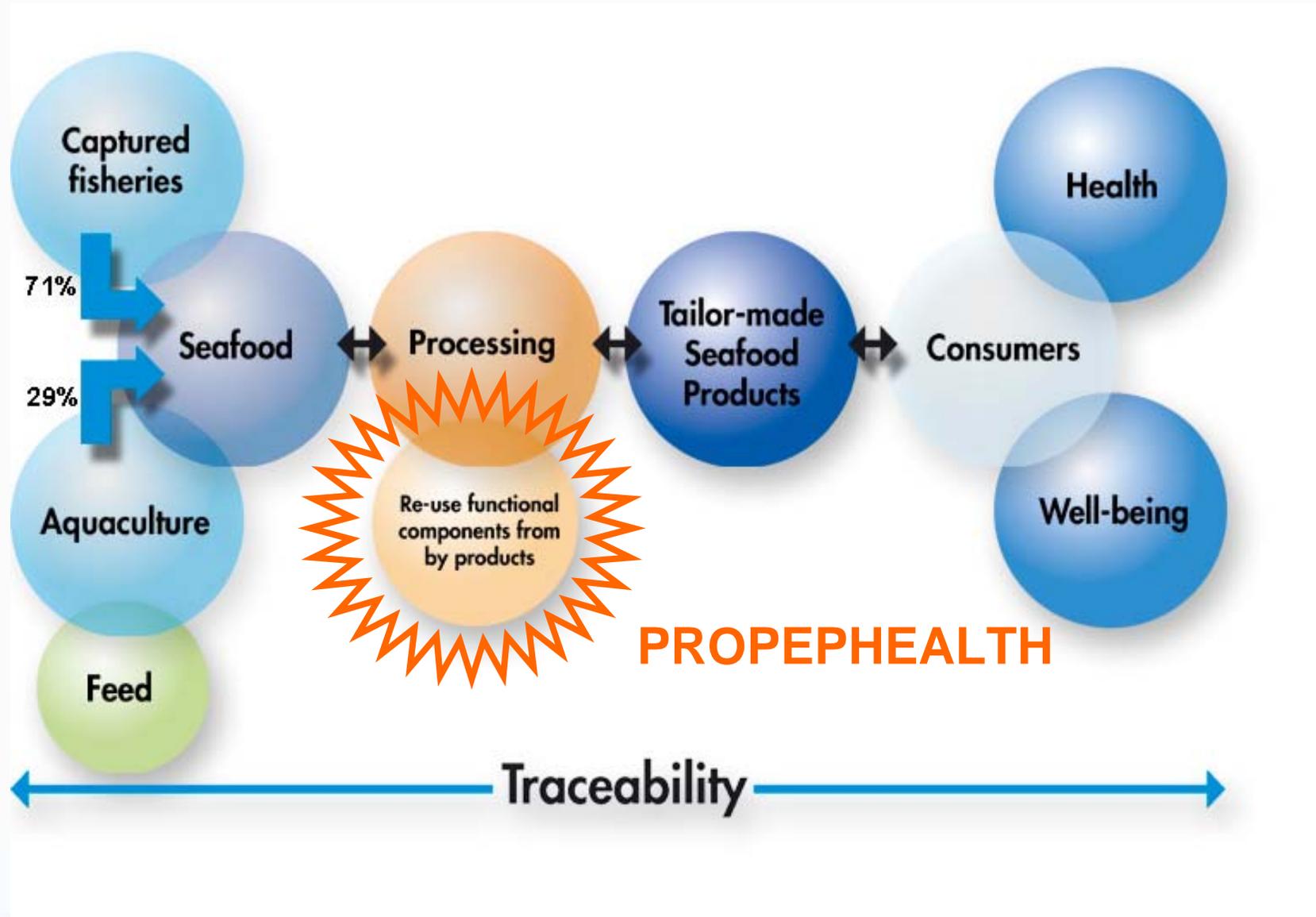
*8 Matis ohf, Reykjavik, Iceland-*

*9 Copalis-CTPP, Boulogne sur Mer, France*

*10 Marinova, Højmark, Denmark*

**SEAFOODplus PROJECT 4.1. PROPEPHEALTH**

# The Total Food Chain approach



# Fish Market



World production (Millions T)

- capture 98
- aquaculture 27

30 to 50 %

**By-products**



*Gadus morhua*

**H  
Y  
D  
R  
O  
L  
Y  
S  
I  
S**

**Biological activities !**

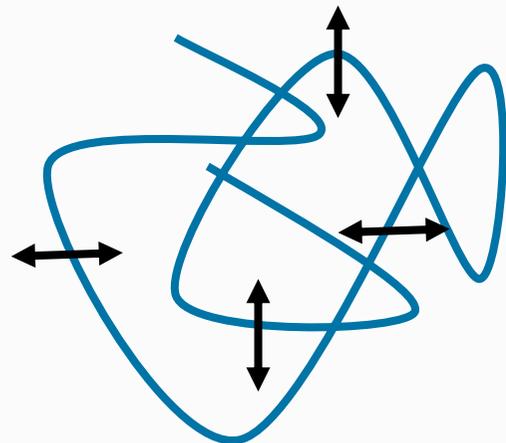
*In vitro* tests

**Peptides**



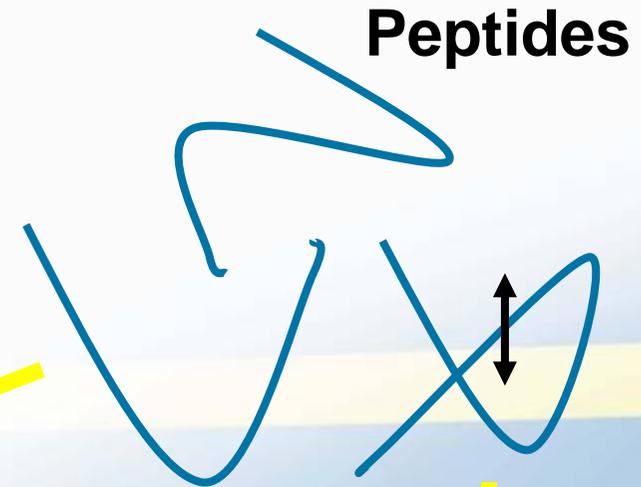
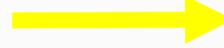
*In vivo* tests

# Hydrolysates ?



**Native protein**

**Hydrolysis**



**Peptides**

**Change of conformation**



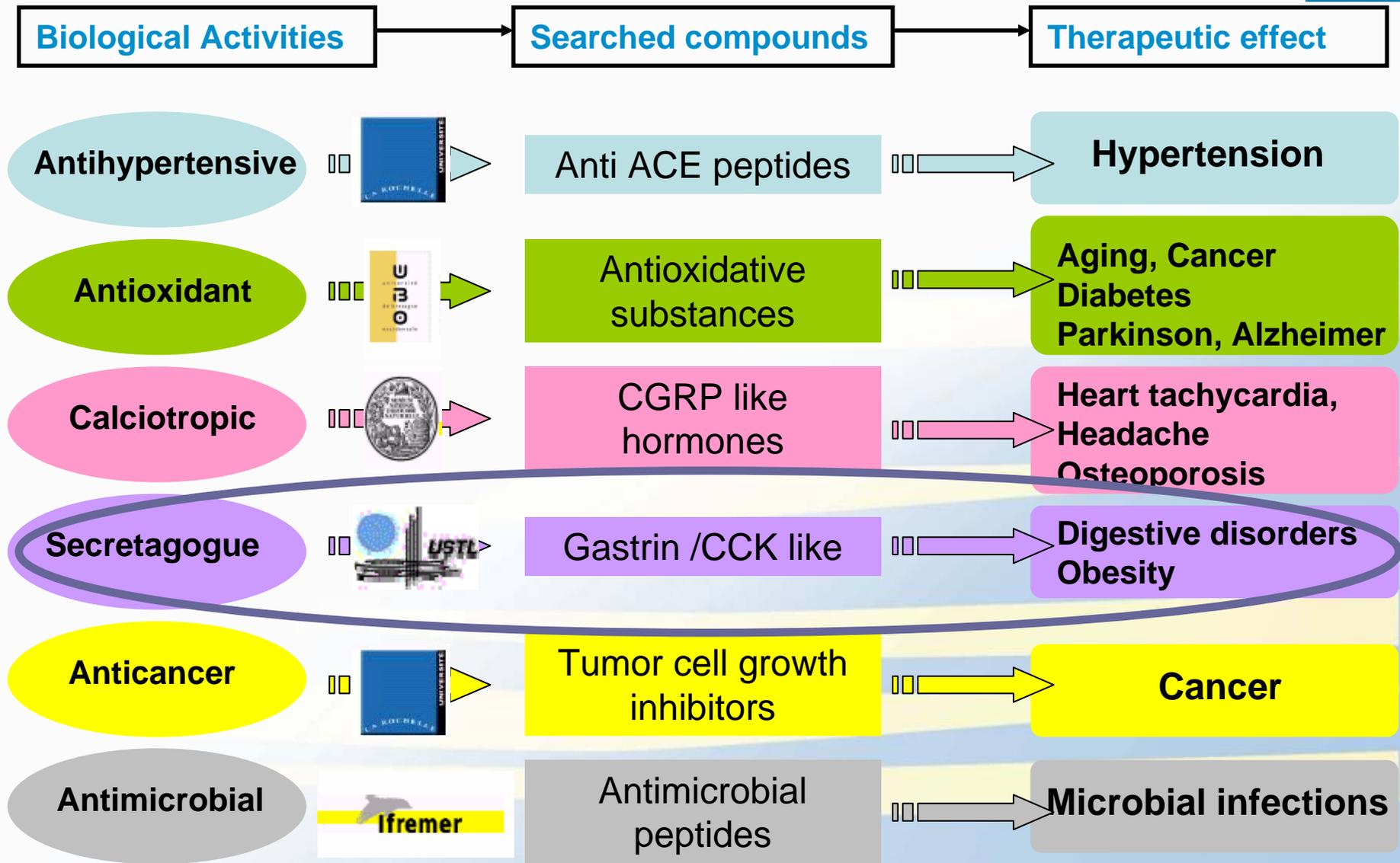
**New hydrolysis**



**Amino-acids**



# Therapeutic effects for nutraceutical uses



# Physiological effects of Gastrin/CCK

## Two target physiological functions

### -Digestion :

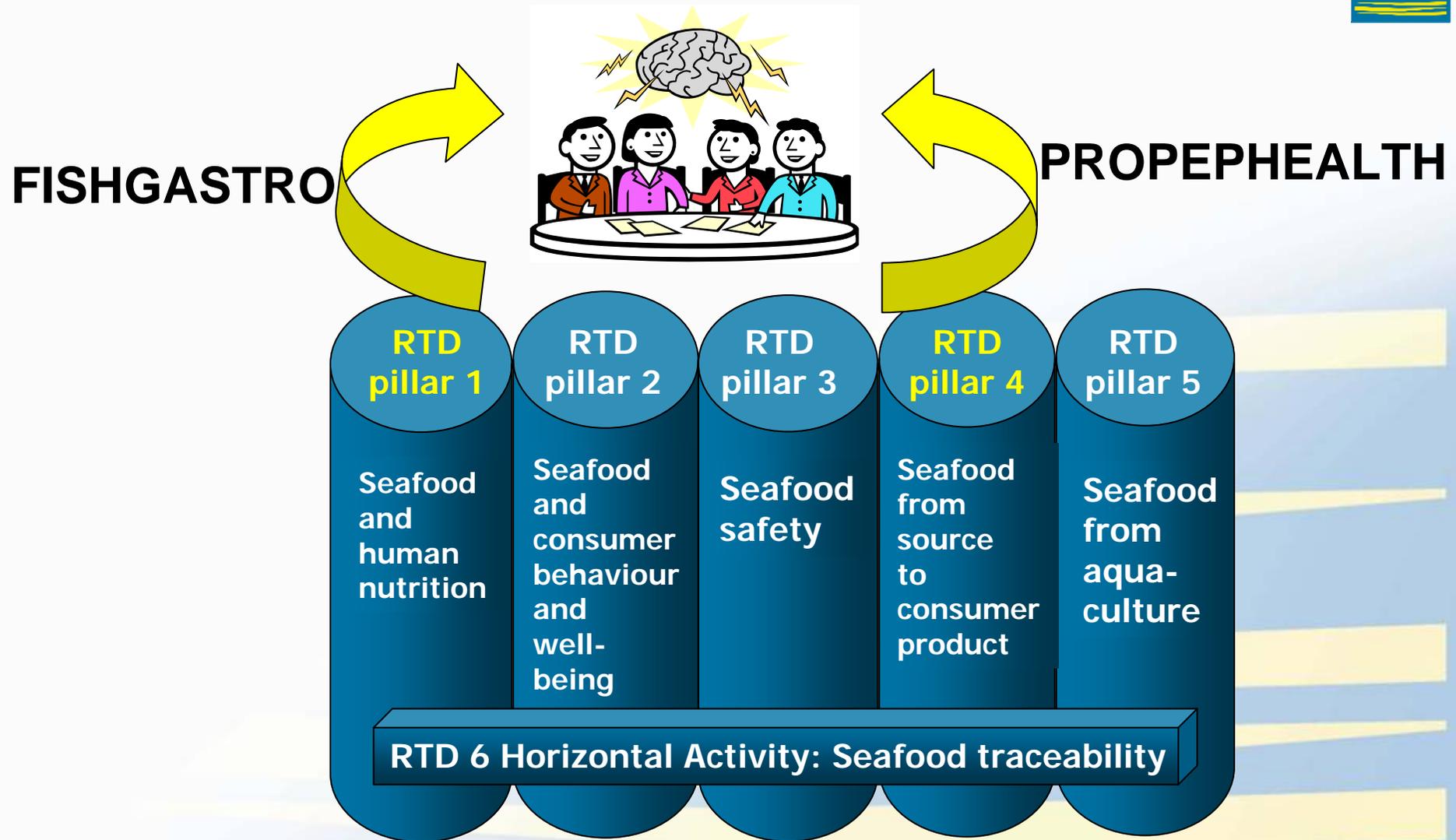
- By the stimulation of intestinal contractions and mobility
- By the secretion of digestive enzymes

-Satiety : the binding of CCK8 to their receptors give to the brain a satiety signal



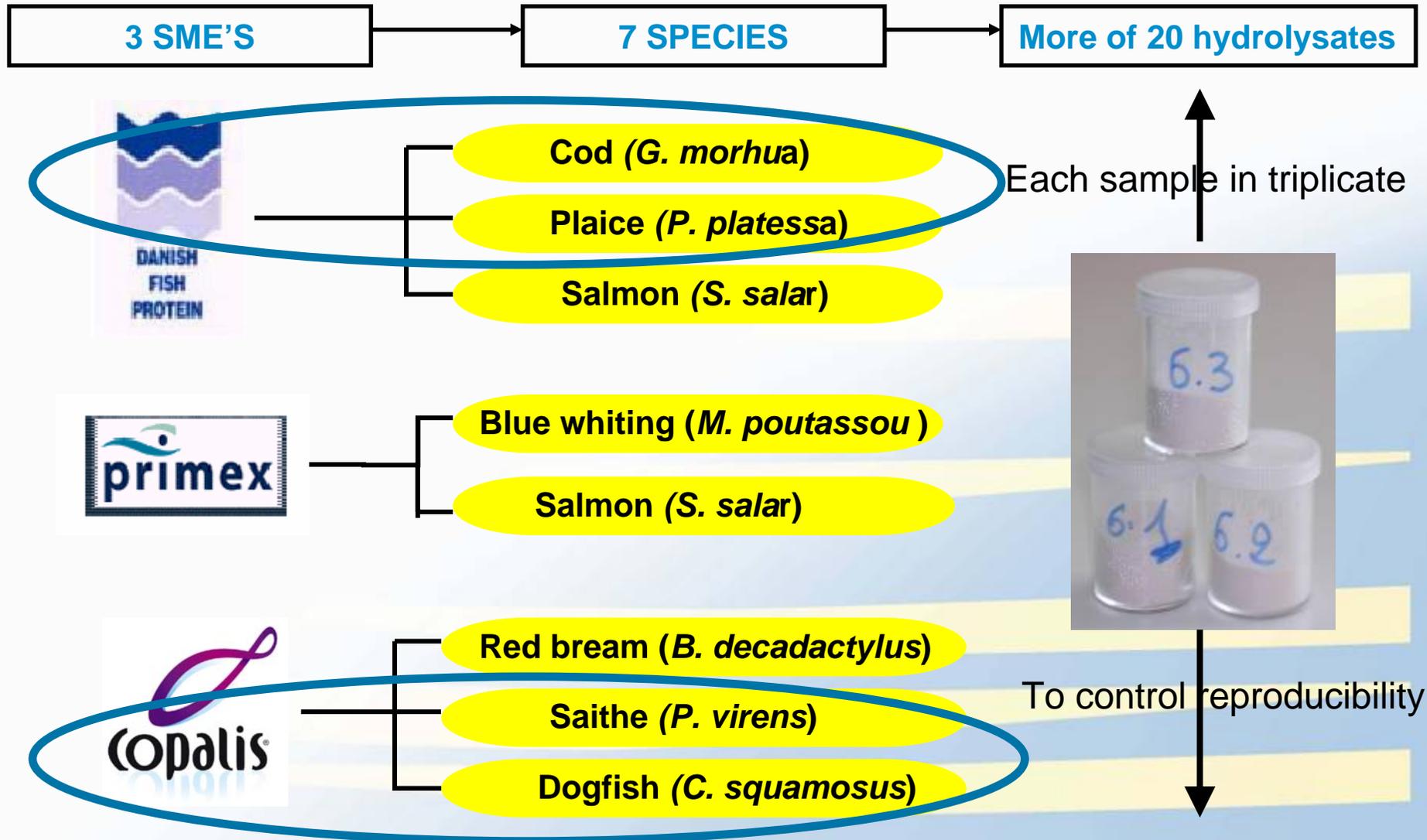
no resistance in obese patients

# Integrating the research



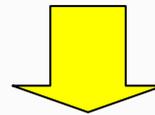
**The challenge:** To have researchers from very different scientific areas work closely together

# Peptide preparation



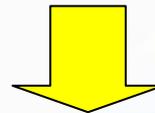
# In vivo tests : two steps

## Ingestion orogastric of peptide fractions



First step : 21 days

Measurement of the food intake  
and of the body weight



Second step : after 24 hrs of fasting

Measurement of the food intake  
and of plasmatic molecules

CCK  
Insulin  
Cholesterol  
Glycemia



H1 : Plaice

H2 : Cod 8650

H3 : Cod 8649



H1 : Siki

H2 : Saithe fermented

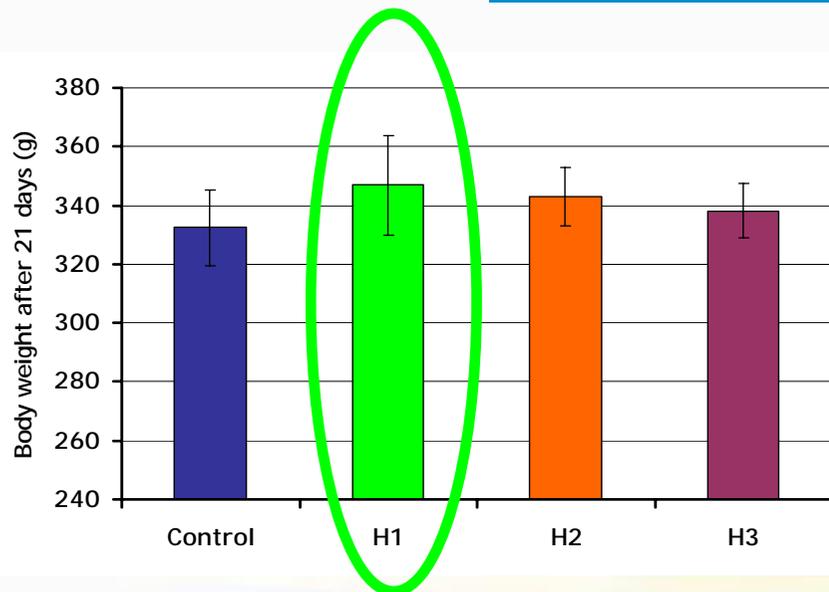
H3 : Nutipeptin

# In vivo tests : first step 21 days

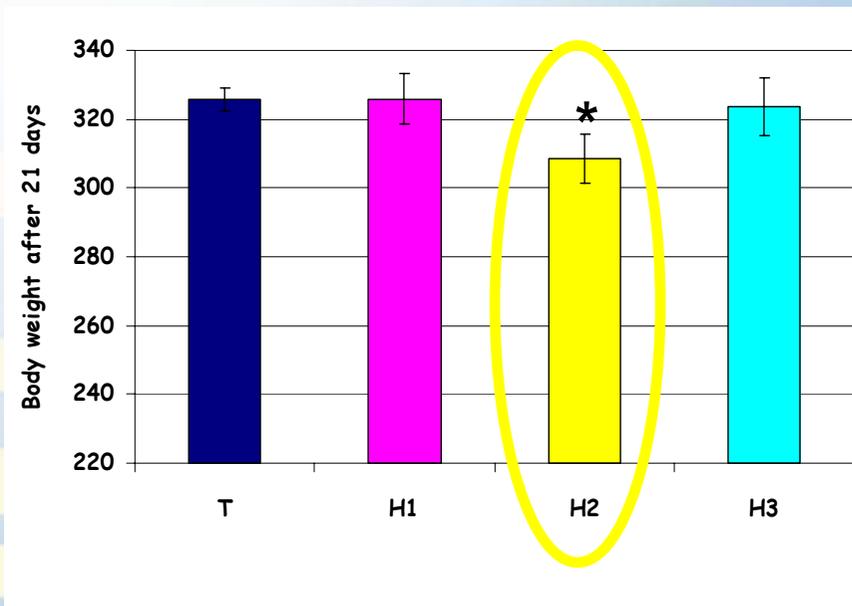
Daily orogastric ingestion on 4 groups of 8 rats :  
control T(0.5 ml distilled water ) and 3 hydrolysates H (50 mg/0.5 ml)



Measurement of the food intake  
and of the body weight



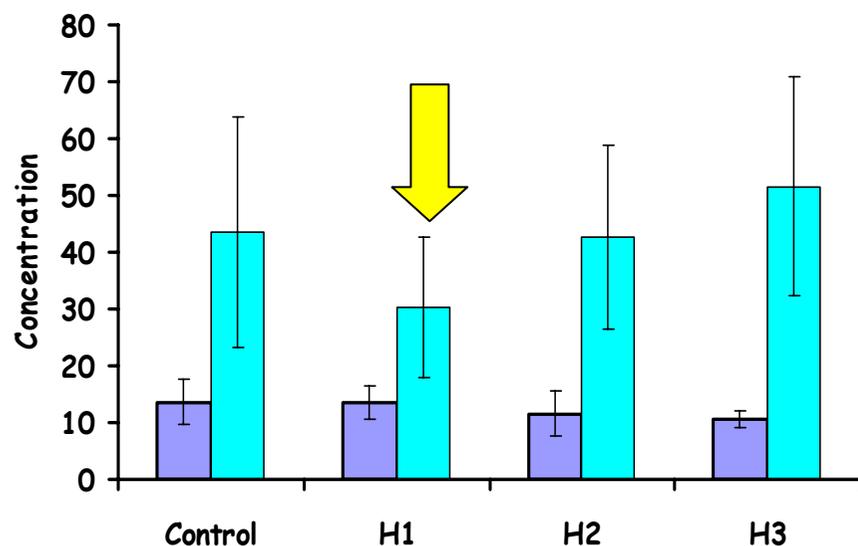
•:  $p < 0,05$  - H1 : plaice powder 8651  
H2: cod powder 8650 -H3:cod powder 8649



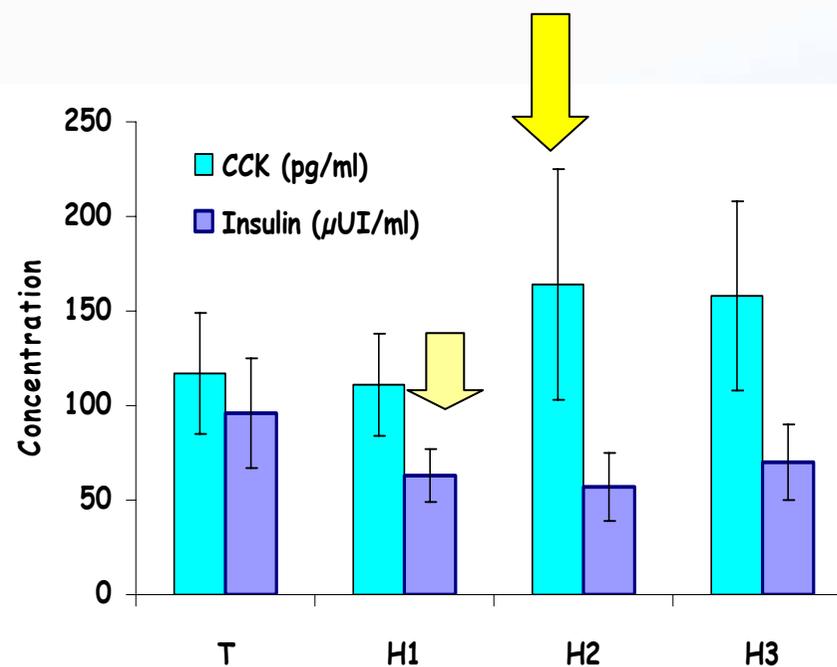
\* :  $p < 0,05$  - Siki (H1), saithe fermented (H2)  
and nutripeptin (H3)

# In vivo tests : second step 24h (1/2)

## Plasma CCK and Insulin levels after 1 h of food intake



\* :  $p < 0,05$  - H1 : plaice powder 8651 - H2: cod powder 8650 - H3: cod powder 8649



\* :  $p < 0,05$  - Siki (H1), saithe fermented (H2) and nutripeptin (H3)

# In vivo tests : second step 24h (2/2)

## COPALIS samples

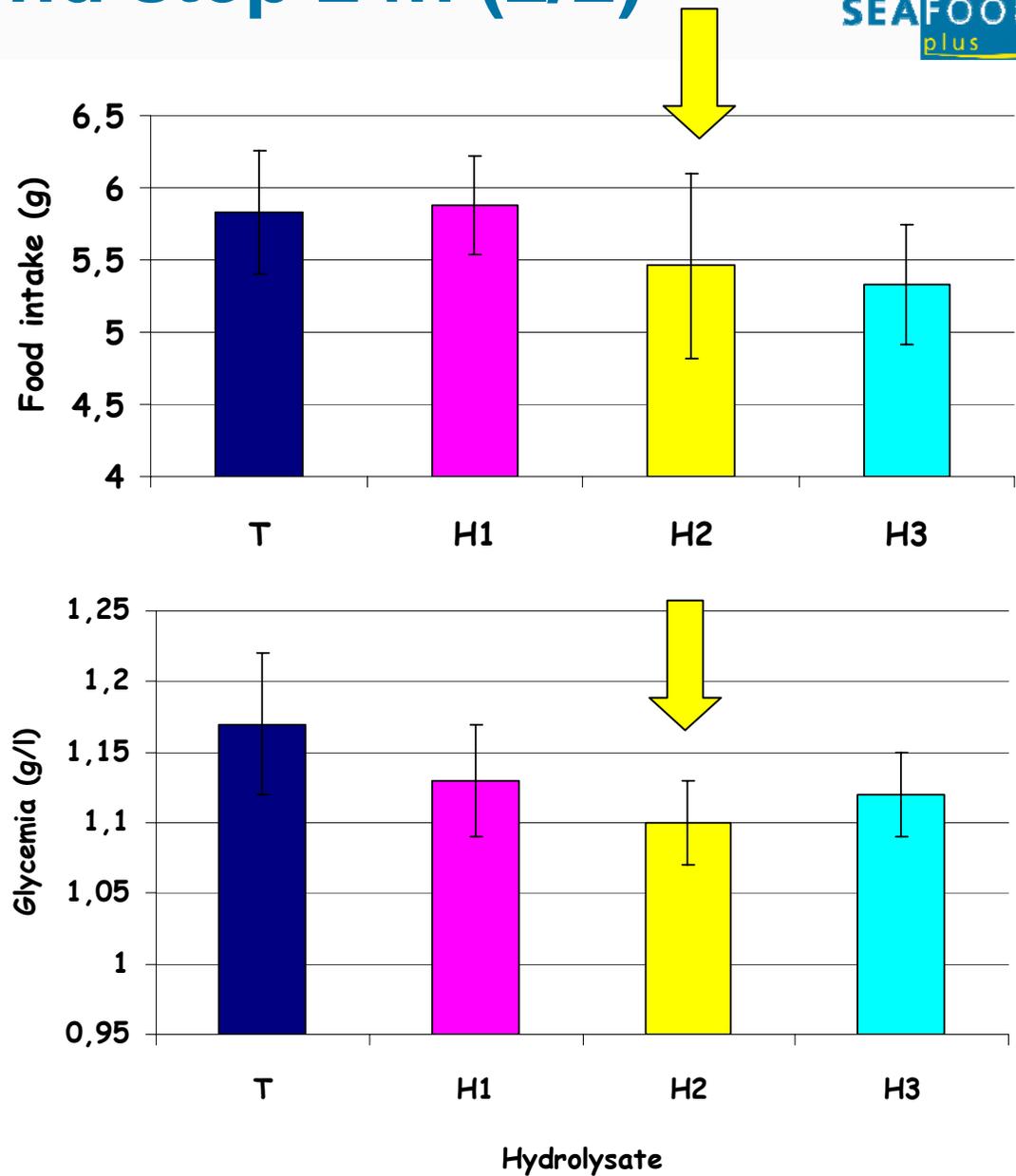


Ingestion orogastric  
of peptide fraction after  
24 hours of fasting on  
the same 32 rats

30 min

Measurement of the food  
intake and of plasmatic  
molecules

Plasma glucose level  
after 1 h of food intake



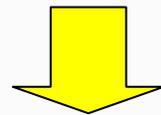
# Conclusion



- H1 : Plaice
- H2 : Cod 8650
- H3 : Cod 8649

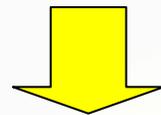


- H1 : Siki
- H2 : Saithe fermented
- H3 : Nutipeptin



**Measurement of the food intake and of the body weight**

**With H2 Copalis :** - less body weight after 21 days of stuffing  
- less food intake during the 3 weeks



**Measurement of the food intake and of plasmatic molecules**

**With H2 Copalis:** - tendency to reduce food intake and glycemia  
- high level of CCK  
- significative difference in the insulin amount

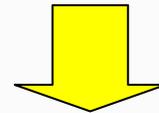
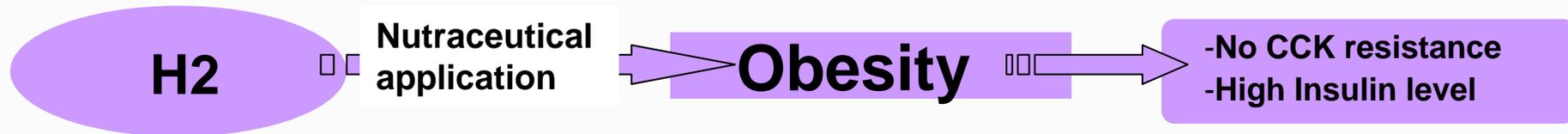
Secretagogue

Nutraceutical application

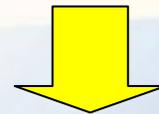
**Obesity**

-No CCK resistance  
-High Insulin level

# Perspectives

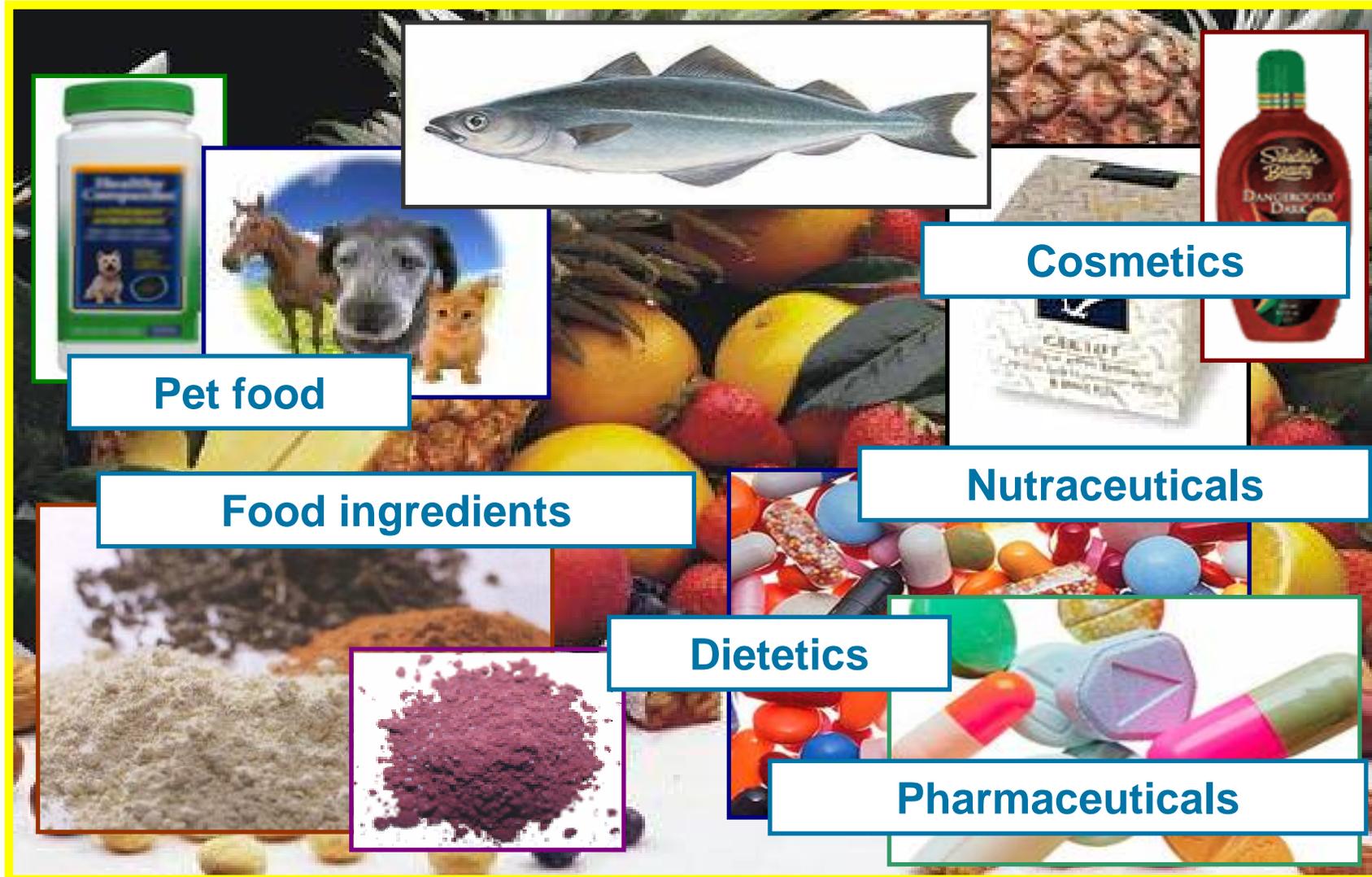


**STC1 cell line**  
Purification and identification of molecules involved in the CCK secretion



**GLP-1**  
Peptide involved in the satiety signal

# Applications (1/2)



# Applications (2/2)



Contain Fish protein autolysate , Fish oil,...

**Against oxidative stress**



Contain omega3 PUFA and Fish protein autolysate (*Molva molva*)

**Against oxidative stress, tiredness, overwork**



Contain Fish protein autolysate , marine gelatine, ...

**For weight loss or weight stabilisation**



Contain 72% of FPH

**For regulation of appetite**



Contain Fish protein autolysate or hydrolysate

**Antistress effect**

# Aknowledgements



To all the partners involved in  
SEAFOODplus project 4.1 PROPEPHEALTH

*9. MATIS, Iceland*

*55. Muséum National d'Histoire Naturelle (MNHN), France*

*3. Institut Francais de Recherche pour l' Exploitation de la Mer (IFREMER), France*

*56. University of La Rochelle (ULR), France*

*47. University of West Brittany (UWB), France*

*40. University of South Brittany– GIS PROGEBIO (PROGEBIO), France*

*17. National Research Institute on Agriculture and Fisheries (IPIMAR), Portugal*

*61. PRIMEX, SME, Iceland*

*54. Copalis, SME, France*

*63. Marinova (Danish Fish Protein), SME, Denmark*



# A better life with seafood...

A large version of the SEAFOOD plus logo, with "SEAFOOD" in blue and "plus" in yellow, set against a blue square background with yellow wavy lines at the bottom.

[www.seafoodplus.org](http://www.seafoodplus.org)