

What is the VIVALDI project?

Isabelle Arzul, Ifremer

VIVALDI Workshop, EAFP conference,
Porto, 9 September 2019

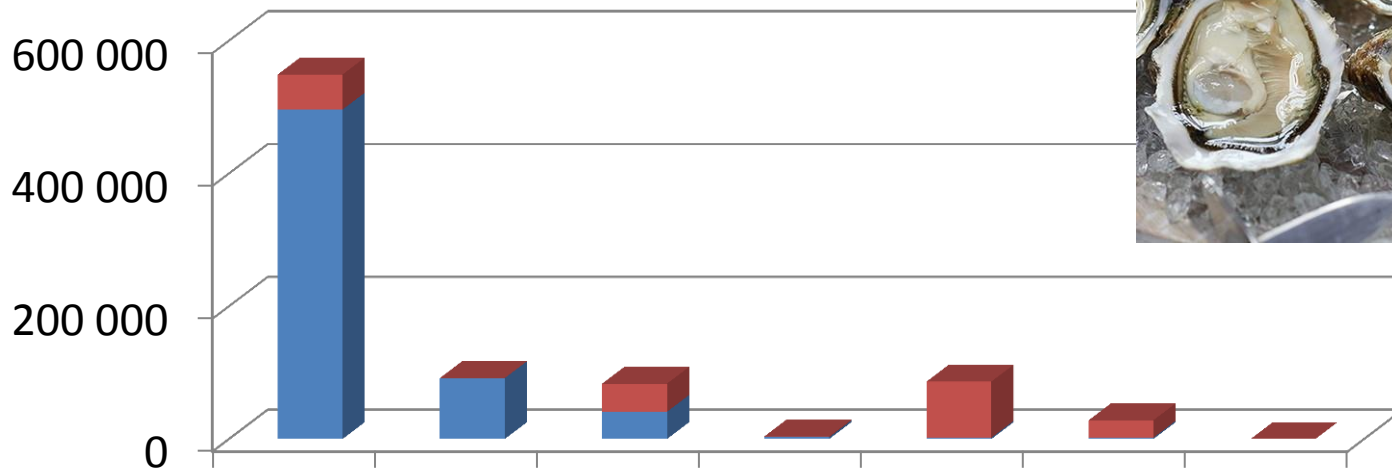


VIVALDI

Preventing and mitigating
farmed bivalve diseases

European mollusc production

Production (t)



■ capture
■ aquaculture

FAO 2015

Vulnerability of this production against diseases



<https://www.lemonde.fr/>

GALICIA
Encuentran berberecho en Boiro tras meses desaparecido de la ría
Los muestreos indican que hay algo de cría en dos puntos del litoral

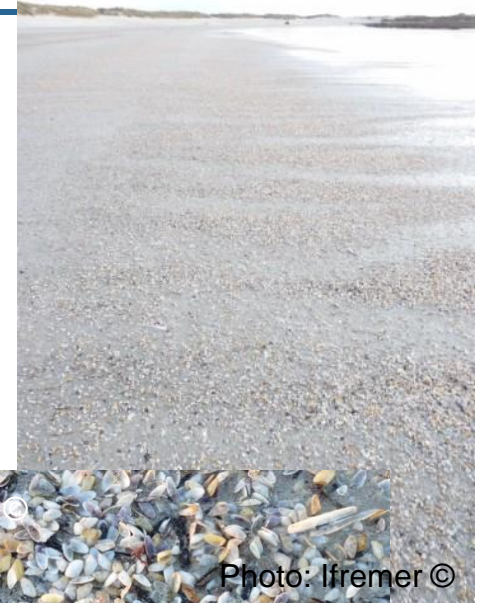
BARLA HEREDIA
16:26 | 09 de abril de 2013 08:48



SABER MÁS...
Materia: Materiales | Datos

Mar dedica 3 millones a regenerar bancos

SI NO FUERA



M. Engeslma

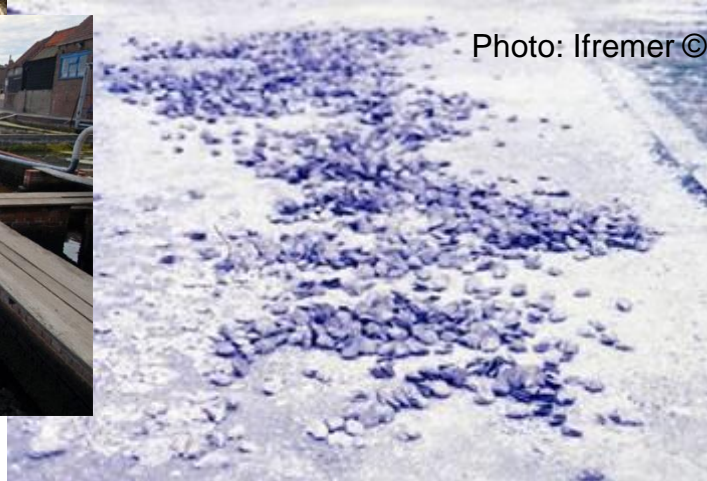


Photo: Ifremer ©

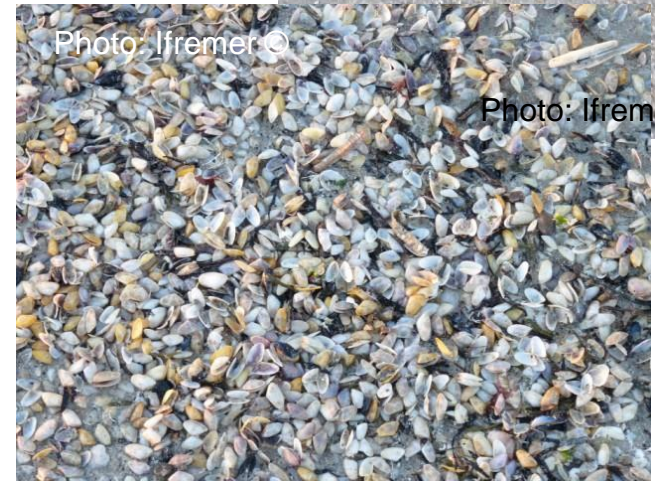


Photo: Ifremer ©

Photo: Ifremer ©

Control of mollusc diseases

Prevent the entry of diseases

Limit the spread of diseases

Mitigate the effect of diseases

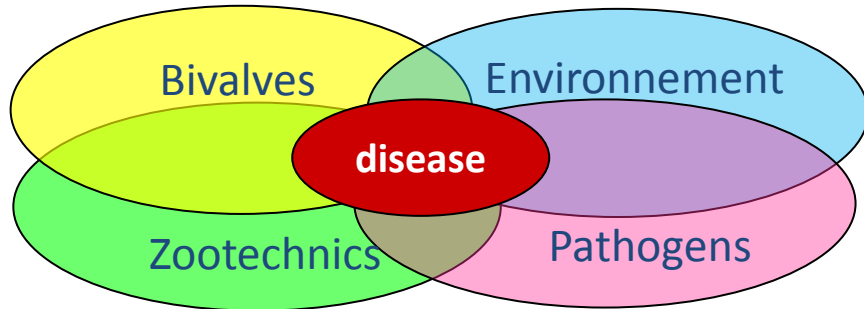
**Sharing
results with
stakeholders**



```
graph LR; A[Prevent the entry of diseases] --- C((Sharing results with stakeholders)); B[Limit the spread of diseases] --- C; D[Mitigate the effect of diseases] --- C;
```

The VIVALDI project: 2016-2020

Better knowledge of factors triggering disease emergence



Sniezko modified by Le Groumellec et al.

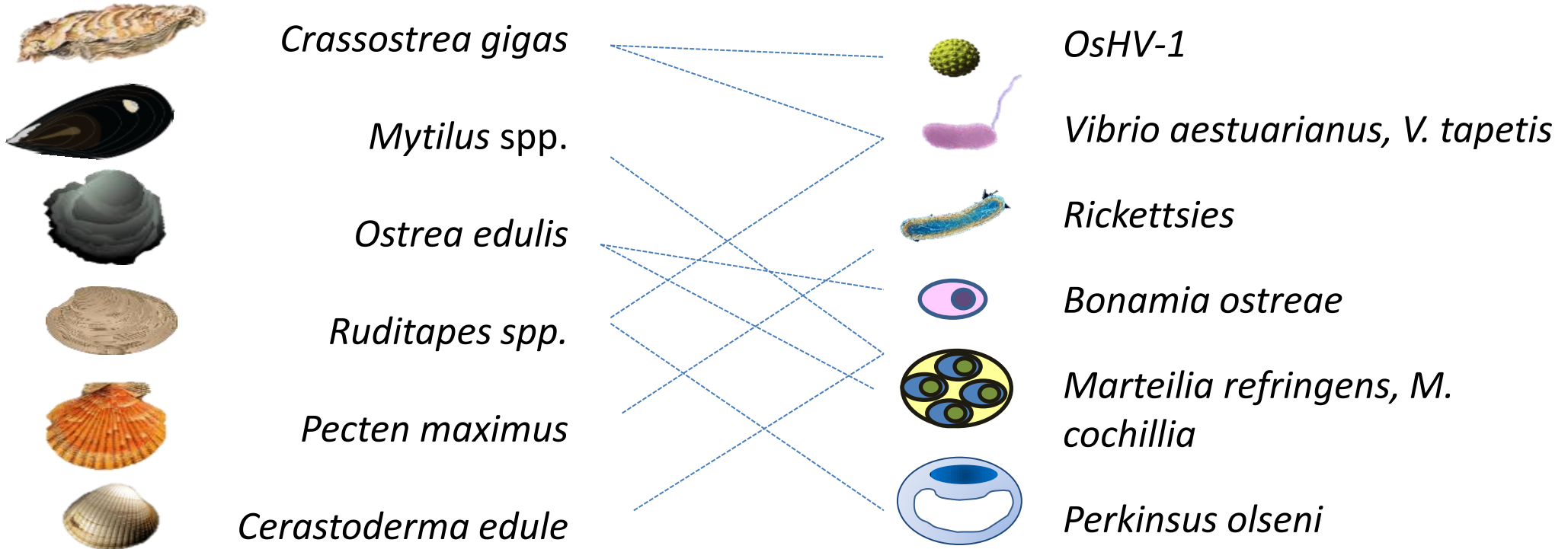
Tools and strategies to prevent control and mitigate impact of diseases





3rd General Assembly, 11-13 June 2019

Main species investigated in VIVALDI



Improve detection/identification of pathogens



Compartment/Reservoirs

Pathogens can be found in sediment, water, plankton and other species...

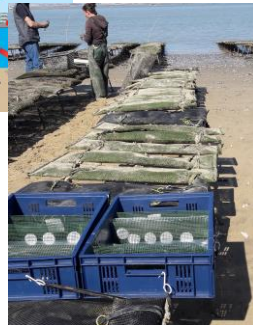
Diversity of known pathogens



OsHV-1
V. aestuarianus
Marteilia refringens
...

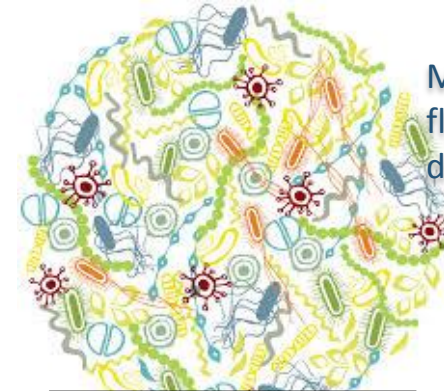


Early warning tools

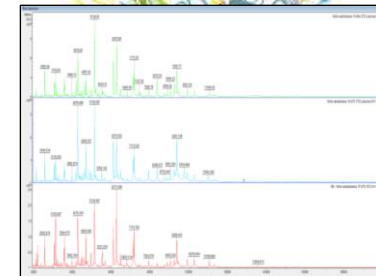


Passive sensors
Magnetic beads
...

Microbiota and pathogen characterization



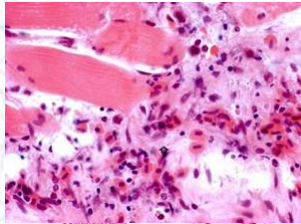
* Microbiota fluctuates during disease



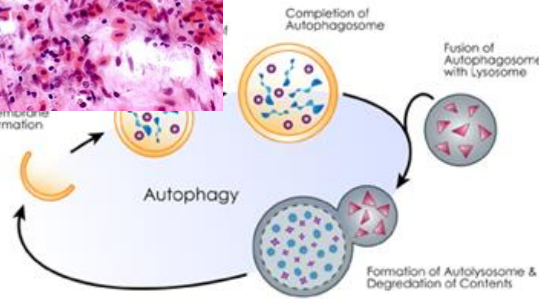
* MALDI TOF:
An interesting tool to quickly identify *Vibrio* strains

Promote resistant shellfish

Evaluate pathogen virulence

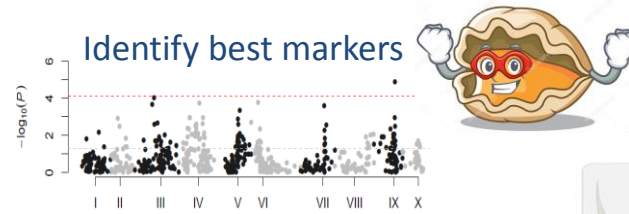


Ex: *Vibrio* pathogenesis



Ex: autophagy

Measure defense mechanisms



Identify markers associated with better survival



Optimization of selection programme



Impact of selection

Stimulate immunity

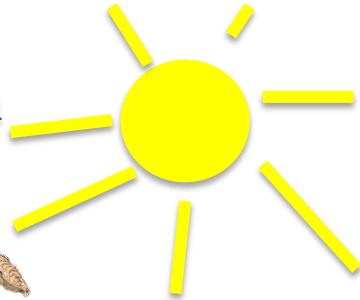


Exposing oysters to virus like particles protect against OsHV-1



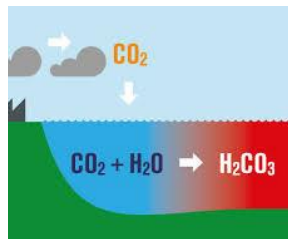
Decrease risk of pathogen emergence and spread

UV-B radiation decreases OsHV-1 load



Factors acting on transmission and mortality

Temperature impacts mortality associated with OsHV-1



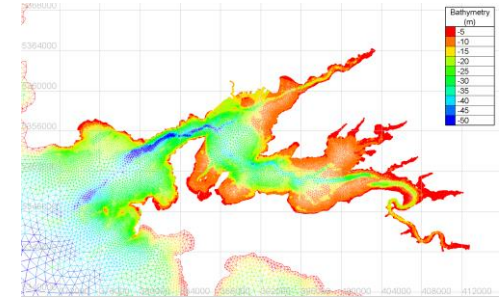
What about acidification?



Species diversity decreases mortality

Disease transmission modelling

Allows predicting pathogen spread

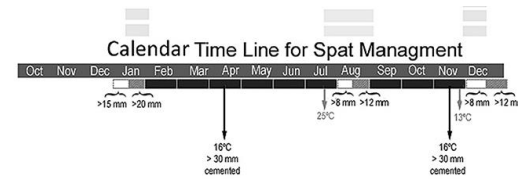


Inactivate pathogens



HOD system successfully inactivate OsHV-1 and Vibrio

Husbandry practices



Calendar allowing decreasing mortality

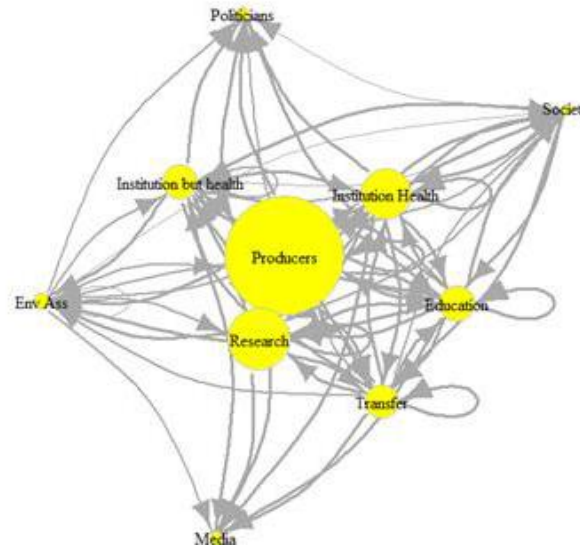
Sharing and disseminating results



List of stakeholder categories



Stakeholders mapping



Stakeholders mapping and analysis



Risk perception

Interviews to evaluate risk perception regarding shellfish diseases

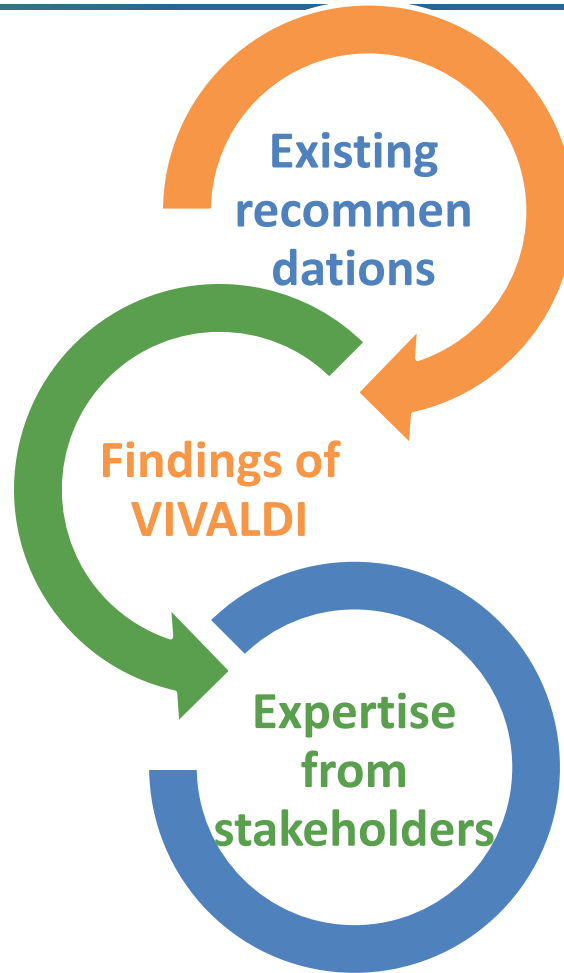


Co construct a manual for disease management and biosecurity

Co construction process



Producers, hatcheries, decision-makers and scientists **from different countries**

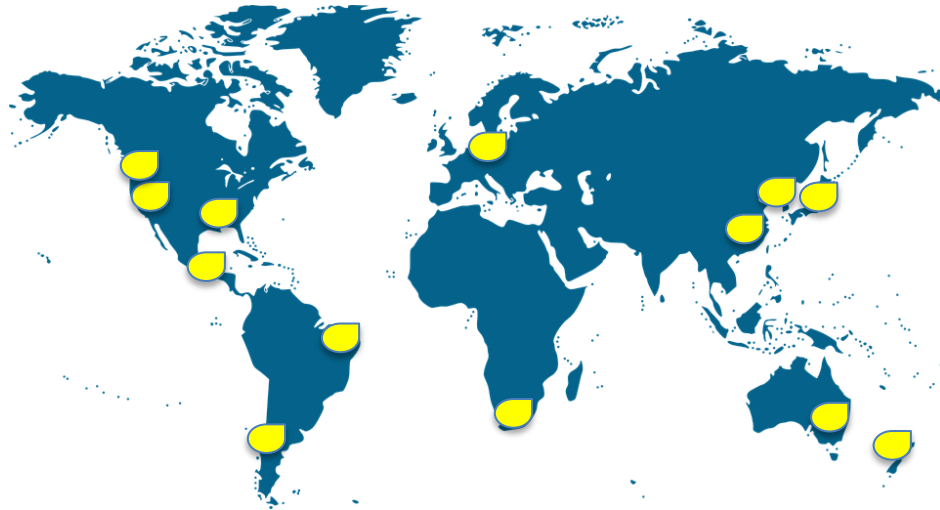


Manual for disease management and biosecurity



for stakeholders

Shellfish health: an international challenge



Shellfish diseases do not stop at the frontiers:

Socio-economical and ecological consequences of shellfish diseases

A context in evolution: changing environment, increase of animal movements...

An international expert advisory panel

- Sharing expertise
- Increasing international cooperation
- Improving information flows

Building an
International network
on shellfish diseases

Our meeting today



Objective

crossing experiences from the VIVALDI project with research conducted overseas to answer the following questions:

What can be done to detect the emergence of diseases as early as possible?

How can we anticipate on these diseases?

Our meeting today

Programme

Passive sensors (Benjamin Morga, Ifremer)

New genetic methods for pathogen detection in bivalves (Alberto Pallavicini, UNITS)

Maldi-tof (Mirna Moussa-Pouly, Ifremer)

Biosensors: magnetic beads (Anna Toldrá, IRTA)

Discussion

Concluding remarks

Concluding remarks

Does the ideal diagnostic tool exist?

Quick response

Easy to be used /access

Fit for purpose and context

Sensitive

Reproducible/
repeatable

Freedom demonstration

Screening

Specific

Several responses in one

Few/No false positive/negative

Disease monitoring

Disease emergence

...

...

Concluding remarks

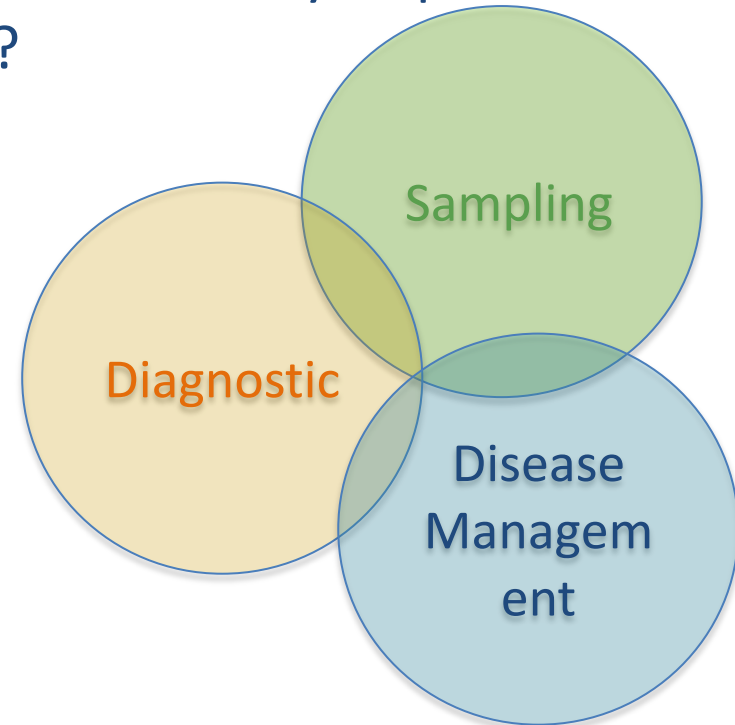
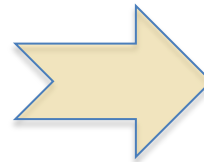
How can we detect the emergence of diseases as early as possible?
How can we anticipate on these diseases ?

Passive sensors

Magnetic beads
based approach

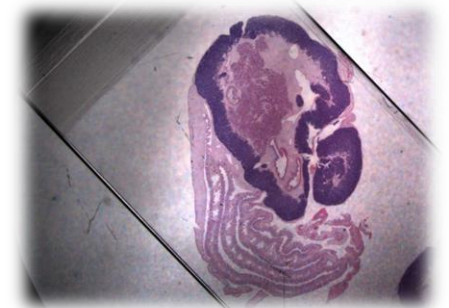
NGS based
approach

Maldi ToF



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Join us at VIVALDI's final meeting in Brest (F)

26-27 November: scientific conference with VIVALDI's research results



28 November: conference with all stakeholders on disease management measures and biosecurity



More information:





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CONTACT

Isabelle Arzul
isabelle.arzul@ifremer.fr

IFREMER - Station de La Tremblade
17390 La Tremblade / FRANCE

Direct line: +33 (0)5 46 76 26 47
Switchboard: +33 (0)5 46 76 26 10

www.vivaldi-project.eu

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