

# **CMS**

## **KUNNSKAPSHULL/ KUNNSKAPSBEHOV**

### **Innspill til diskusjon**

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# CMS Consortium , 2008-2011



# Objectives

The principal objectives of the project are to identify **causal factors** leading to the development of CMS, **improve diagnostic tools** and suggest **strategies for prevention** and control to reduce the occurrence and consequences of the disease.

Sub-goals are to:

1. Identify **risk factors associated with CMS** outbreaks by conducting epidemiological studies.
2. Evaluate potential risk factors based on current hypotheses on **environmental and nutritional impact**.
3. Describe disease mechanisms with particular focus on developing a **better and broader understanding of pathogenesis**.
4. Develop **improved diagnostic tools**, to improve differentiation of related cardiac pathologies and allow for early diagnosis.

## **Project is divided into four main scientific work packages:**

WP I: Epidemiology and pathogenesis studies

WP II: Infection experiments and aetiology studies

WP III: Molecular and physiological pathogenesis

WP IV: Development of specific or indicative markers for disease development

Main challenge:

- Ensure proper diagnosis vs. other related diseases (PD, HSML..)

# Project details

- Duration 2008 – 2011
- Total budget 21, 5 mill NOK
- Funding from NRC: 6 mill NOK
- FHF: 3.3 mill NOK
- Direct and in kind funding from MHN, Lerøy Seafood Group ASA, Aqua Gen & Pharmaq. In kind support from EWOS.

# **Koch's postulates:**

## **to establish link between a causative microbe and a disease**

- 1.The microorganism must be found in abundance in all organisms suffering from the disease, but should not be found in healthy organisms.
- 2.The microorganism must be isolated from a diseased organism and grown in pure culture.
- 3.The cultured microorganism should cause disease when introduced into a healthy organism.
- 4.The microorganism must be reisolated from the inoculated, diseased experimental host and identified as being identical to the original specific causative agent.

# What do we know ?

- ✧ The causative virus, PMCV, has been identified (Pharmaq and NSVS, NVI)
- ✧ Epidemiology work show a very complex picture (eg PRV widely spread)
- ✧ Not all CMS cases with CMS changes only.
- ✧ Many control sites with cardiac lesions, incl CMS

48 randomly selected control farms: 18 with CMS like lesions, of which 12 were diagnosed CMS (Marta Alarcon, pers. comm)

→ Makes identification of risk factors more difficult

# What do we know about PMCV ?

- ✧ In close to all sites with typical CMS lesions \*
- ✧ Not present in sites with no lesions\*
- ✧ Positive correlation CMS histo score and virus load, both from challenge tests and field material\*\*
- ✧ PCR test available, enabling  
diagnostics and screening, epidemiology, studies on  
reservoir & vectors, vaccine development.\*\*

\* Wiik-Nielsen, Haugland et al. Frisk Fisk 2011

\*\* Haugland et al. Samling verdikjede havbruk 2011



# What do we know about CMS/PMCV ?

- ✧ Histopathology + PCR necessary to verify CMS diagnosis\*
- ✧ Disease is underdiagnosed\*
- ✧ Viral persistence (1.5 year) \*
- ✧ Virus present in many organs (highest in heart, kidney, spleen)\*\*
- ✧ High responders and low responders (no development of pathology)\*\*
- ✧ Potential to include CMS resistance in breeding programs (family variation) through conventional methods or QTL approach \*\*\*

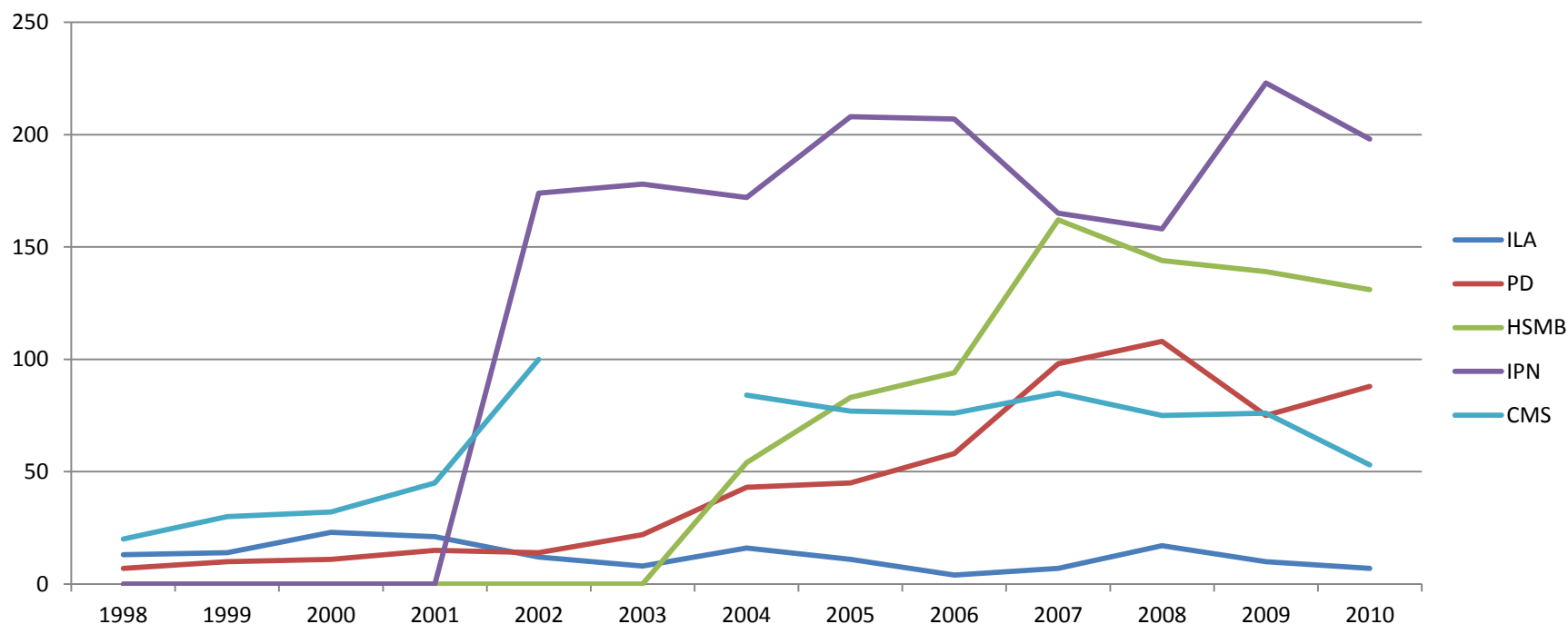
\* Marta Alarcòn et al. Samling verdikjede havbruk 2011

\*\* Jørgensen et al. Samling verdikjede havbruk 2011

\*\*\* Fineid et al. Samling verdikjede havbruk 2011

# control of infectious diseases ?

- IPN - no reduction in yearly incidence
- HSMB - no reduction in yearly incidence
- PD – avoid further spread, mitigate within endemic area (list 3)
- ISA – low yearly incidence (list 2, strategy ref.: EU, OIE)



CMS

2010: 53 sites

1988 : 60 sites

(Poppe, pers comm)

# What do we need not know about PMCV / CMS ?

- ✧ Transmission routes

- ✧ Reservoir & vectors

- ✧ Possible risk factors

nutrition, stress, environment..

- ✧ Role of / interaction with other agents

- ✧ Why fish die in field, but not in challenge tests ?

- ✧ Etiology of CMS like (non PMCV) lesions