

CMS

KUNNSKAPSHULL/ KUNNSKAPSBEHOV

Innspill til diskusjon

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SAMLING VERDIKJEDE HAVBRUK
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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, HSMI..)

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 ***

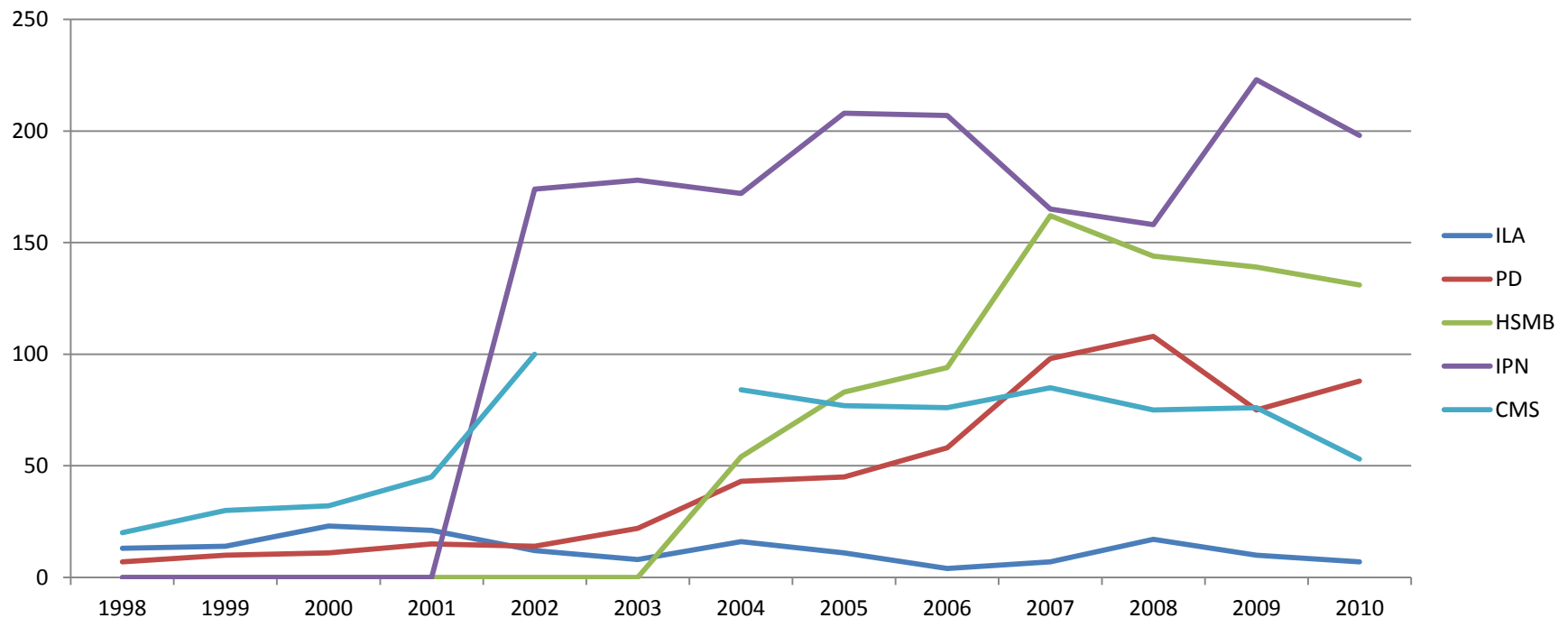
* Marta Alarcòn et al. Samling verdikjede havbruk 2011

** 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