



Comparative pathogenicity of Norwegian SAV2 and SAV3 isolates in experimental challenge

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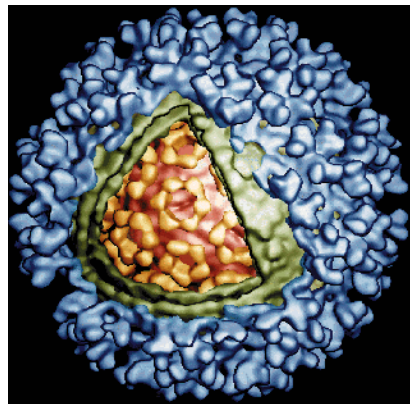
Background Pancreas Disease (PD)

- ❑ PD is one disease caused by one virus (SPDV=SAV)

- ❑ Severity of PD varies a lot in the field most likely due too multiple factors
 - The host (fish)
 - The environment (water..)
 - Farm management (density, movement, treatments....)
 - Virus isolate

Background Pancreas Disease (PD)

- ❑ PD is one disease caused by one virus (SPDV=SAV)
- ❑ Severity of PD varies a lot in the field most likely due too multiple factors
 - The host (from fish species to general health status...)
 - The environment (water quality/temp/current, other pathogens.....)
 - Farm management (density, movement, lice treatments....)
 - **Virus isolate**

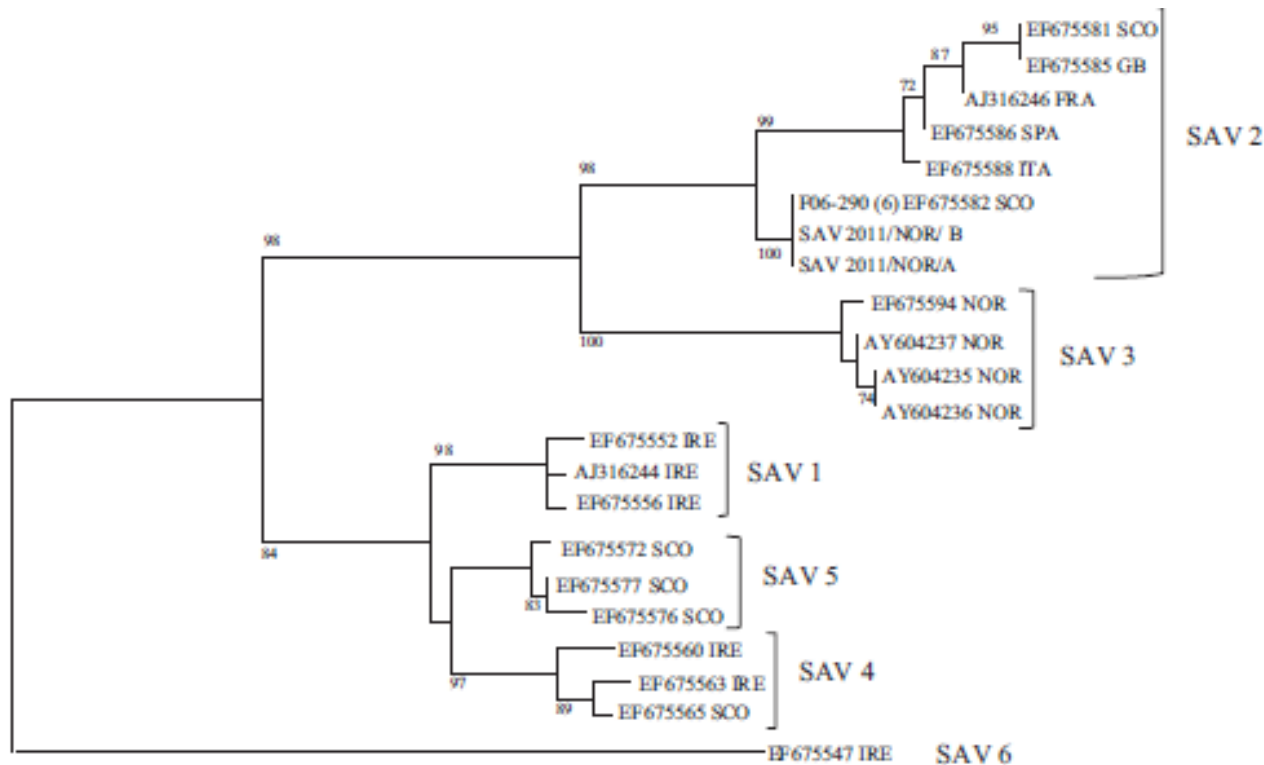


Background SAV, what we know

- ❑ There are differences in virulence between isolates of SAV (Graham et al. 2011)
- ❑ All SAV isolates are so similar that they can only be systematically discriminated by high resolution genetic analysis (Fringuelli et al. 2008)
- ❑ In genetic analysis SAV isolates cluster in 6 closely related genogroups (referred to as subtypes)

Background SAV, what we know

- SAV subtypeX is not a separate virus “type”, its a virtual image describing a “genogroup” of SAV isolates

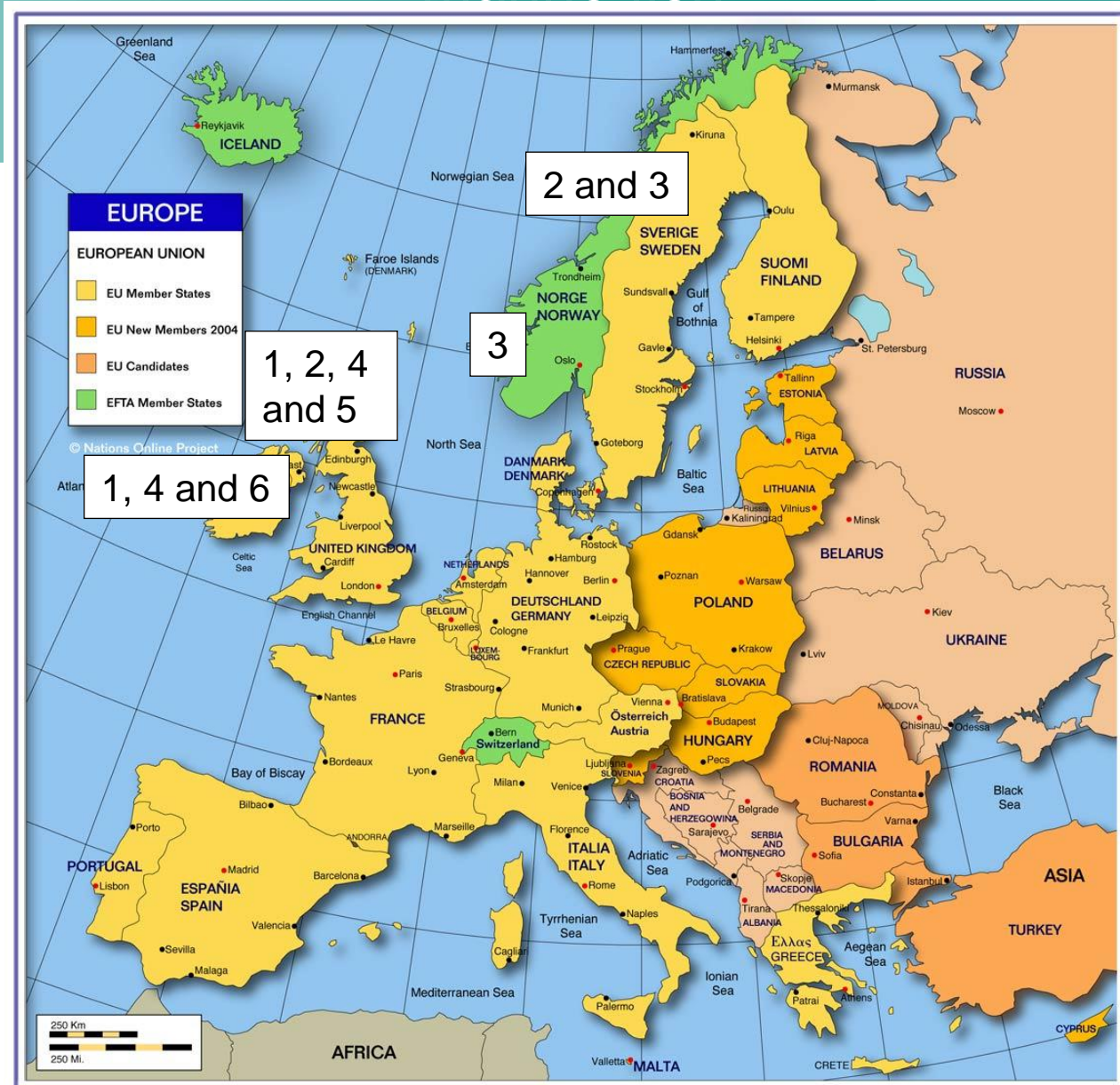


From Hjortaaas et al. 2012

Background SAV, what we know

- ❑ SAV subtypeX is not a separate virus “type” its a virtual name describing a group of SAV isolates.
- The 6 genetic groups of SAV has evolved in nature by normal “evolution” within geographically separated populations
- This natural geographic separation is likely to be less over time when humans “interfere”(Graham et al 2012)
 - Probably most recently demonstrated by finding of “Scottish like” SAV2 isolates in Norway (Hjortaas et al. 2012)

Distribution of European SAV subtypes in marine fish



SAV, what we would like to know

- ❑ Is there a general differences in virulence between SAV isolates of the different subtypes?



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Study design Norwegian SAV2 vs. SAV3 isolate



❑ Two isolates from fish with PD

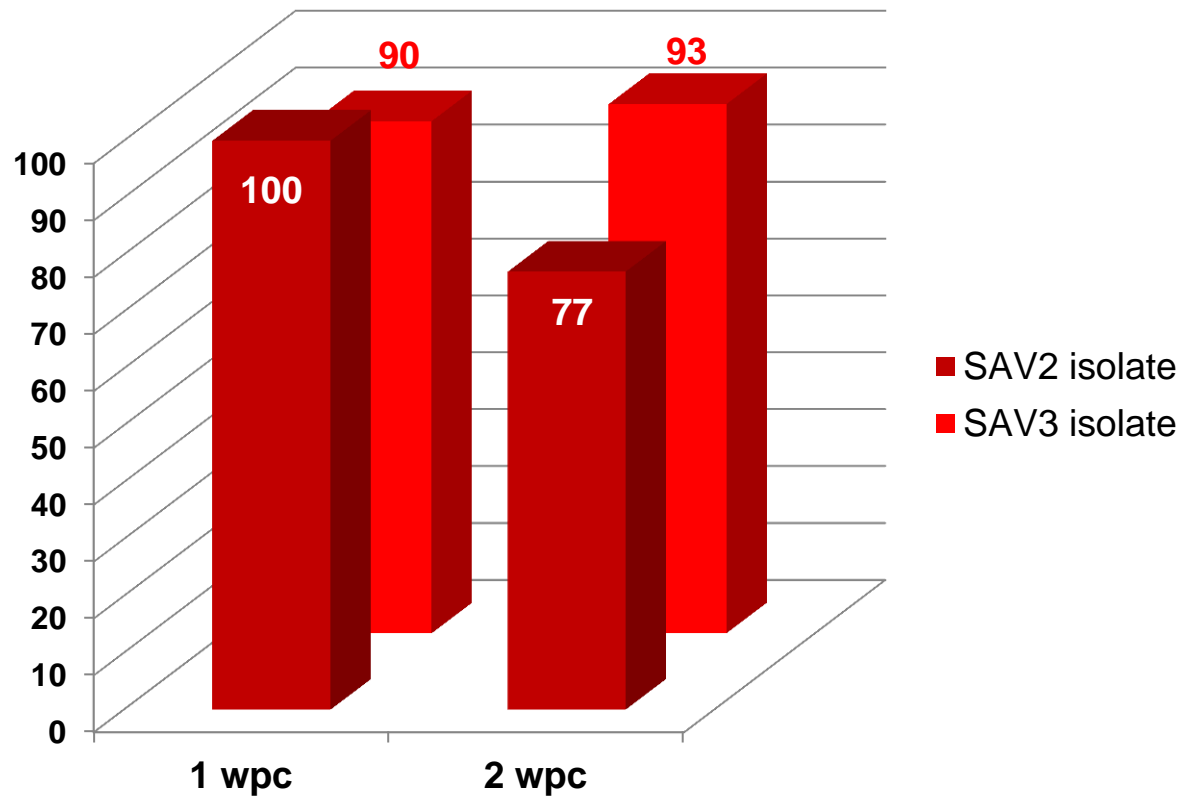
- Passaged in “labfish” to maintain pathogenicity
- Challenge material made by one single passage in cell culture
- Challenge by injection of identical low virus quantity in 30g A.salmon

❑ Measurements post challenge

- Infection kinetics (virus in blood)
- Histopathology
 - Heart,
 - Pancreas
 - Muscle

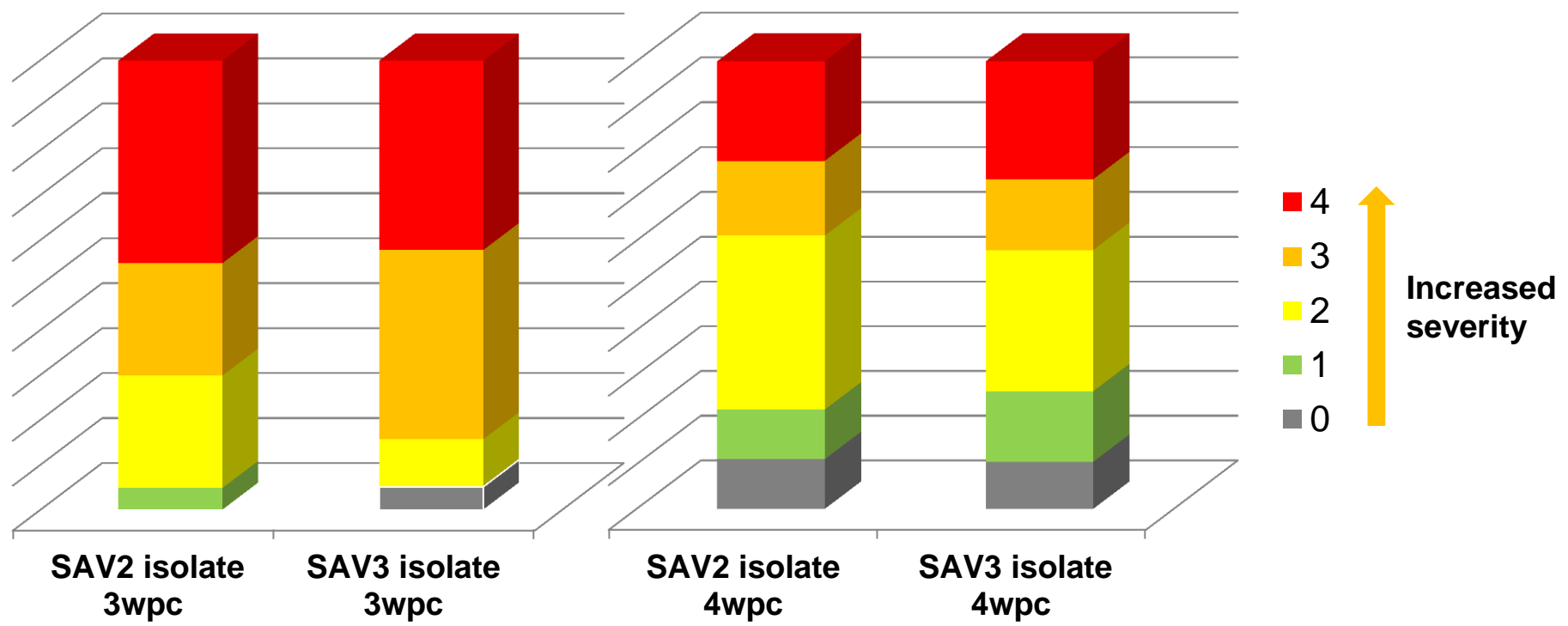
Comparative pathogenicity of Norwegian SAV2 and SAV3 isolates in experimental challenge, Infection

Prevalence of infection post challenge (SAV in blood n=30)



Comparative pathogenicity of Norwegian SAV2 and SAV3 isolates in experimental challenge, heart lesions

Distribution of PD heart lesion scores* post challenge (n=20)



* According to quantitative histopathology scoring system of M. McLoughlin

Comparative pathogenicity of Norwegian SAV2 and SAV3 isolates in experimental challenge, pancreas and muscle

- ❑ Moderate PD pancreas lesions found in all fish at 3 wpc and at 4 wpc. No severity or prevalence difference between pancreas lesions induced by the SAV2 and the SAV 3 isolate

- ❑ No lesions found in red or white muscle

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Overall findings

- Although inducing PD of different severity in the field the two Norwegian SAV isolates tested (SAV2 and 3 genotype) were both virulent and no difference in pathogenicity or infection could be observed in the laboratory challenge

Injection challenge model weakness

- By injection challenge putative differences in infectivity from water is not covered

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Comparative pathogenicity of Norwegian SAV2 and SAV3 isolates in experimental challenge

Conclusion (this study and literature)

- There is no evidence of any correlation between virulence of SAV isolates and the subtype system where they are genetically organized.
- There are differences in virulence between isolates of SAV (very likely within all subtypes)
- Variation in properties between SAV isolates are very likely not linked to how many genetic differences there are (how mathematically closely related they are) but what the differences are

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There is no scientific findings that supports any “disease decision” to go “Right” if a SAV isolate is typed for instance Subtype2 and “Left” if typed Subtype 3.

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Acknowledgements

- Hilde Sindre (Norwegian Veterinary Institute) for providing the SAV2 isolate
- Karen Elina Christie (MSD Animal Health) for providing the SAV3 isolate, prepare all challenge materials and conduct the animal trial.
- Marian McLoughlin (Aquatic Vet Services) for reading all the histology.

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