

ABILITY OF VIRAL HAEMORRHAGIC SEPTICAEMIA VIRUS TO EVADE THE PROTECTIVE IMMUNE RESPONSE INDUCED IN RAINBOW TROUT BY DNA VACCINATION

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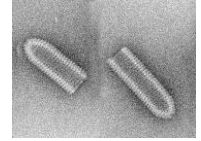
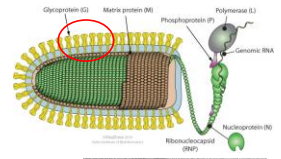
Section of Fish Health  
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INTRODUCTION

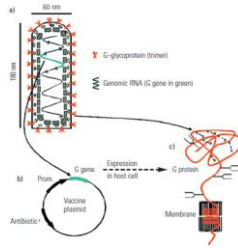
Viral haemorrhagic septicaemia virus (VHSV)

- Rhabdoviridae family
- Novirhabdovirus genus
- Enveloped virus
- Single strand RNA, negative sense
- ~ 11,2 kb



INTRODUCTION

DNA vaccine against VHSV

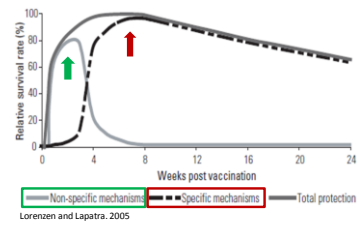


Lorenzen and Lapetra. 2005

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INTRODUCTION

Immune protection induced by DNA vaccine against VHSV

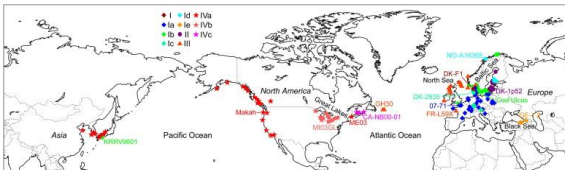


Lorenzen and Lapetra. 2005

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INTRODUCTION

Distribution of viral haemorrhagic septicaemia virus (VHSV)



He, M. et al. 2014

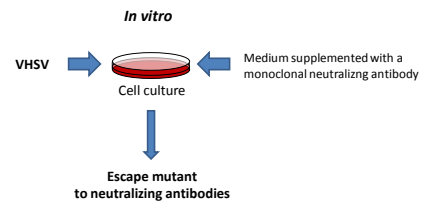
- Four genotypes
- Adapted to different hosts
- Adapted to different environments

Long term adaptability

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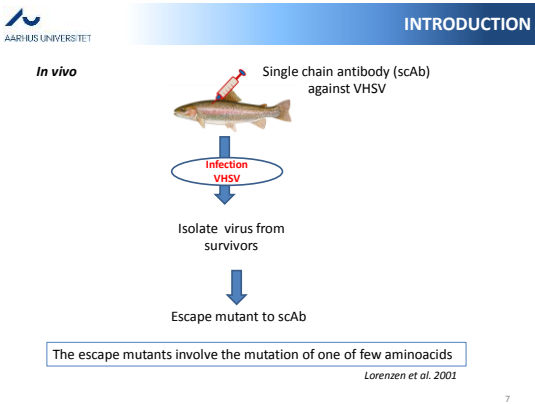
INTRODUCTION

Evidence of variability of viral haemorrhagic septicaemia virus (VHSV)

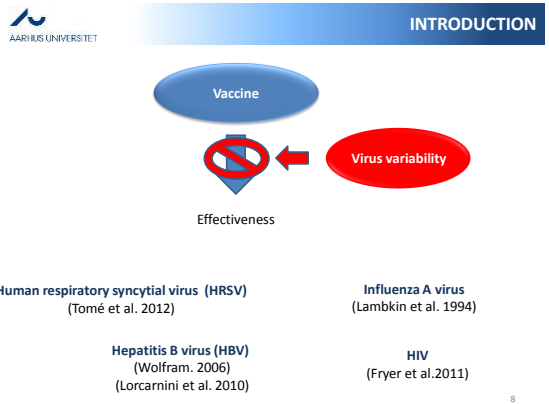


Bearzotti et al. 1995

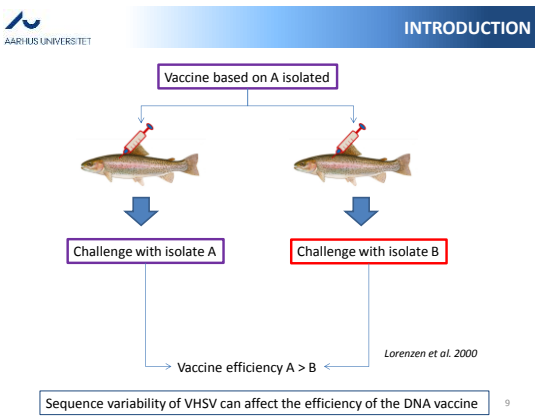
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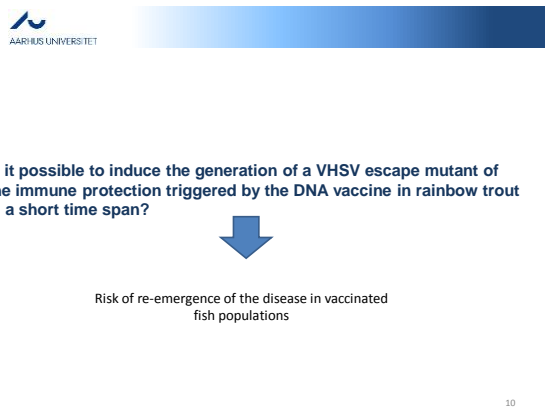
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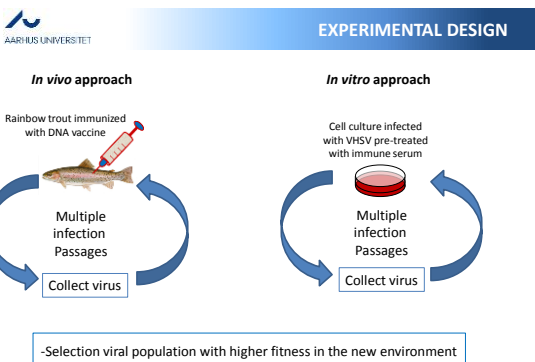
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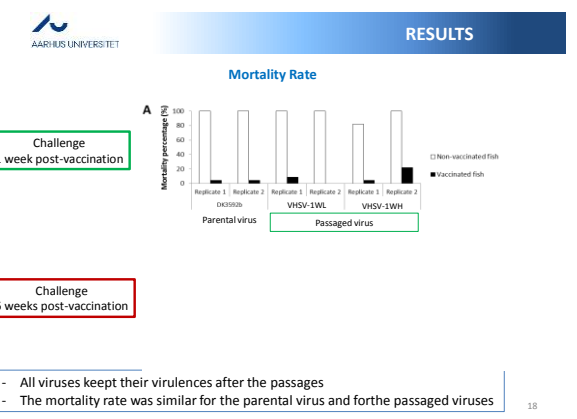
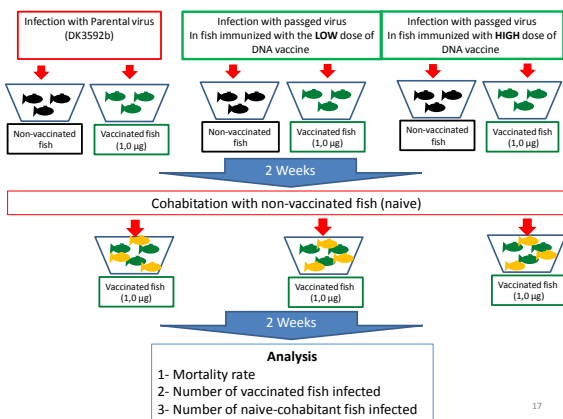
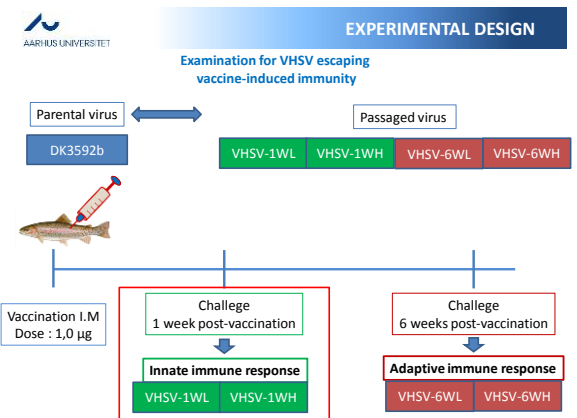
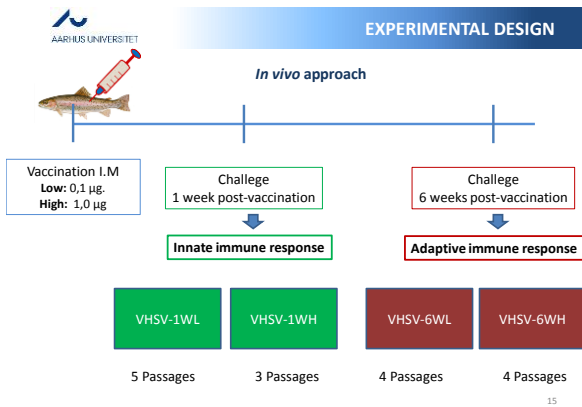
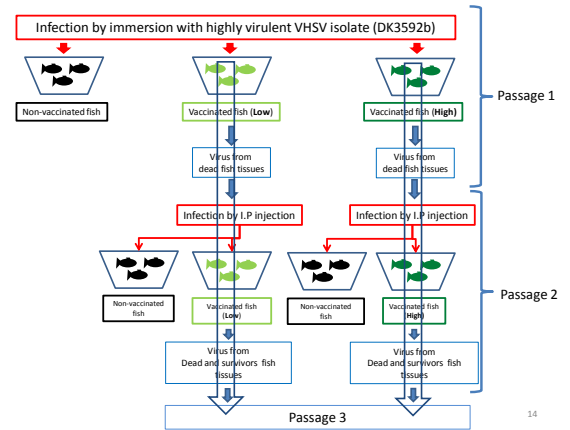
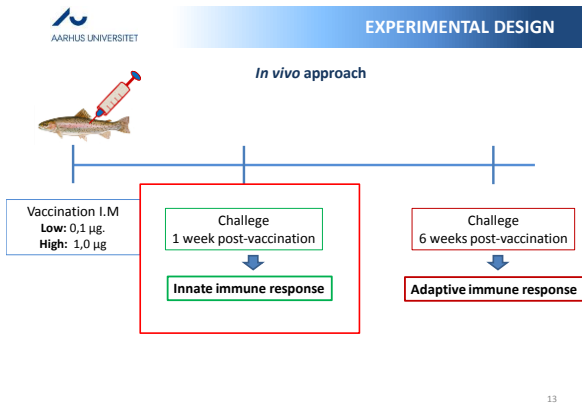
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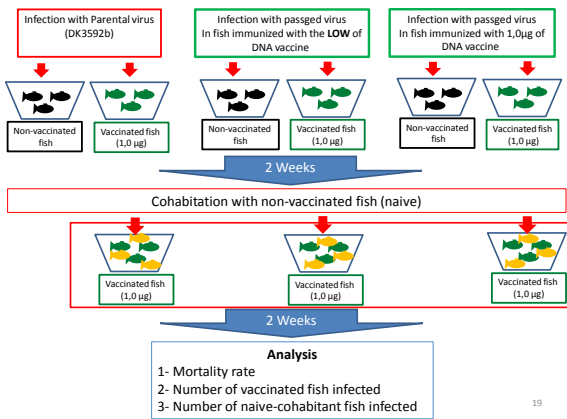


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RESULTS

Carrier status of survivors vaccinated fish

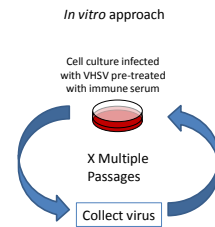
Challenge time	Virus	Replicate		Vaccinated fish positive in virological examination (%)
		Aquaria	N°	
Challenge 1 week post-vaccination	DK3592b	1	1	36,4
		2	2	5,6
	VHSV-1wL	1	1	5,6
		2	2	13,6
	VHSV-1wH	1	1	0
		2	2	5,0
Challenge 6 weeks post-vaccination	DK3592b	1	1	0
		2	2	15,8
	VHSV-6wL	1	1	10,5
		2	2	5
	VHSV-6wH	1	1	0
		2	2	10,0

The passed virus did not show an advantage infecting vaccinated fish

The passed virus did not show an advantage spreading the virus to non-vaccinated fish

EXPERIMENTAL DESIGN

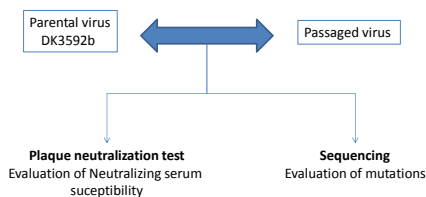
In vitro approach



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RESULTS

After 11 passages



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RESULTS

Plaque neutralization test (PNT)

	Parental Virus DK3592b		Passaged Virus1		Passaged Virus2		Passaged Virus3	
	Neutralizing serum	Control serum	Neutralizing serum	Control serum	Neutralizing serum	Control serum	Neutralizing serum	Control serum
Serum dilution	+++	-----	+++	-----	+++	-----	+++	-----

Sequencing

100 % identity between the passaged viruses and parental virus

It was not possible to isolate a full escape mutant in the *in vitro* approach after 11 passages.

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## CONCLUSIONS

### In vivo approach

- It was not possible to isolate an escape mutant from the *in vivo* approach; considering the innate and the adaptive protection induced by the DNA vaccine.
- After 4 weeks post vaccination a low percentage of vaccinated were virus carriers, which were able to infect cohabitan naive fish, therefore the vaccinated fish should not be considered virus free.
- The broad protection induced by the DNA vaccine, which activate the cellular and humoral responses, could explain why it was not possible for the virus to evade the vaccine-induce protection

### In vitro approach

- It was not possible to isolate a full escape mutant from the *in vitro* approach after 11 passages in cell culture.

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### Acknowledgements

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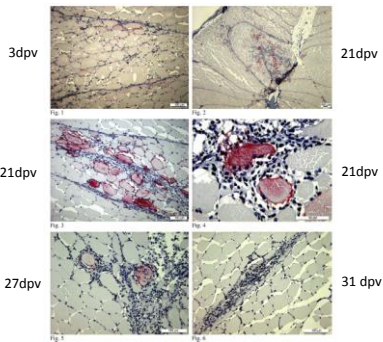
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Thank you for your attention

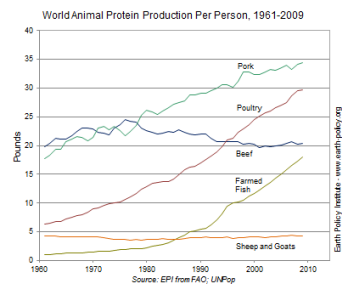
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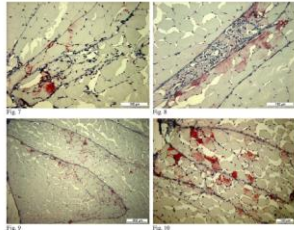
## FUTURE PLAN



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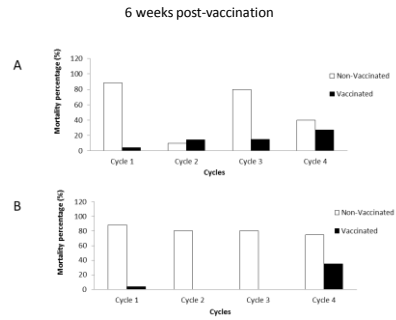
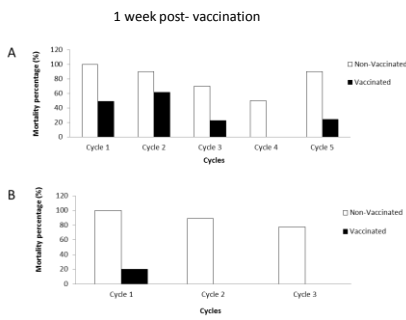
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Passage	Fish challenge 1 Week post-vaccination		Fish challenge 6 Weeks post-vaccination	
	Dose 0,1 µg	Dose 3,0 µg	Dose 0,1 µg	Dose 1,0 µg
1	Not collected	Non Collected	1,73x10 <sup>6</sup>	1,26x10 <sup>6</sup>
2	8,17x10 <sup>6</sup>	7,87x10 <sup>6</sup>	1,59x10 <sup>6</sup>	1,84x10 <sup>6</sup>
3	1,26x10 <sup>6</sup>	-	7,11x10 <sup>5</sup>	1,26x10 <sup>5</sup>
4	2x10 <sup>5</sup>	-	4,0x10 <sup>5</sup>	2,25x10 <sup>4</sup>
5	1,26x10 <sup>5</sup>	-	-	-

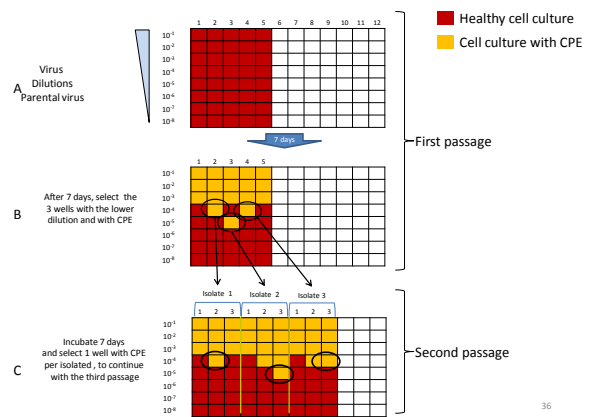
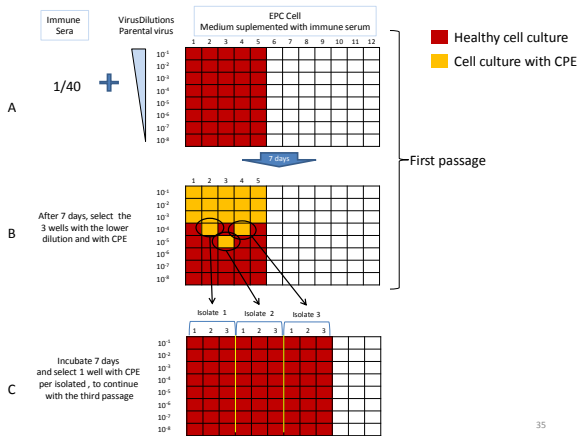
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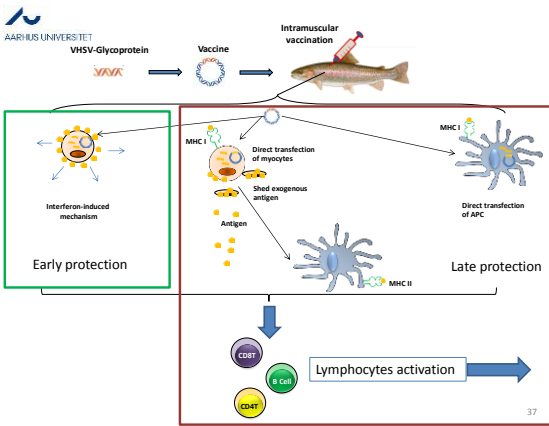
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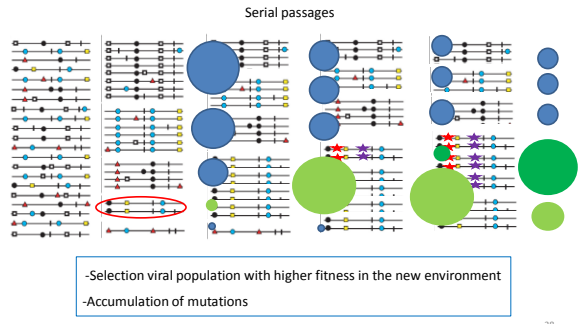


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**EXPERIMENTAL DESIGN**



**INTRODUCTION**

**Infection trial in immunized rainbow trouts with the DNA vaccine**

