Efficacy of a single shot rHVT-NDV compared to a traditional vaccination program in commercial meat turkeys

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25th Annual Meeting of the National Laboratories for Avian Influenza and Newcastle Disease of European Union Member States 2019

Padova-Italy 19-21 June 2019

Prevention of NDV in EU relies on…

All Member States except Sweden, Finland and Estonia apply a prophylactic vaccination policy (Council Directive 92/66/EEC)

(How many countries have compulsory vaccination?)

NDV prophylactic policy in Italy

All Member States except Sweden, Finland and Estonia apply a prophylactic vaccination policy (Council Directive 92/66/EEC)

Epidemic in 2000

Ministry of Health Decree
5266-03/03/2015-DGSAF

COMPULSORY VACCINATION

NDV prophylactic policy in Italy

Lentogenic live vaccines (ICPI<0,7)

Inactivated vaccines (ICPI<0,7)

Hitchner B1, La Sota, Clone 30, 6/10 e VG/GA

(18-26% nucleotide distance)

Viral vectored vaccines

HVT-ND, HVT-ND-IBD

EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH

Epidemic in 2000

Ministry of Health Decree
5266-03/03/2015-DGSAF

COMPULSORY VACCINATION

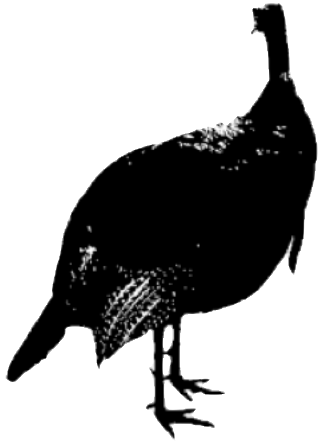
For each poultry species and production type

MINIMUM NUMBER OF VACCINAL INTERVENTIONS

Commercial meat turkeys : 1 live/inactivated by three weeks of age

Turkey breeders: 4 immunizations (2 live + 2 inactivated before laying)

Commercial meat turkeys



Male, 145 days of age
16-17 kg

Female, 100 days of age
8-9 kg

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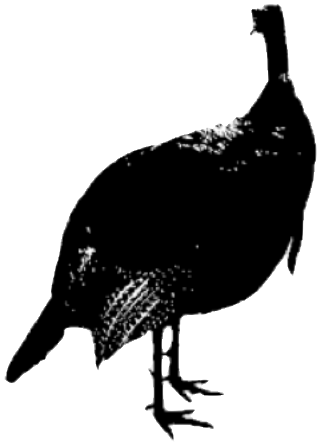

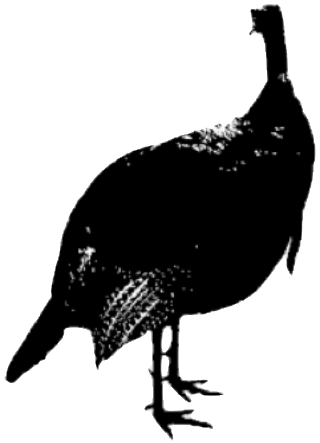

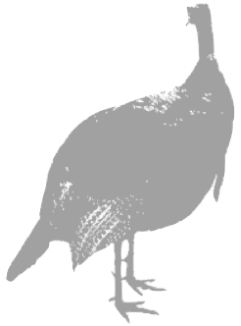

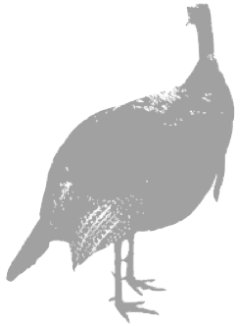

Live (4 days) + Inact. (26 days)	HVT-ND s.c. (1 day)	Live (4 days) + Inact. (26 days)	HVT-ND s.c. (1 day)

Four different farms applying 2 immunization schemes

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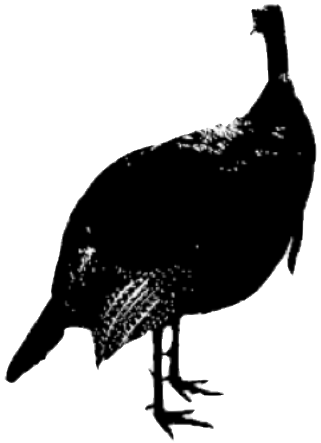
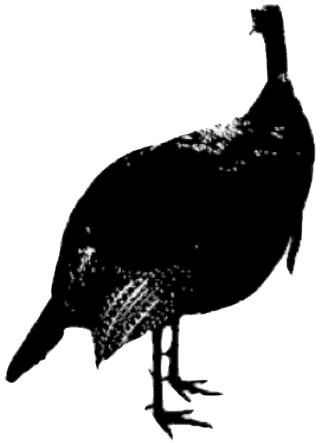
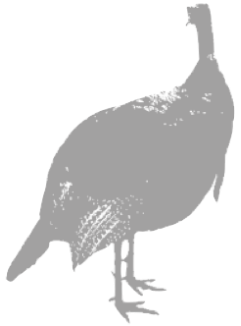


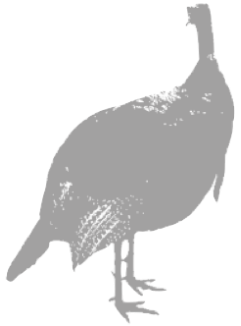


Live (4 days)
+
Inact. (26 days)

HVT-ND s.c.
(1 day)

Male, 145 days of age





Live (4 days)
+
Inact. (26 days)

HVT-ND s.c.
(1 day)

Female, 100 days of age

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Sperimentale delle Venezie

- Serological and virological analyses
- Oculo-nasal challenge with 0.2 ml of a velogenic Hertz 33/56 (10^7 EID_{50})
- Tracheal and cloacal swabs at 2, 4, 7 and 10 dpi
- Post-challenge serology 14 dpi (HI and ELISA)

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Non vaccinated turkeys (10 weeks of age), our control group

Sample	Animal ID	DPI		
		2	4	7
TS	1	$2,17*10^4$	$9,75*10^6$	$1,10*10^6$
	2	$6,59*10^4$	$2,46*10^6$	D
	3	$6,60*10^3$	$1,95*10^7$	$9,82*10^5$
	4	-	$4,54*10^4$	D
	5	$1,89*10^5$	$4,80*10^5$	$1,66*10^5$
	6	-	$3,04*10^6$	D
	7	$5,21*10^4$	$1,00*10^5$	D
	8	-	$3,50*10^6$	D
CS	1	-	$2,53*10^5$	$4,95*10^5$
	2	-	$1,23*10^3$	-
	3	-	-	-
	4	-	-	-
	5	-	-	-
	6	-	-	-
	7	-	-	-
	8	-	$1,71*10^3$	-

(TS) Tracheal swab; (CL) cloacal swab; (-) Not detected; (D) Dead.

100% mortality

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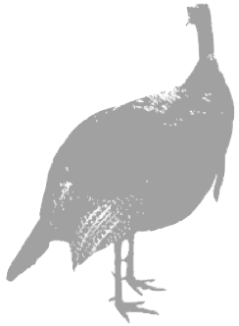
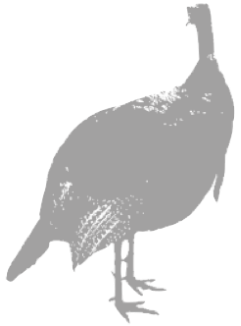
Female turkeys





No shedding

Live (4 days)
+
Inact. (26 days)

HVT-ND s.c.
(1 day)

20% shedding via the trachea (no isolation)

Full clinical protection

70% seroconversion

80% seroconversion

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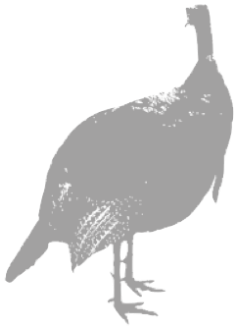
Female turkeys

Sample	Animal ID	DPI			
		2	4	7	10
TS	111	-	$5,72*10^5$ (N)	$8,10*10^4$ (N)	-
	112	-	-	-	-
	113	-	$6,21*10^4$ (N)	-	-
	114	-	-	-	-
	115	-	-	-	-
	116	-	-	-	-
	117	-	-	-	-
	119	-	-	-	-
	120	-	-	-	-
	120	-	-	-	-

(TS) Tracheal swab; (-) Not detected; (N) Negative by virus isolation in embryonated SPF chicken eggs.



HVT-ND s.c. (1 day)

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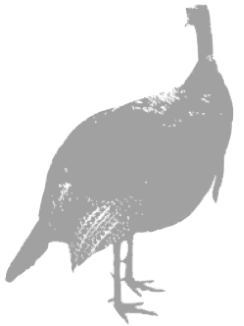
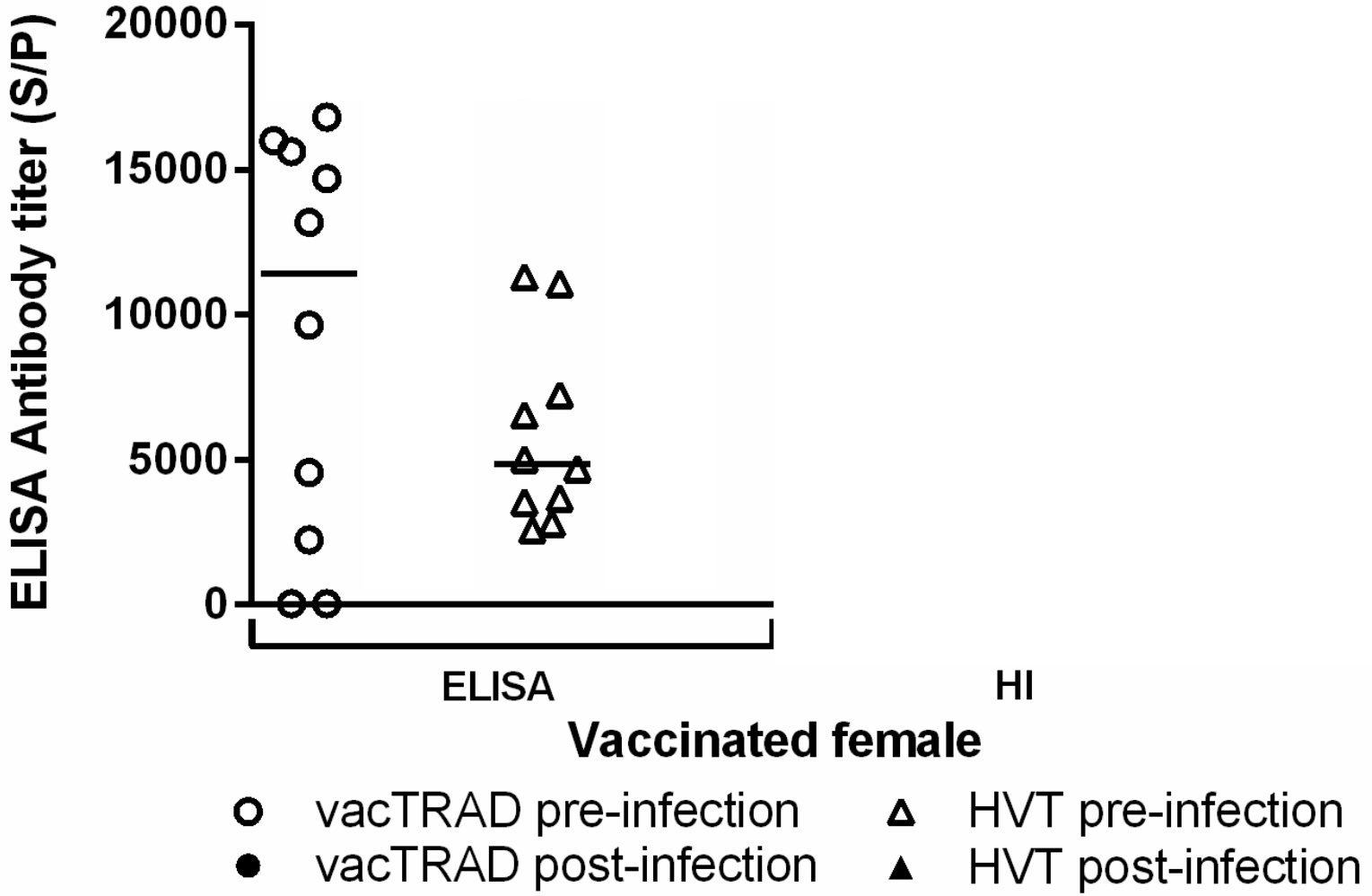
Female turkeys

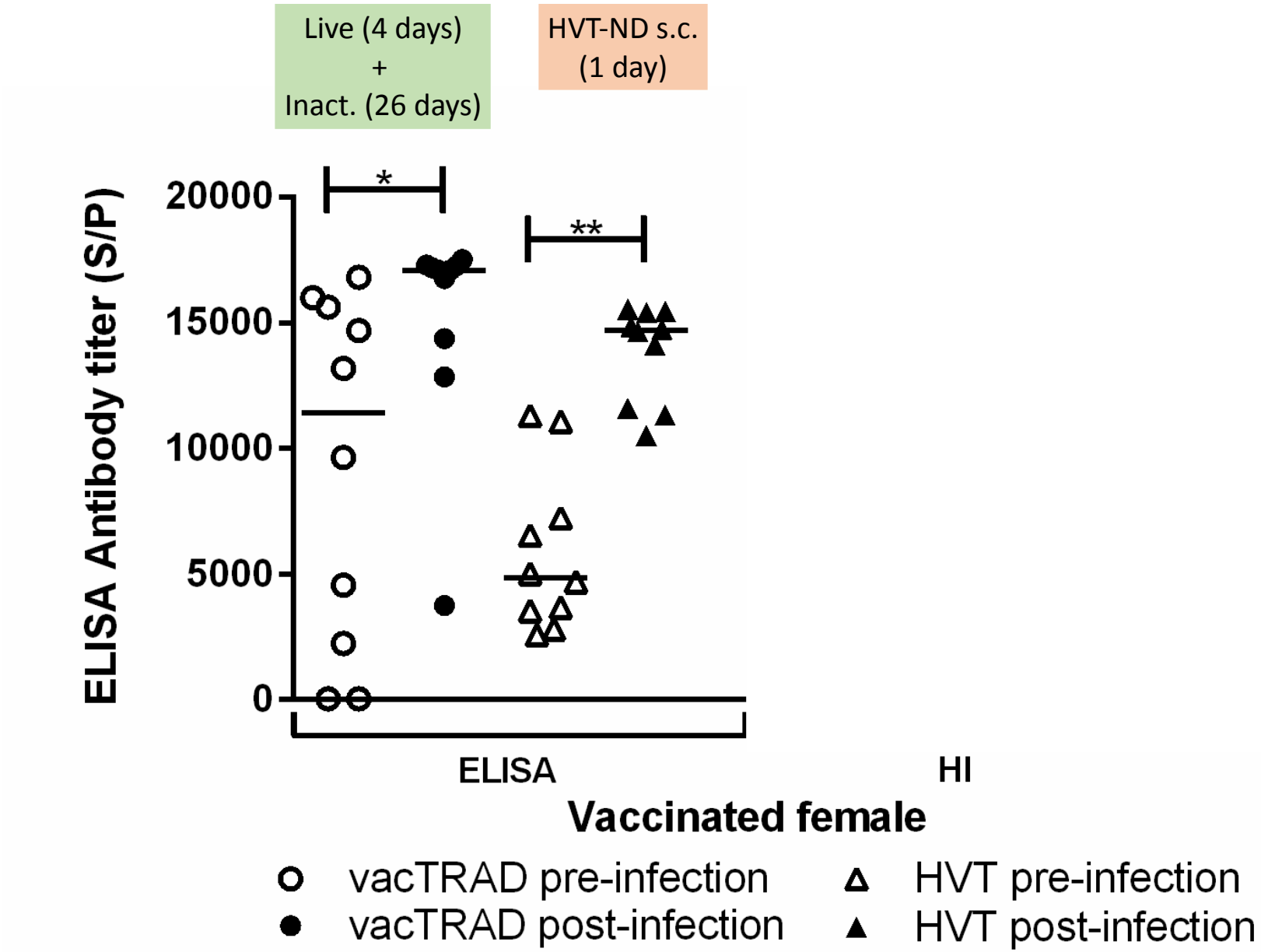
Live (4 days)
+
Inact. (26 days)

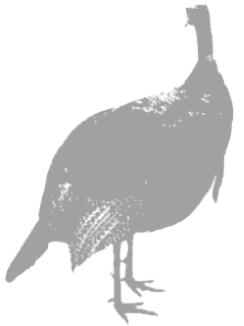
HVT-ND s.c.
(1 day)





Female turkeys





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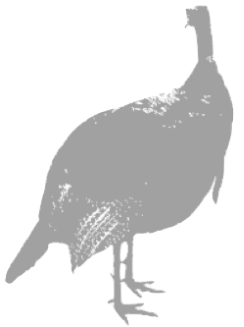
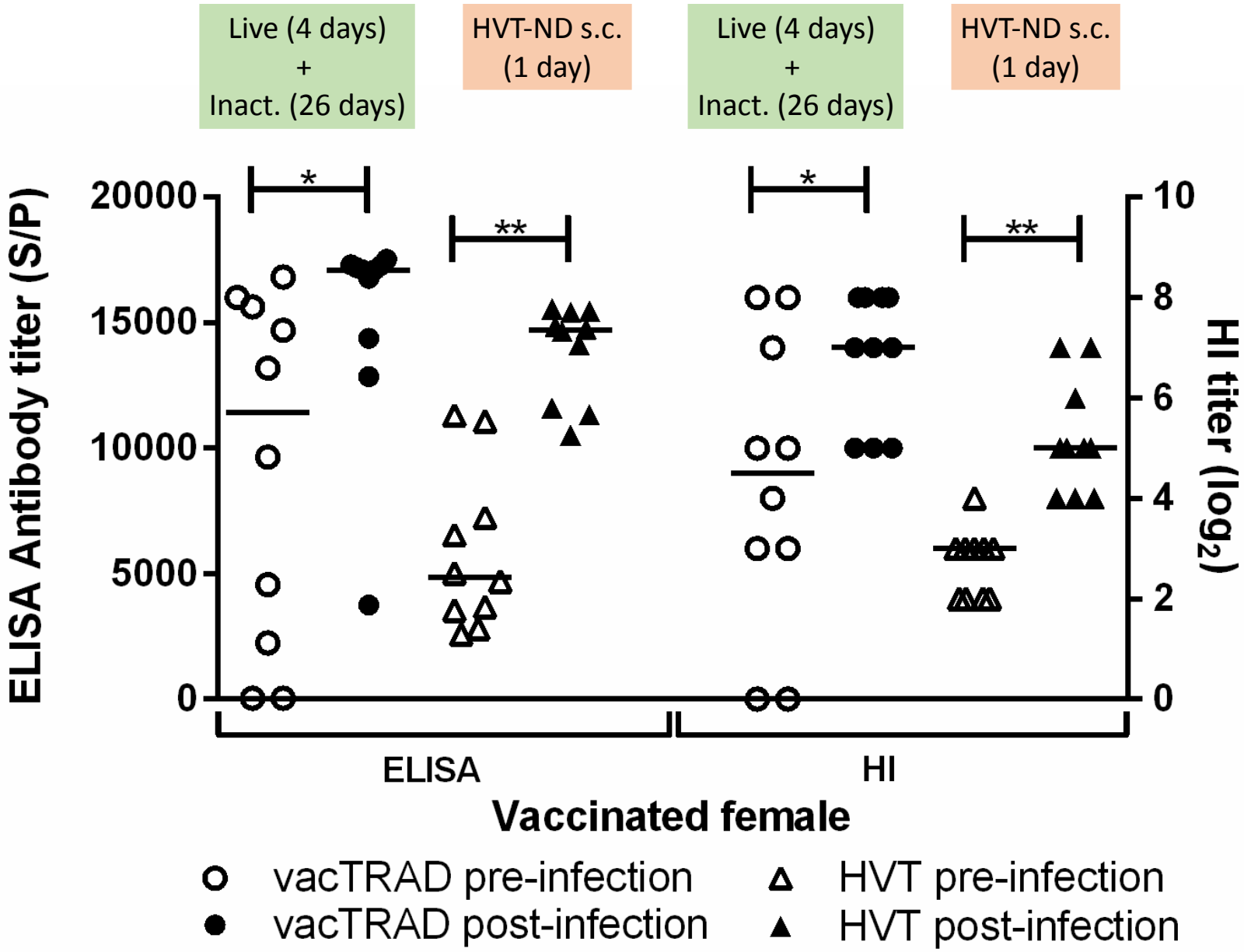
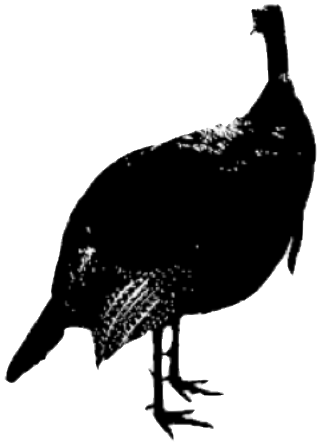
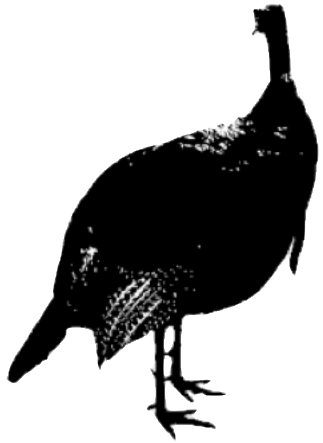
Female turkeys





Male turkeys





No shedding

Live (4 days)
+
Inact. (26 days)

HVT-ND s.c.
(1 day)

No shedding

Full clinical protection

No seroconversion

No seroconversion

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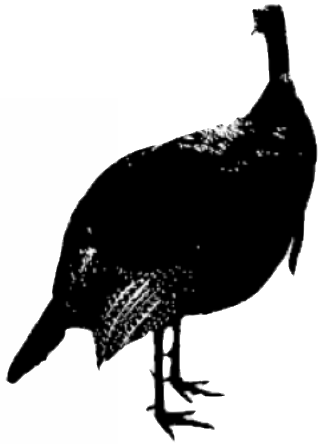
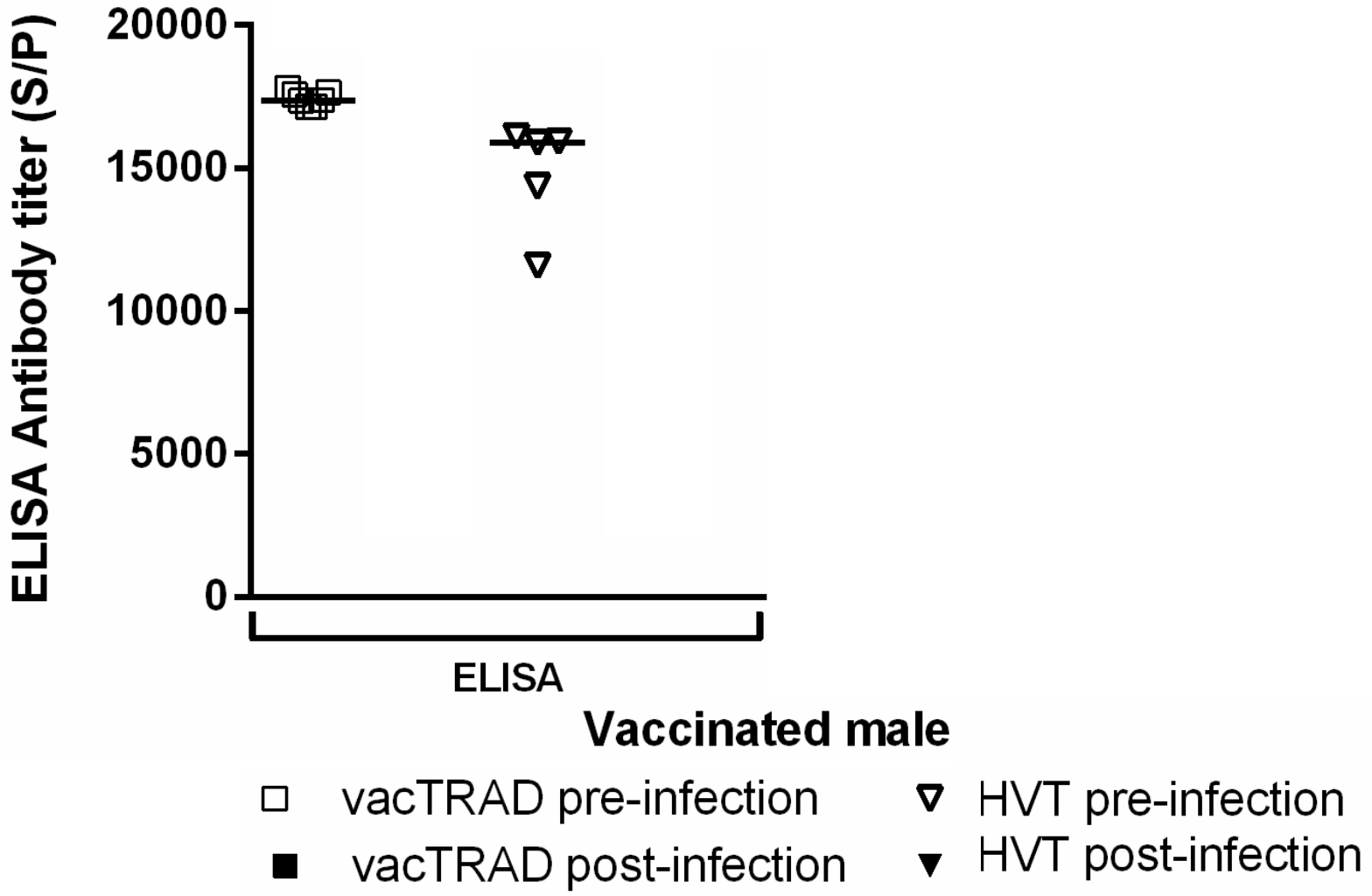
Male turkeys

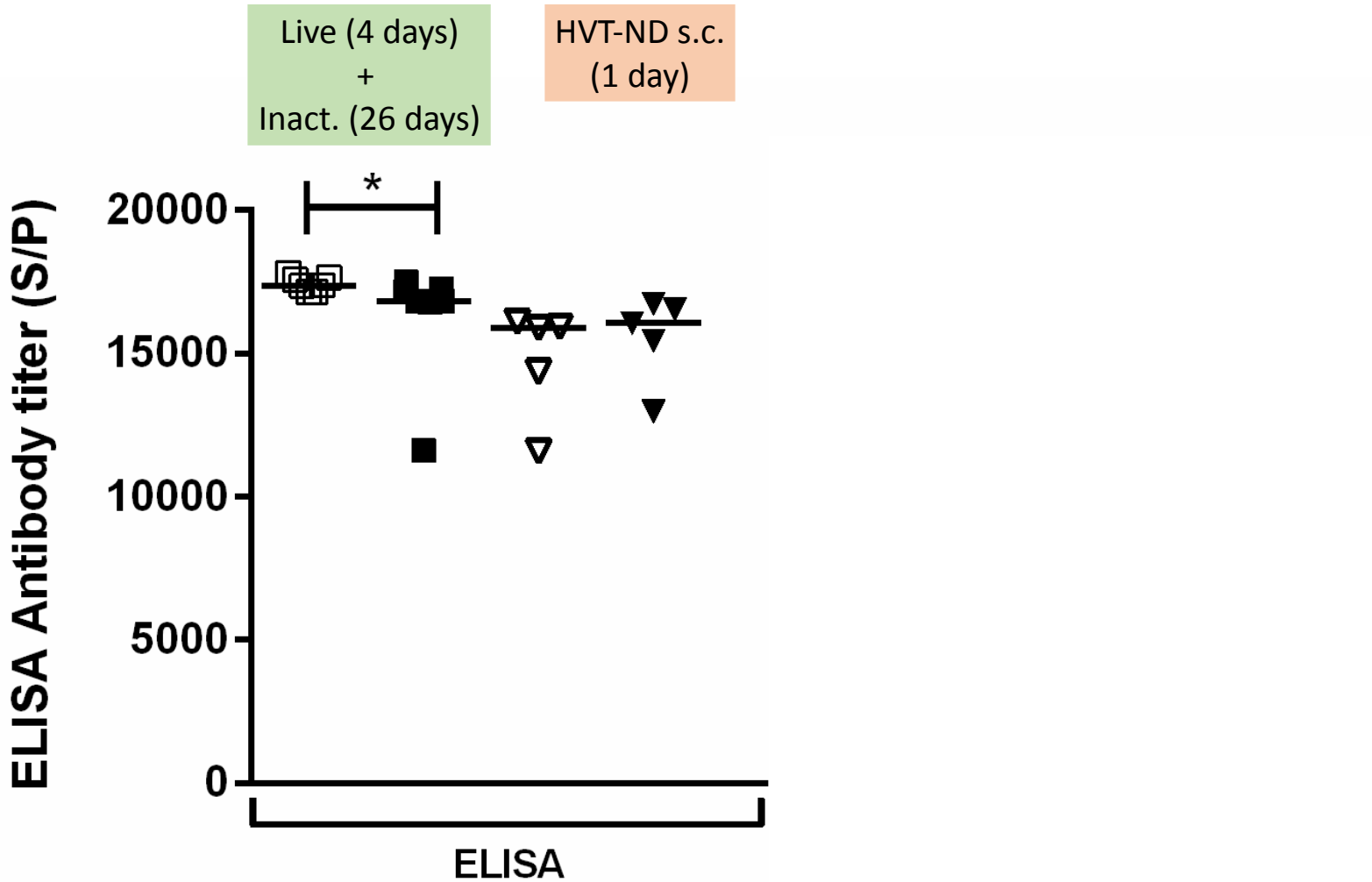
Live (4 days)
+
Inact. (26 days)

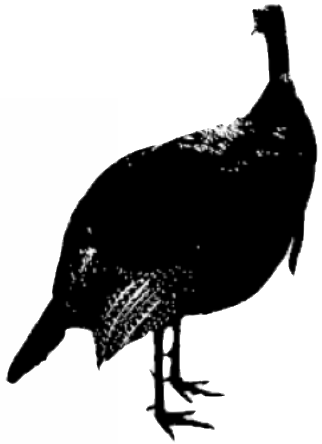
HVT-ND s.c.
(1 day)





Male turkeys





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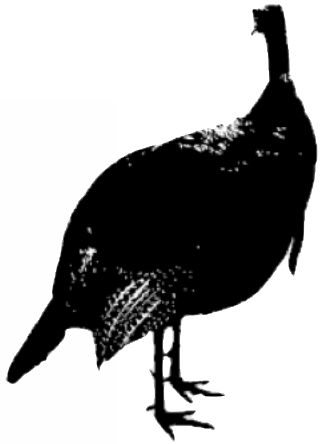
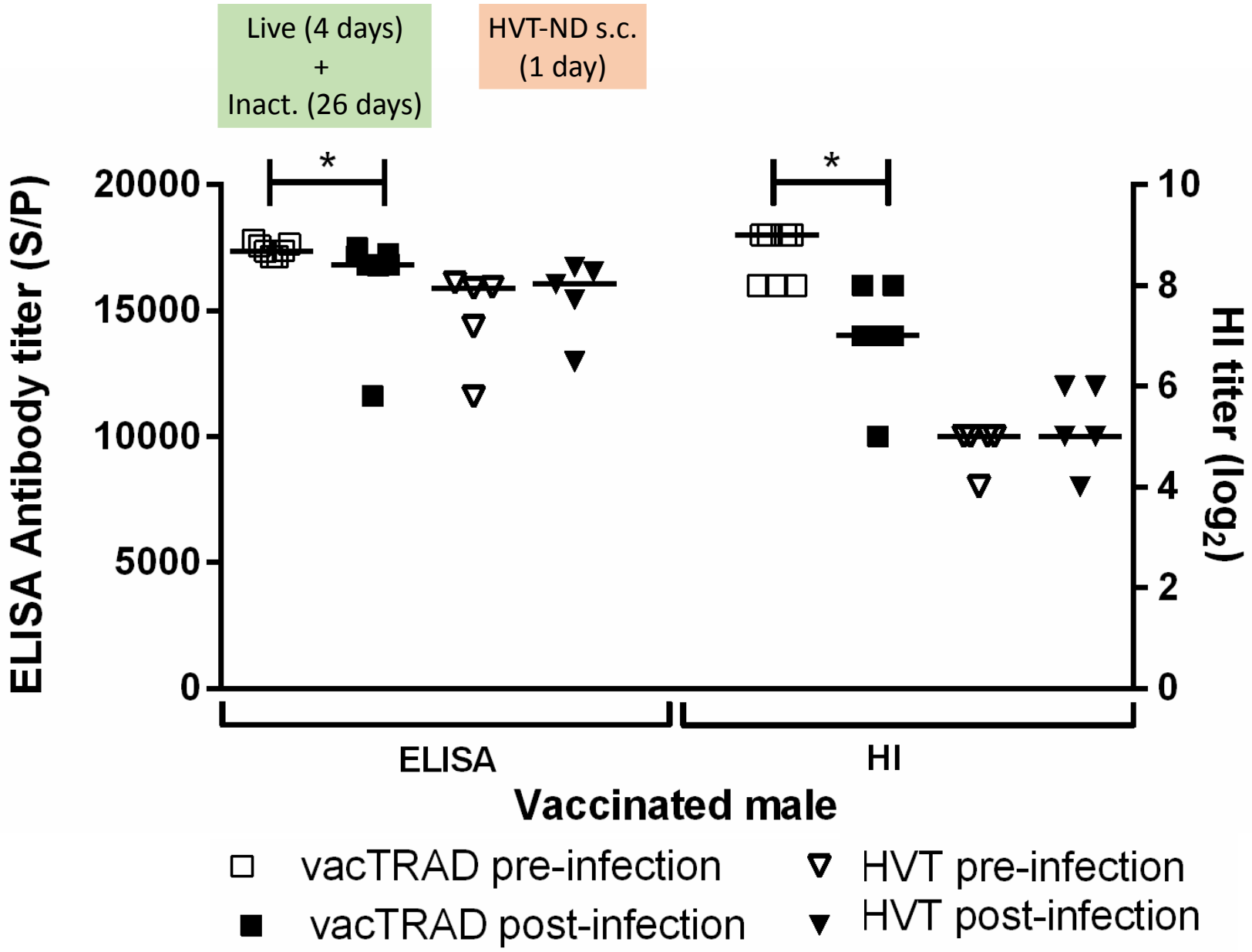
Male turkeys

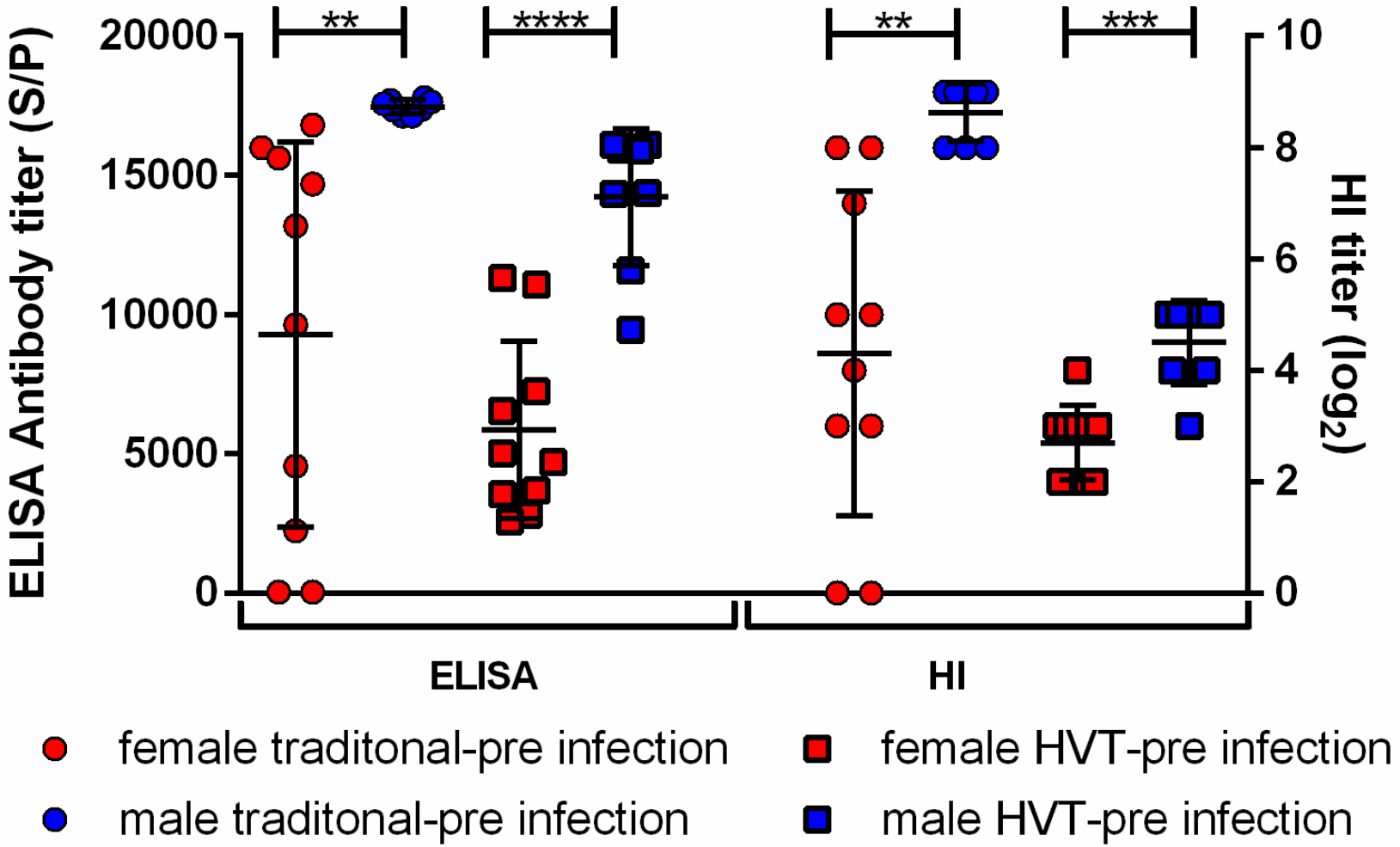




Sex differences?

Live (4 days)
+
Inact. (26 days)

HVT-ND s.c.
(1 day)



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In conclusion

- Despite the difference in age, both female and male animals were clinically protected with only one shot of HVT-ND.
- Male turkeys at 145 days of age recorded a sterilizing immunity matching the one of the traditional vaccination scheme.
- In females af 100 days of age non viable virus was recovered in two subjects.

In conclusion

- All in all, HVT-ND is a valid alternative to reduce the number of immunizations, particularly appealing for long-life animals.

- HVT-ND might also represent a solution for antigenically matched vaccines in case of NDV epidemics, as its manufacturing process is safe and highly scalable in 4-6 months.

Thanks much!