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In vivo transmission study of a feline hemotropic mycoplasma

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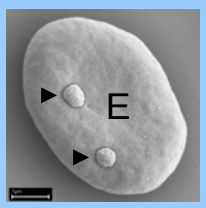
Introduction

Hemotropic mycoplasmas cause infectious anemia in several species (1).



Erythrocyte with two coccoid bodies of *Mycoplasma haemofelis*

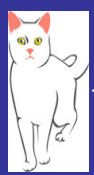
In cats three hemotropic mycoplasmas (aka hemoplasmas) are known: *Mycoplasma haemofelis*, ‚*Candidatus* Mycoplasma haemominutum' and ‚*Candidatus* Mycoplasma turicensis' (2,3).

The natural transmission routes of these agents are largely unknown (4).

Saliva samples of infected cats were found hemoplasma PCR-positive, but loads were low (5).

Aim of the study

The aim of the study was to evaluate possible routes of transmission of ‚*Candidatus* Mycoplasma turicensis' via direct contact among cats and to confirm successful infections by qPCR and serodiagnostics.



Transmission by aggressive contact?
(cat bites)

Transmission by direct contact?

Transmission by social contact?
(grooming, sharing of food dishes)

Material & Methods

For the transmission study, ten SPF cats were inoculated with saliva/blood collected from ‚*Candidatus* Mycoplasma turicensis' infected cats: five cats were inoculated subcutaneously (to mimic a cat bite), five cats received the inoculi oronasally (saliva) or orally (blood). The study comprised of five steps: I) saliva only; II) recipient cats immunosuppressed, saliva only; III) blood containing equivalent and IV) higher copy numbers than given previously in saliva; V) blood, s.c. (as positive control).

Table 1: Experimental setup

Group	Aim	N° of cats	Carrier	Route
Group A	I. Transmission by saliva	5	100 µl of saliva (120 copies)	*subcutaneous*
	II. Transmission by saliva, immunosuppression		2 x 200 µl of saliva (1x10^3 copies)	*subcutaneous*
	III. Transmission by blood (twice in cat1)		10 µl of infectious blood (1x10^3 copies)	*subcutaneous*
Group B	I. Transmission by saliva	5	2 ml of saliva (920 copies)	*oronasal*
	II. Transmission by saliva, immunosuppression		6 ml of saliva (7x10^3 copies)	*oronasal*
	III. Transmission by blood		63 µl of infectious blood (8x10^3 copies	*oral*
	IV. Transmission by blood		500 µl of infectious blood (4x10^5 copies)	*oral*
	V. Transmission by blood, positive control		50 µl of infectious blood (6x10^3 copies)	*subcutaneous*

Results

Table 2: Outcome of the transmission study

Group A	I. Saliva sub-cutaneous	II. Saliva + Immuno-suppression	III. Blood sub-cutaneous
Cat 1	○	○	○ *
Cat 2	○	○	●
Cat 3	○	○	●
Cat 4	○	○	●
Cat 5	○	○	●

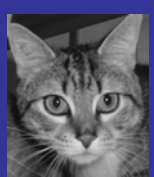
Group B	I. Saliva oronasal	II. Saliva + Immuno-suppression	III. Blood oral, 63 µl	IV. Blood oral, 500 µl	V. Blood sub-cutaneous
Cat 6	○	○	○	○	●
Cat 7	○	○	○	○	●
Cat 8	○	○	○	○	●
Cat 9	○	○	○	○	●
Cat 10	○	○	○	○	●

○ PCR-negative
● PCR-positive, seropositive
○ PCR-negative, seropositive

* twice in cat 1

Using only saliva, neither oral nor subcutaneous inoculation led to infection in groups A and B independent of presence or absence of immunosuppression (I/II). When blood containing the same copy number was inoculated subcutaneously, infection was successful in four cats of group A (real-time TaqMan PCR positive), whereas cat 1 sero-converted after a second subcutaneous injection of 10 µl of blood (III). However, the oronasal group B stayed negative by PCR and serology after oral inoculation of blood (III/IV). When group B received the inoculi subcutaneously (positive control experiment), all five cats turned PCR-positive and seropositive (V).

Conclusion



Transmission by direct social contact via saliva seems highly unlikely. Oronasal exposure of up to 6 ml did not lead to transmission of infection. Transmission via aggressive interaction may occur if the recipient cat is exposed to a minimal volume of infectious blood (e.g., in the case of gingivitis/stomatitis of the aggressor cat).

Reference

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