Congenital deafness in white cats

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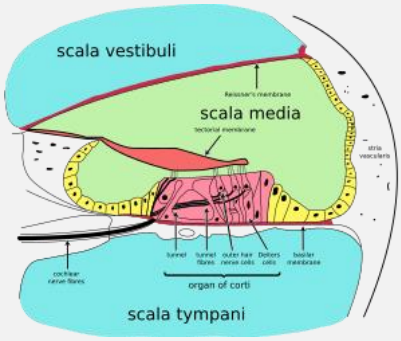
INTRODUCTION AND OBJECTIVES

The prevalence of congenital deafness in cats in general is low but white cats are particularly prone to this condition. It seems that this deafness is linked to genes responsible for white pigmentation. This work focuses on investigating the relationship between the white phenotype, potential mutations and deafness in cats.

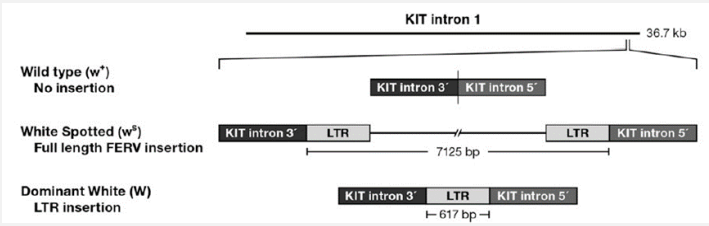
ANATOMY AND PHYSIOLOGY OF THE INNER EAR

The cochlea is essential for converting sound vibrations into nerve signals and is composed of :

- Organ of Corti with hair cells
- Stria vascularis that produces endolymph thanks to melanocytes



[1]**Fig 1: Anatomia del cochlea**



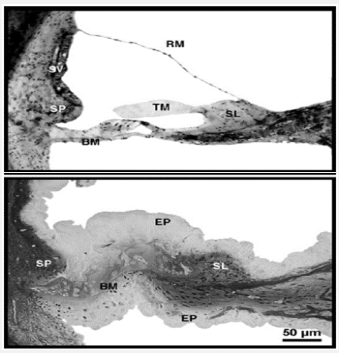
[2]**Fig 2: Retrotransposition in the KIT gene**

IMPLICATED GENES IN DEAFNESS

- Mutations of the **KIT** gene : locus **White (W).**
- Other genes involved : **Mitf, Ednrb, Edn3, Pax3**, **Slug**, **Sox10**

ANATOMICAL CONSEQUENCES

- **Cochleosaccular degeneration**
- 'Spongiform' degeneration of the cochlea
- Alteration of endbulb synapses
- Disruption of inputs to the principal neurons of the medial superior olive
- Rudimentary inferior colliculus
- Alterations in the cerebral cortex



[3]**Fig 3: Photomicrographs of a normal organ of Corti and one with 'spongiform" degeneration**

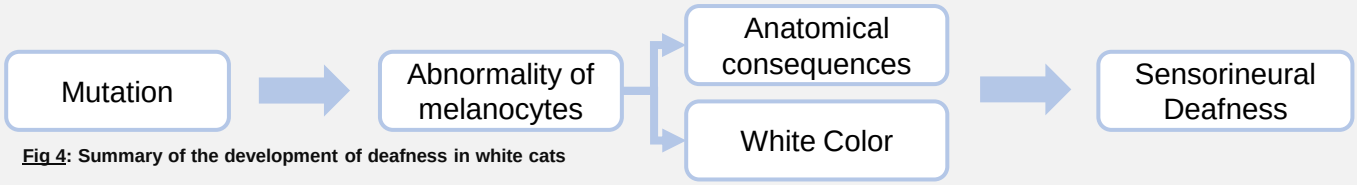


Fig 4: Summary of the development of deafness in white cats

CONCLUSION

This work has addressed congenital deafness in white cats with the W locus, highlighting the molecular and genetic bases.
Mutations in the genes mentioned above affect melanocytes essential for hearing, causing degeneration of the cochlea and other inner ear structures, leading to sensorineural deafness.

Sources
[1]Steel y Bryan. Hearing molecules : Contributions from genetic deafness, 2007
[2]David et al., Endogenous retrovirus insertion in the KIT oncogene determines White and White-spotting in domestic, 2014
[3]De Rycge et al. Formas separadas de patología en la cóclea de gatos blancos congénitamente sordos, 2003