

Silvers and smokes

- The one-gene theory:
- A dominant Inhibitor gene I
 - inhibits pigment production at the hair base(erasing)
 - cancels rufousing everywhere (bleaching)
- It may have different alleles, producing different length of depigmentation (shaded and chinchilla alleles), but perhaps this variation is more gradual, due to polygenes

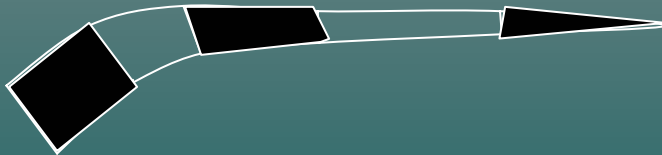
How the silver gene acts



•Non-agouti hair



•Action of the silver gene on non-agouti hair



•Agouti hair



•Action of the silver gene on agouti hair

Smoke and tipped silver colors

- Superimposing the silver gene we have the following results:
 - Solid ---> smoke
 - Classic, mackerel or spotted tabby ---> silver tabby in the same pattern
 - Ticked or agouti tabby ---> shaded silver or chinchilla

Smoke, silver tabby and shaded colors



smoke



silver classic tabby



chinchilla

The two genes theory

- One dominant gene to inhibit pigmentation (eraser, E), perhaps with shaded and chinchilla alleles
- Another dominant gene to cancel rufousing (bleaching, B1)

Genotypes of silvers in the two genes theory

- Unrufoused solid (for instance, ink-jet black):
aa ee Bl-
- Smoke: aa E- Bl -
- Shaded silver and chinchilla: A- T^aT^a E- Bl-
- Silver tabby: A- TT E- Bl- or A- t^bt^b E- Bl- or
A- Tt^b E- Bl-

Golden tabbies in the two genes theory

- Which phenotype corresponds to $A- T^aT^a E- bl\ bl$? Golden (shaded or shell)
- Which phenotypes correspond to $A- TT E- Bl-$ or $A- t^{bt^b} E- Bl-$ or $A- Tt^b E- Bl-$? Golden tabbies

Failure of the two genes theory: predicted colors which do not exist

- A- T^a- ee Bl- : unrufoused tabbies which are not depigmented at the base, they exist, but not with the offspring probabilities dictated by a principal gene
- aa E- bl bl : golden smoke. Never seen!

Can we save the two genes theory?

- To save this theory we must assume that E is disactivated by aa and B1 is disactivated by ee: a bit too implausible
- If we do so, then the theory is equivalent to assume a silver gene I and an epistatic "golden" modifier g (similarly to the maltese dilution), which transforms silver into golden, while its dominant allele G does nothing

Other theories for goldens

- Golden = brown ticked tabby!
 - But the best goldens are depigmented at the base for a length greater than the ticked tabby first agouti band
- Wide-band theory: assume that there is a bleaching gene, Bl , and a dominant wide-band gene Wb which makes the first agouti band much longer. Then: silvers: $Bl- Wb-$, goldens: $bl bl Wb-$
 - this explains why there are no golden smokes, but does not explain the smokes!

A satisfactory theory for silvers and goldens

- Goldens = brown ticked tabbies + wide-band polygenes
- Shaded silvers/chinchillas: brown ticked tabbies + wide-band modifiers + Eraser gene + Bleaching gene
- Silver tabbies: brown tabbies (not ticked/agouti) + wide-band modifiers + Eraser gene + Bleaching gene
- Smokes: non-agouti + Eraser gene + Bleaching gene