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Characterization of the melanocyte lineage in patchwork hair follicles

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Mice homozygous for the patchwork (*pwk*) recessive mutation are salt and pepper: their coat contains a mixture of unpigmented and fully pigmented hairs, but no partially pigmented hairs¹. In the matrix of *pwk/pwk* unpigmented hair follicles, there are no mature melanocyte. This phenotype could be due to: (i) absence of the melanocyte stem cell (MSC) population, (ii) impaired differentiation of MSC into transit amplifying cells (TA cells), (iii) inhibition of TA cells proliferation and/or migration, or (iv) death of melanoblasts within the proliferative compartment. To discriminate between these hypotheses, we used transgenic mice expressing reporter genes for the melanocyte lineage, namely *Dct-lacZ* and *Pax3^{GFP}*². We validated the *Pax3^{GFP}* reporter strain by comparing its labelling of melanocyte lineage to *Dct-lacZ*'s. In *pwk/pwk* hair follicles, whatever the hair color, MSC and TA cells are present though in reduced number in the bulge and in the transitory portion respectively. In *pwk/pwk* unpigmented hair follicles, some TA cells reach the bulb region where they remain undifferentiated. By contrast, in the bulb of *pwk/pwk* pigmented hair follicles, TA cells are more numerous and differentiate into functional melanocytes. To test whether the impaired differentiation in the unpigmented hair follicles is related to the lower number of melanoblasts, we dissected *pwk/pwk*; *Dct-lacZ/Dct-lacZ* or *pwk/pwk*; *Pax3^{GFP/+}* and control hair follicles and counted cells of the melanocyte lineage within single hair follicles. Which process (survival, proliferation and/or migration) is deficient in the transit amplifying population is under investigation.

1. Aubin-Houzelstein G, Bernex F, Elbaz C, Panthier JJ (1998). Survival of patchwork melanoblasts is dependent upon their number in the hair follicle at the end of embryogenesis. *Dev Biol.* 198(2):266-76.

2. Relaix F, Rocancourt D, Mansouri A, Buckingham M (2005). A Pax3/Pax7-dependent population of skeletal muscle progenitor cells. *Nature* 435:948-953.