

Tyrosinase as a marker for transgenic mice

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Screening of transgenic animals is usually time consuming and normally requires DNA analysis on tail tips either by conventional Southern blot analysis (1) or by the polymerase chain reaction (2). It would be very helpful, if transgenic animals could be identified by inspection at birth. We recently showed that a functional mouse tyrosinase gene when introduced into an albino mouse strain leads to pigmentation in eyes and skin with high penetrance (3). We found that almost every tyrosinase transgenic line does express the transgene and we therefore decided to use the tyrosinase gene as a marker for transgenic mice. Coinjection with any other construct should then lead to a certain percentage of transgenic mice carrying both transgenes at a single chromosomal site (4).

Equal molar amounts (about 2 ng/μl) of the mouse tyrosinase gene construct ptrTYR5 (11.2 kb XbaI/SalI fragment; Fig. 1) and a construct containing 11 kb rat tyrosine aminotransferase 5′ sequence fused to a CAT reporter gene (pTC11.1; 12.7 kb SalI/ClaI fragment; 5) were coinjected into fertilized eggs of the albino mouse strain NMRI.

transferred eggs	mice born	mice transgenic	mice pigmented	mice double transgenic
78	21	5	4	3

We obtained 4 pigmented mice and 3 of them were shown to be transgenic for pTC11.1. These 3 founders were bred to albino mice and analysis of offspring revealed complete concordance between pigmentation and transgenicity for pTC11.1. Thus, we suggest that the two transgenes have integrated at a single chromosomal location. We conclude that using tyrosinase as a marker will greatly facilitate identification of transgenic offspring. The gene of interest might be cloned into one of the unique restriction sites of ptrTYR5 (indicated by bold letters).

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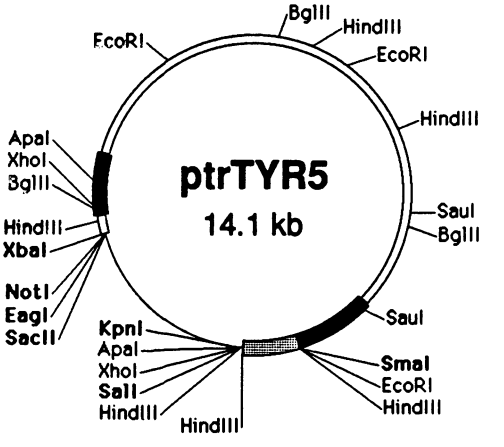

Figure 1. The construct ptrTYR5 contains 270 bp 5′ flanking sequence (open box, up to the XbaI site), exon 1 (filled box), intron 1 (open box) and a fusion of exons 2–5 (filled box) of the mouse tyrosinase gene linked to an SV40 splice and polyadenylation signal (stippled box). Mapping of ptrTYR5 is complete for the indicated enzymes.

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