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Genetic mapping of fused root of the maxillary second molar in mice to chromosome 5

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Abstract Although studies have identified several genes that are involved in tooth root formation, little is known about the genetics of root fusion. The purpose of the present study was to identify the chromosomal region that includes the candidate gene causing root fusion, using SMXA recombinant inbred (RI) strains of mice. Fusion of the mesial and palatal roots of the upper second molars (M^2) was observed in 16 of 21 substrains of SMXA RI mice. The incidence of root fusion of the M^2 in substrains and parental strains showed a continuous spectrum of distribution between 0 and 85%. In a genome-wide linkage analysis, a high Lod score exceeding the suggestive threshold level was found between D5Mit97 and D5Mit31 on chromosome 5. These findings suggest that a polygenic system with incomplete penetrance is involved in the fusion of roots, and that one of the genes causing root fusion of the M^2 in mice is located in a distal region on chromosome 5.

Key words Fused root, Inbred mice, Linkage analysis

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