A human MSX1 homeodomain missense mutation causes selective tooth agenesis

Abstract:

We demonstrate that a mutation in the homeobox gene, MSX1, causes a common developmental anomaly, familial tooth agenesis. Genetic linkage analyses in a family with autosomal dominant agenesis of second premolars and third molars identified a locus on chromosome 4p, where the MSX1 gene resides. Sequence analyses demonstrated an Arg31Pro missense mutation in the homeodomain of MSX1 in all affected family members. Arg 31 is a highly conserved homeodomain residue that interacts with the ribose phosphate backbone of target DNA. We propose that the Arg31 Pro mutatrion comprises MSX1 interactions, and suggest that MSX1 functions are critical for normal development of specific human teeth