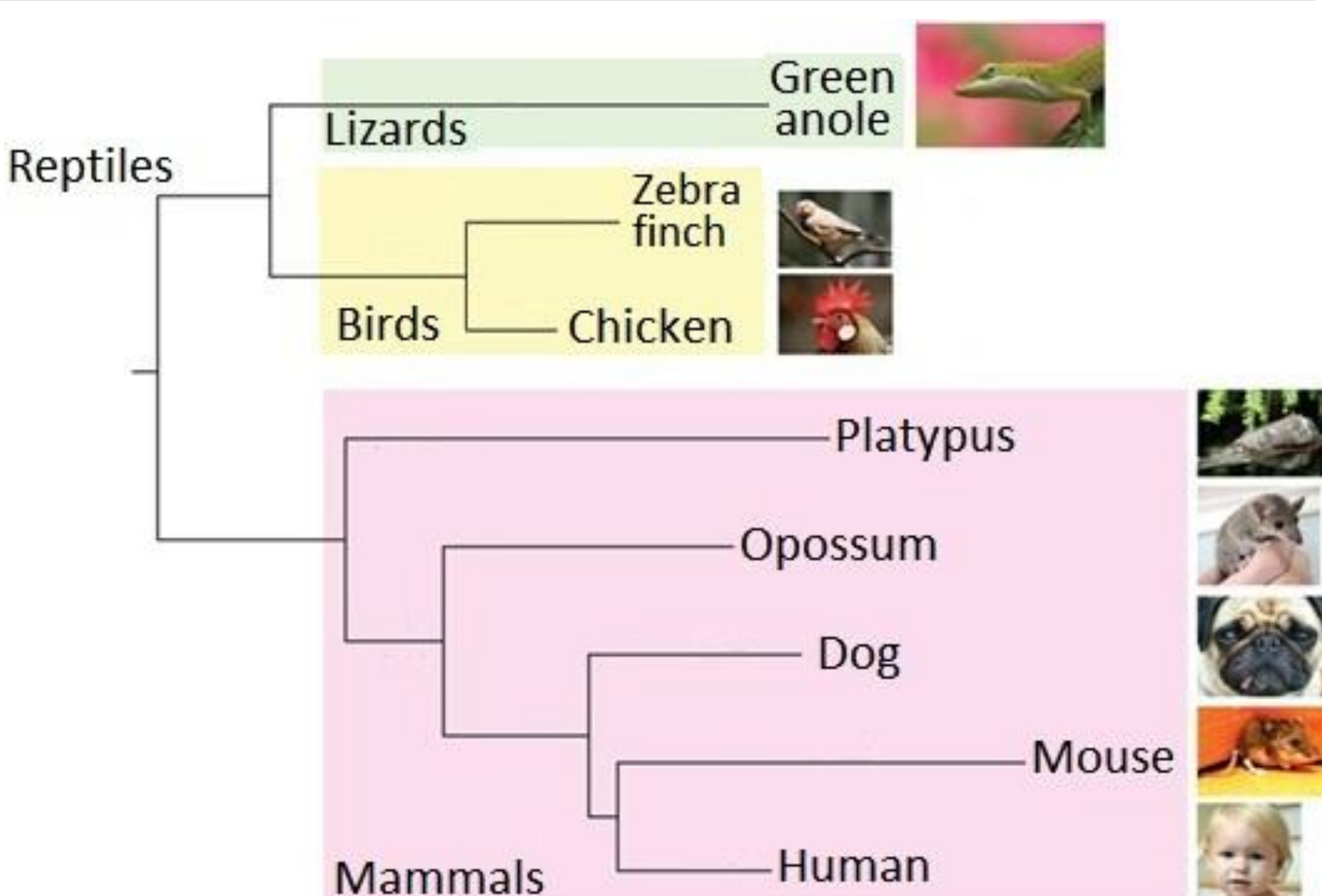


Abstract

The Amelogenin (AMEL) gene is found embedded in the RhoGTPase activating protein 6 gene (ARHGAP6) of *Homo sapiens* on the X chromosome. In this study, NCBI and Ensembl databases were used to determine if AMEL was also embedded in ARHGAP6 of lizards and snakes. We were interested in the recently reported genome of *Anolis carolinensis*. Based on the location of AMEL in humans and other placental mammals, we believe that anole AMEL belongs in the region upstream of the currently annotated anole ARHGAP6.

Background

- Amelogenin is an enamel building protein found in developing teeth.
- The mammalian amelogenin gene has been identified embedded in the first intron of the human ARHGAP6 gene on the X chromosome approximately 40Kb upstream from exon 2.
- ARHGAP6 is responsible for encoding Rho GAP and contains 13 exons in the human genome.



Modified J Alföldi et al. *Nature* 000, 1-5 (2011) doi:10.1038/nature10390

Figure 1: Phylogeny Tree.

The divergence between reptilian and mammalian lineages is pictured.

Identification of Surrounding Genes

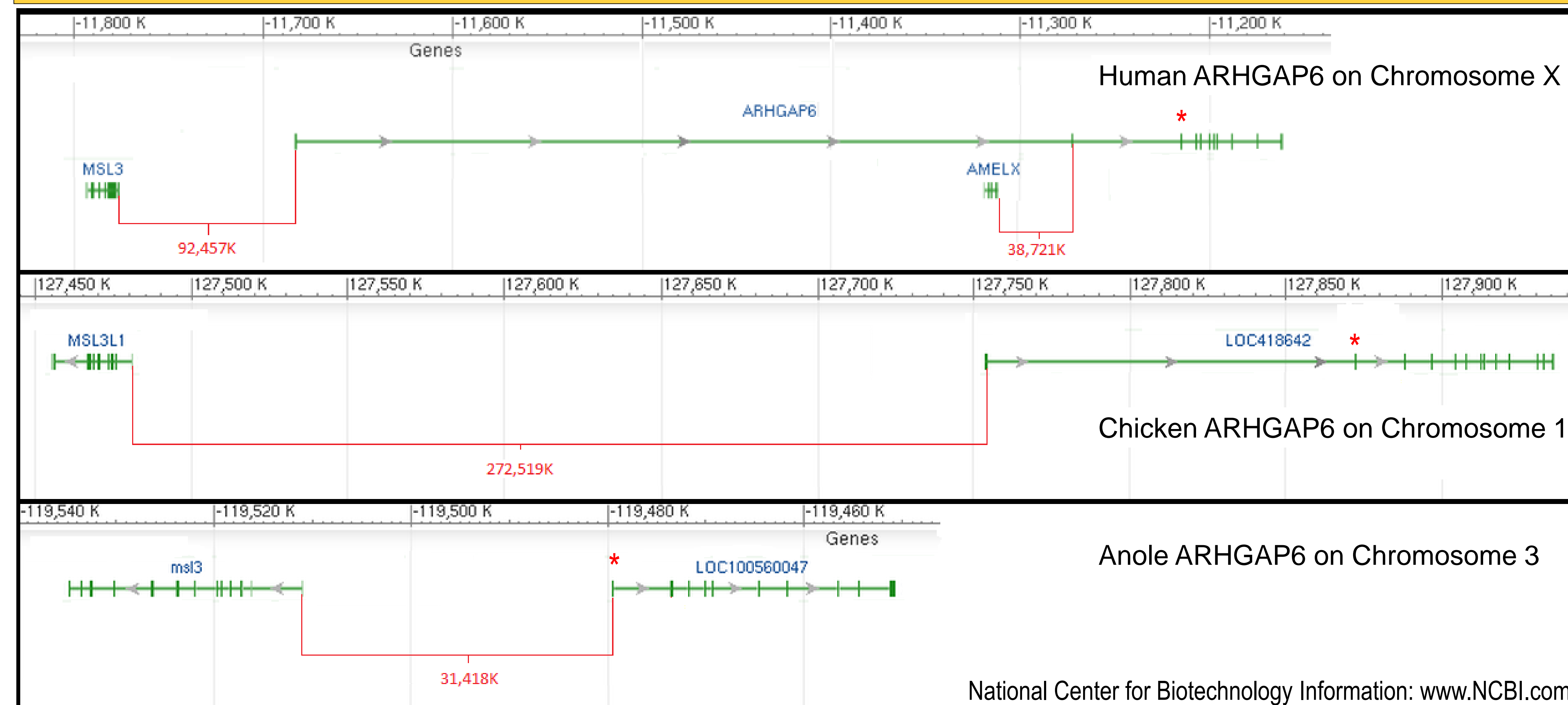


Figure 1: ARHGAP6 Gene Region. Gene structure of the three species, showing the distance between the conserved MSL3 gene from the 5' end of ARHGAP6. [*] Denotes the location of the exon corresponding to anole ARHGAP6 exon 1.

Comparison of ARHGAP6

ARHGAP6 Comparison to Human Equivalent								
Human ARHGAP6			<i>Gallus gallus</i> ARHGAP6			Anole ARHGAP6		
Exon #	Size	Identity	Exon #	Size	Identity	Exon #	Size	Identity
1	1,461	100%						
2	160	100%	1	160	86%	Unplaced	160	82%
3	72	100%	2	72	87%	1	73	87%
4	257	100%	3	257	80%	2	257	80%
5	196	100%	4	196	80%	3	196	80%
6	56	100%	5	56	92%	4	56	91%
7	151	100%	6	151	76%	5	151	76%
8	149	100%	7	149	81%	6	149	72%
9	180	100%	8	180	85%	7	180	80%
10	98	100%	9	98	85%	8	98	76%
11	269	100%	10	232	74%	9	263	72%
12	81	100%	12	81	76%	10	81	72%
13	1,987	100%						

Table 1: Comparison of ARHGAP6 Exons. Exons of ARHGAP6 in *Gallus gallus* and *Anolis carolinensis* were each compared to their human equivalent. Exon number, size, and sequence identity relative to human ARHGAP6 are represented under each species heading.

• An amelogenin like gene has been identified in the anole genome. However, it is located on an unplaced scaffold GL.343702.1

• Human exon 2 equivalent in the anole genome is not placed on chromosome 3 but was also identified on scaffold GL.343702.1

Amelogenin Location Relative to ARHGAP6

	Human	Platypus	Opossum	Xenopus
1	1461	42	21	155
AMEL	38Kb	26Kb	59Kb	36Kb
2	160	160	160	160
3	72	72	72	72
4	257	257	257	257
5	196	196	196	196
6	56	56	56	71
7	151	151	151	151
8	149	149	149	149
9	180	180	180	180
10	98	98	98	98

Table 2: Amelogenin in platypus, opossum, and western clawed frog. Amelogenin was identified upstream of the 160bp exon in all three species.

Amelogenin Location in Placental Mammals Relative to ARHGAP6

	Human	Chimpanzee	Cow	Horse	Mouse	Elephant	Hedgehog	Megabat
1	1461	588	507	579	1713	39	591	579
AMEL	38Kb	39Kb	50Kb	37Kb	32Kb	47Kb	35Kb	40Kb
2	160	160	160	162	160	160	160	160
3	72	72	72	72	72	72	72	72
4	257	257	257	257	260	257	257	257
5	196	196	196	196	196	196	196	196
6	56	56	56	56	56	56	56	56
7	151	151	151	151	151	151	151	151
8	149	149	149	149	149	149	149	149
9	180	180	180	180	180	180	180	180
10	98	98	98	98	98	98	98	98

Table 3: Amelogenin in Placental Mammals. Amelogenin was consistently identified upstream of the 160bp exon in all placental mammals.

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