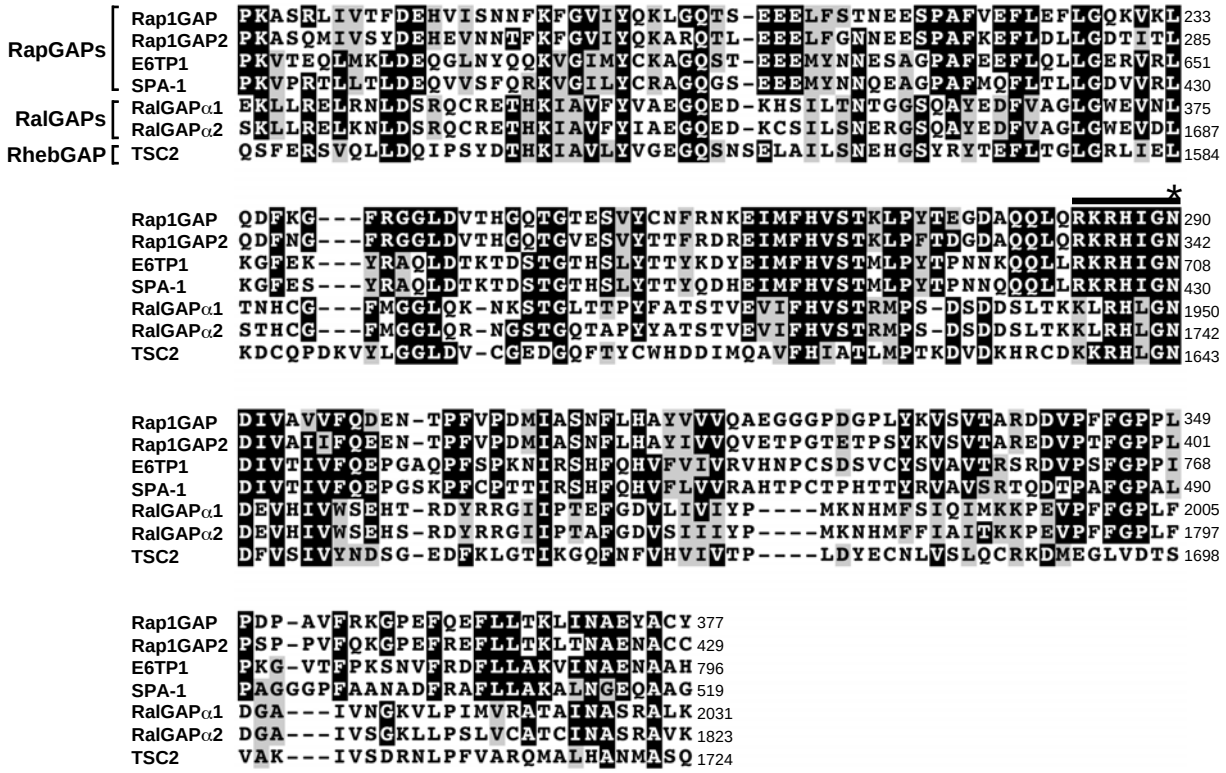
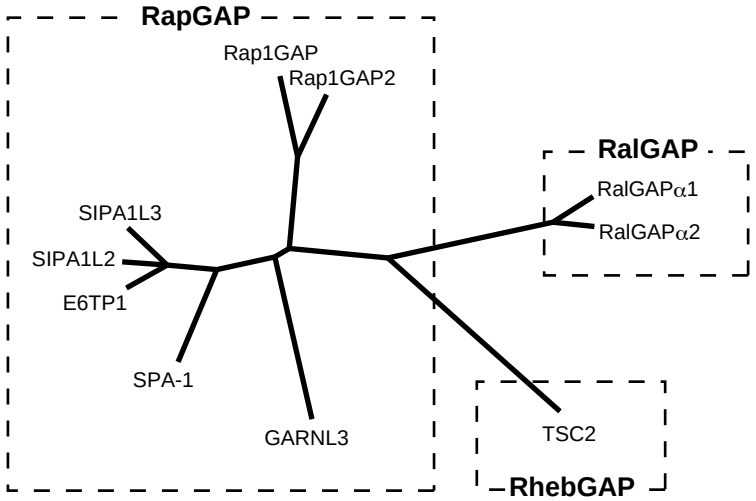
Supplementary Figure 1

A

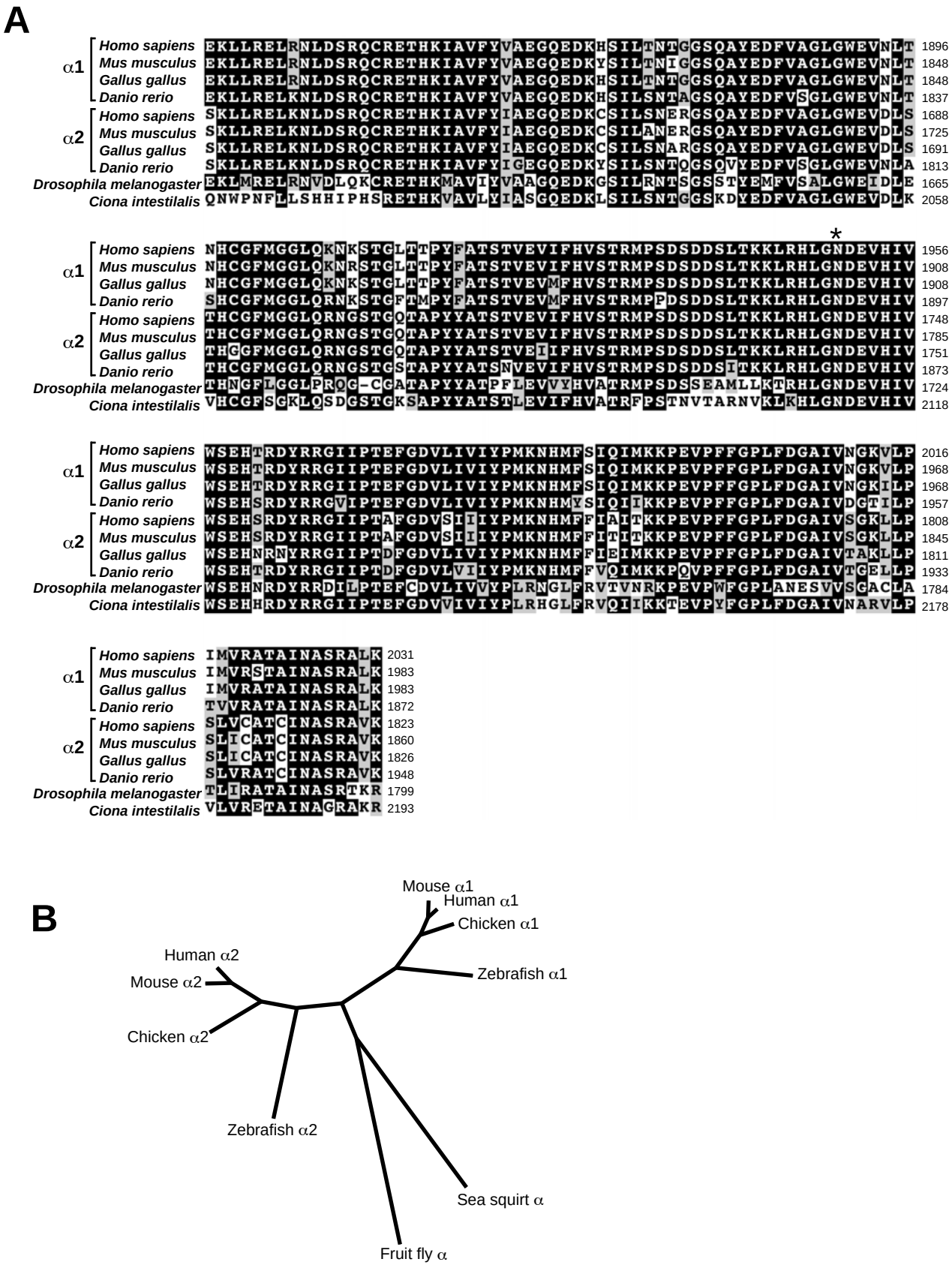


B



SUPPLEMENTARY FIGURE 1. **The asparagine thumb GAP family.** *A*, Amino acid sequence alignment of the catalytic domain of *H.sapiens* Rap1GAP (NP_002876), Rap1GAP2 (NP_001093868), SPA-1 (NP_006738), E6TP1 (NP_056371), TSC2 (NP_000539), RalGAPα1 (NP_055805), and RalGAPα2 (NP_0655076). Black boxes and shaded boxes indicate >50% conserved and >50% similar residues, respectively. The black bar shows the catalytic helix of Rap1GAP. An asterisk marks the position of the catalytic asparagine. *B*, Phylogenetic tree of the asparagine thumb GAP family. Three putative RapGAPs, SIPA1L2 (NP_065859), SIPA1L3 (NP_055888), and GARNL3 (NP_115669) are also included. The human asparagine thumb GAP family comprises 2 RalGAPs, 1 RhebGAP, and 7 probable RapGAPs.

Supplementary Figure 2



SUPPLEMENTARY FIGURE 2. **Comparison of RalGAPα homologues.** *A*, Amino acid sequence alignment of the catalytic domain of RalGAPα from various species: *H.sapiens* α1, *M.musculus* α1 (NP_064378), *G.gallus* α1 (XP_421244), *D.rerio* α1 (XP_684334), *H.sapiens* α2, *M.musculus* α2 (NP_001028520), *G.gallus* α2 (XP_419313), *D.rerio* α2 (XP_001920508), *D.melanogaster* α (NP_651516), and *C.intestinalis* α (XP_002123952). An asterisk marks the position of the asparagine corresponding to the catalytic asparagine of Rap1GAP. Invertebrates such as fruit fly and sea squirt possess a single gene for the α subunit. *B*, Phylogenetic tree of RalGAPα homologues.