



Supplementary Figure S17. Fold enrichment relative to random sampling of conserved elements. (A) ARs association with genes associated with at least one human accelerated region (Lindblad-Toh et al. 2005; Pollard et al. 2006; Prabhakar et al. 2006; Bird et al. 2007; Gittelman et al. 2015). (B) Convergently differentially expressed genes between vocal learning bird and human brains (Pfenning et al. 2014). (C) SFARI class S (syndromic in ASD) genes (Abrahams et al. 2013). (D) genes with highly significant ($Z>5$) coexpression with vocalization behavior GO term genes (Lachmann et al. 2018). Black bars give the distribution of values expected by chance under 95% (thick) and 99.9% (thin) of cases, expected value ranges are inversely proportional to the number of ARs and to the size of the genelist. Dots indicate the observed value, for (red) vocal learning clade ARs ascertained from vocal non-learner conserved elements, (blue) waterbird ARs ascertained from non-waterbird conserved elements, (orange) vocal learner branch of origin ARs ascertained from vocal non-learner conserved elements, and (purple) vocal non-learner ARs ascertained from vocal non-learner conserved elements. Some waterbirds (mallard, American flamingo, and Killdeer) occur in both the blue and purple categories, these are differentiated by which set of conserved elements were used in the AR ascertainment, non-waterbird (blue) or vocal non-learner (purple).