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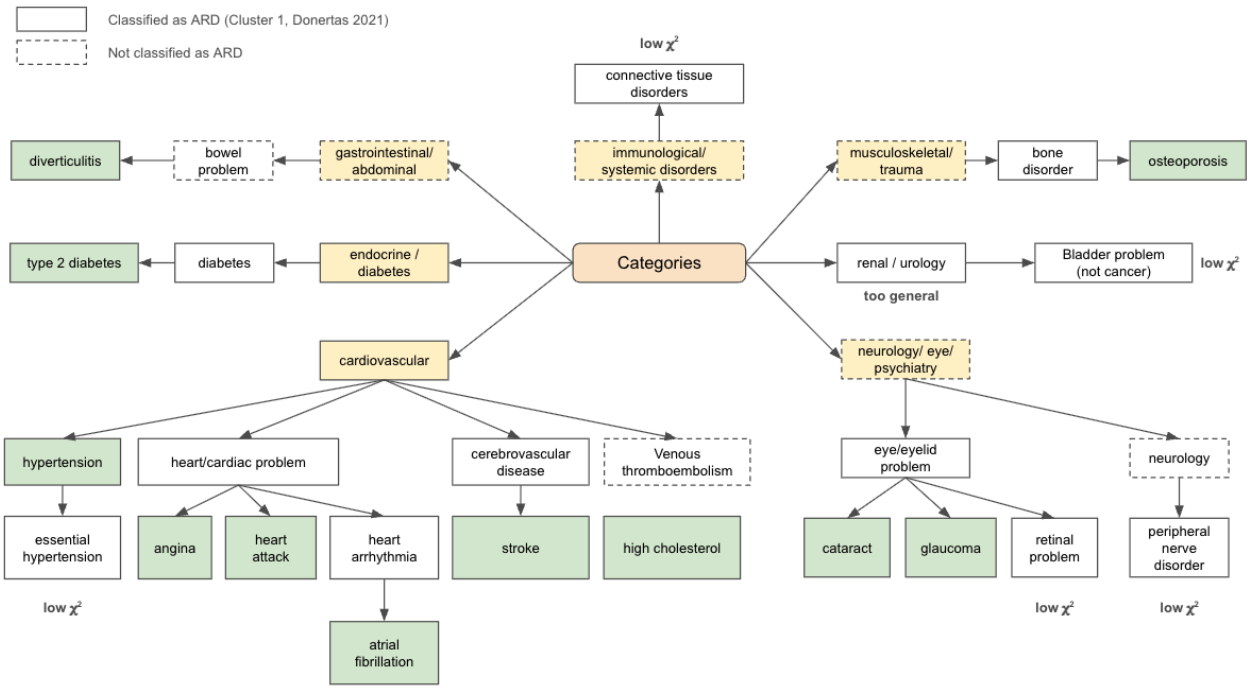
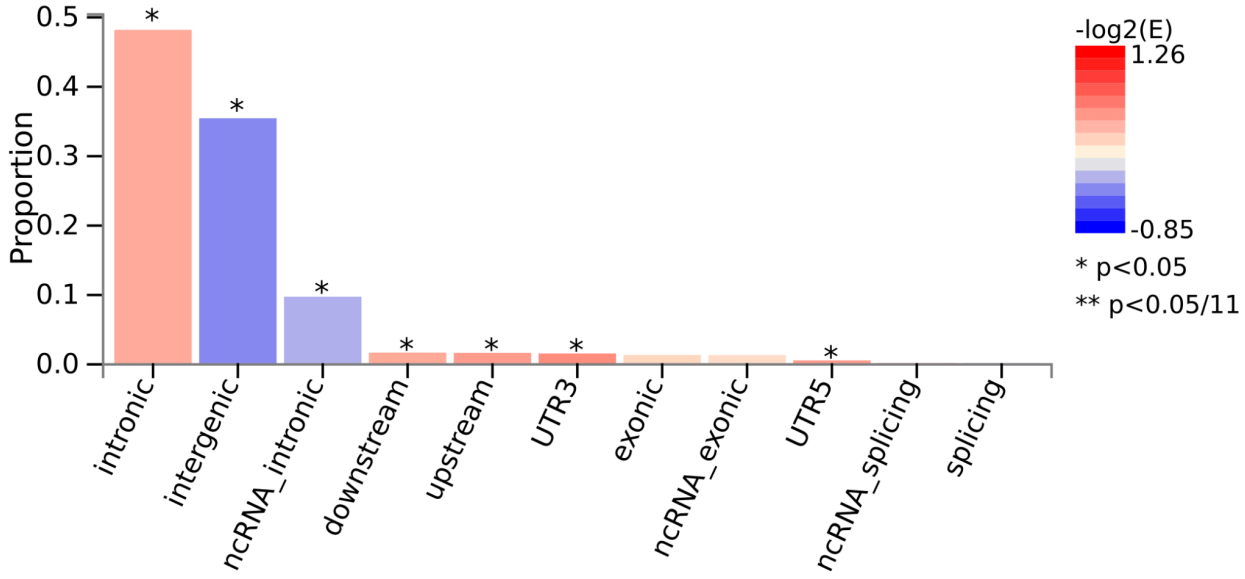
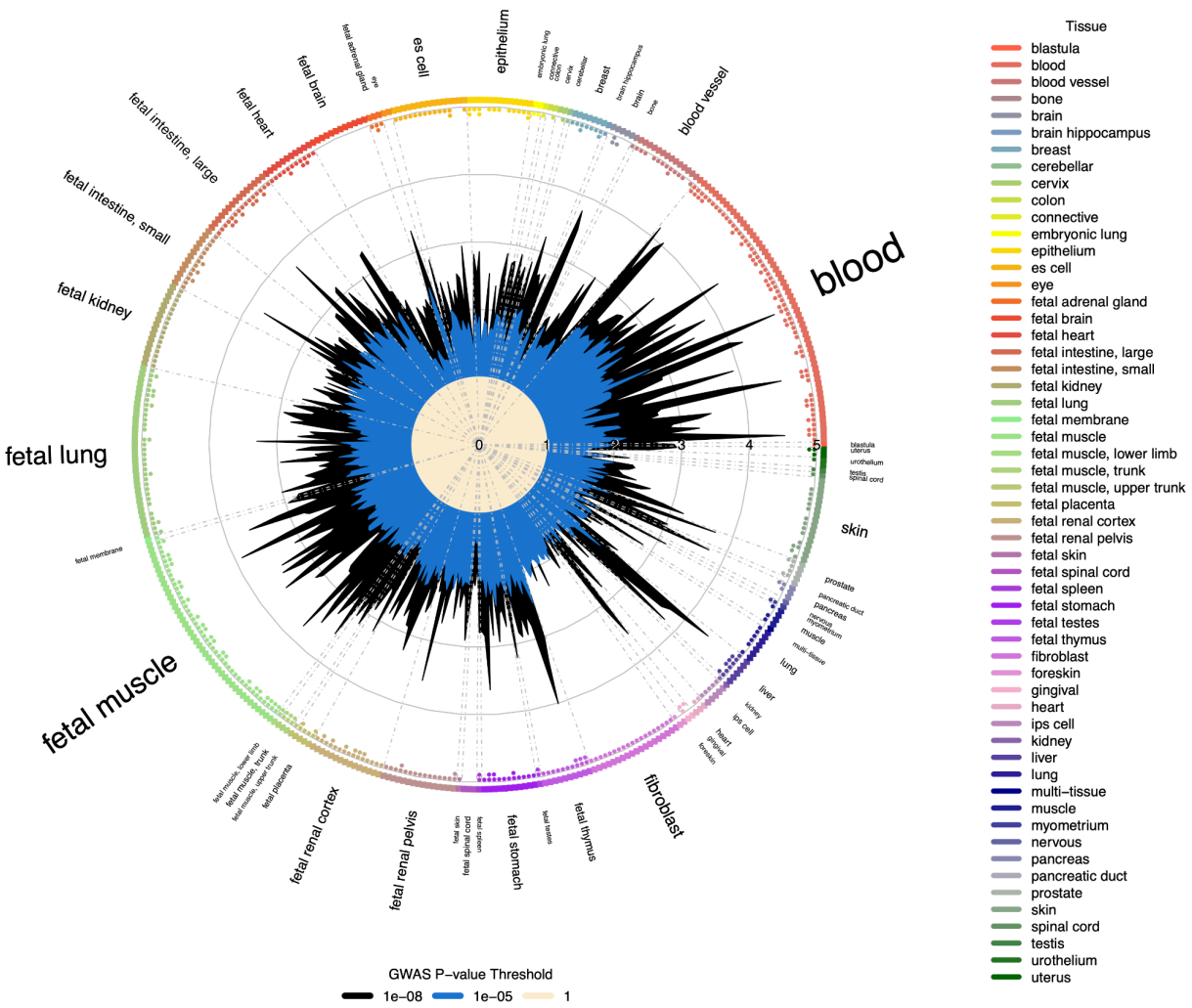


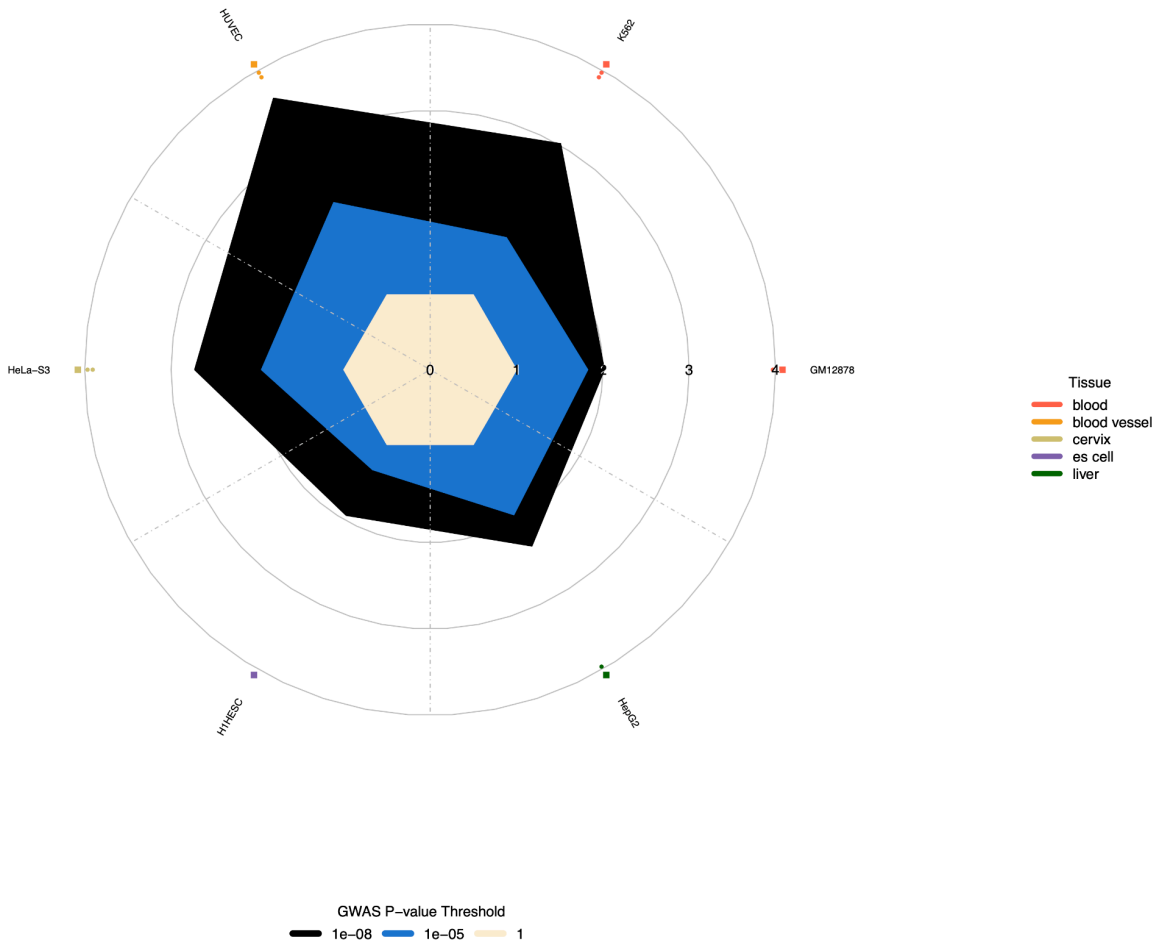

**Supplementary Fig. S1** Hierarchical structure of age-related diseases (ARD). 25 common diseases whose age-of-onset profiles showed a sharp increase after age 40 were obtained from Donertas et al. (2021) and used to construct a hierarchical graph. Boxes highlighted in green indicate ARDs whose GWAS summary statistics met the inclusion criteria for our LDSC analysis




**Supplementary Fig. S2** Functional consequences of SNPs on genes. The figure was generated by FUMA




**Supplementary Fig. S3** Enrichment of mvARD GWAS signals in open chromatin peaks across all ENCODE and Epigenomic DHS cell lines




**Supplementary Fig. S4** Enrichment of mvARD GWAS signals in formaldehyde-assisted isolation of regulatory elements (FAIRE)