

Supplementary Note

Impact of FDR threshold on subsequent somatic eQTL analysis and summary statistics

Although we reported somatic eQTLs at multiple FDR thresholds (**Fig. 2a**, **Supplementary Table 1**), we used an FDR cutoff of 20% for many of the subsequent analyses. Here, we report a brief summary of our analyses based on a more restrictive 10% FDR threshold, which identifies 27 somatic eQTLs regulating 28 mRNA expression level changes (**Supplementary Table 1**). This smaller set of somatic eQTLs is mutated in 30% of TCGA patients (282 out of 930). Nearly 60% are validated in ICGC (16 of 27, related to **Fig. 2d**). Of the three somatic eQTLs functionally validated using reporter assays (related to **Figs. 3, 4**), one passes the restrictive 10% FDR threshold: *HYI* at 1.6% but not *DAAM1* at 19.6% or *MTG2* at 22.6%. Application of the 10% FDR threshold also influences the molecular pathway analysis (related to **Fig. 5**). Among the four pathway subtypes identified with prominent noncoding mutations, two are also recovered at the restrictive FDR of 10% (“*CDKN2A-EGFR-TERT*” and “*TERT-BRAF-IDH1*”). The other two noncoding subtypes are not identified, as the somatic eQTLs regulating *PEX26* and *APOBEC2* do not pass this more stringent threshold (FDR = 13.4% and 19.0%, respectively).

Supplementary Tables

Supplementary Table 1. Full list of somatic eQTL-gene interactions. Separate Excel file.

Supplementary Table 2. Full list of somatic eQTLs which disrupt or create transcription factor binding motifs in four or more patients. Separate Excel file.

Supplementary Table 3. Percent of mutations in each somatic eQTL. Separate Excel file.

Supplementary Table 4. Recapitulation of melanoma somatic eQTLs in the validation cohort.

	Melanoma somatic eQTLs
Overlapped	-133161--133158:RTCA, -202--191:DAAM1, +175+216:GLYCTK, +95097+95132:HYI, +605718+605719:TMEM138, -69--61:MAP1S, -81298--81201:TBC1D20, -267580--267538:RUNX3, +754705+754733:LRRRC4B, +826924+826988:METTL16
Discovery set only	+781185+781238:C3orf18, -424468--424424:SF3A2

Supplementary Table 5. Individual data points for the bar graphs of flow cytometry analysis. Separate Excel file.

Supplementary Table 6. Individual data points for the bar graphs of luciferase assays. Separate Excel file.