



**Supplemental Fig S22. Examples of false negatives by VarScan 2, MuTect 1 or MuTect 2.**

**(a)** Deletion called by Mutinack (star), but rejected by VarScan 2 because of “strandedness” despite the fact that both top and bottom duplex strands are represented; braces highlight reads belonging to the duplex of interest; red and blue denote IGV “first of pair” or “second of pair” and therefore correspond to top or bottom duplex strand. **(b)** Deletion called by Mutinack (star), but rejected by MuTect 2 because of a duplex disagreement at a *different position* (one example read shown by arrow). **(c)** Substitution called by Mutinack (dark brown vertical stripes to the left of star) but rejected by Mutect 1 because of “clustered read position” and by VarScan 2 because of “minimum average distance to effective 3' end”; although the mutation is at the end of the reads both the top and bottom duplex strands are represented (shown by red and blue colors), by overlapping reads that cover each end of the insert (see braces).