



**Supplemental Figure 1. Scoring of alternative orders and orientations.** Red dots represent reads from one barcode. Lines X and Y are depicted. (a) Correct order and orientation: X, then Y. The two reads abutting the juncture of X and Y have separation 1, as compared to the mean separation for all consecutive reads from the barcode, also 1. The quotient  $1/1 = 1$  is less than a fixed threshold 2, and thus does not contribute to the penalty for XY. (b) Incorrect orientation: X, then the reverse complement Y' of Y. The two reads abutting the juncture of X and Y' have separation 9, as compared to the mean separation  $(1+1+1+1+9+1+1+1)/8 = 2$ . The quotient  $9/2 = 4.5$  exceeds the fixed threshold 2 and thus contributes 4.5 to the penalty for XY'.