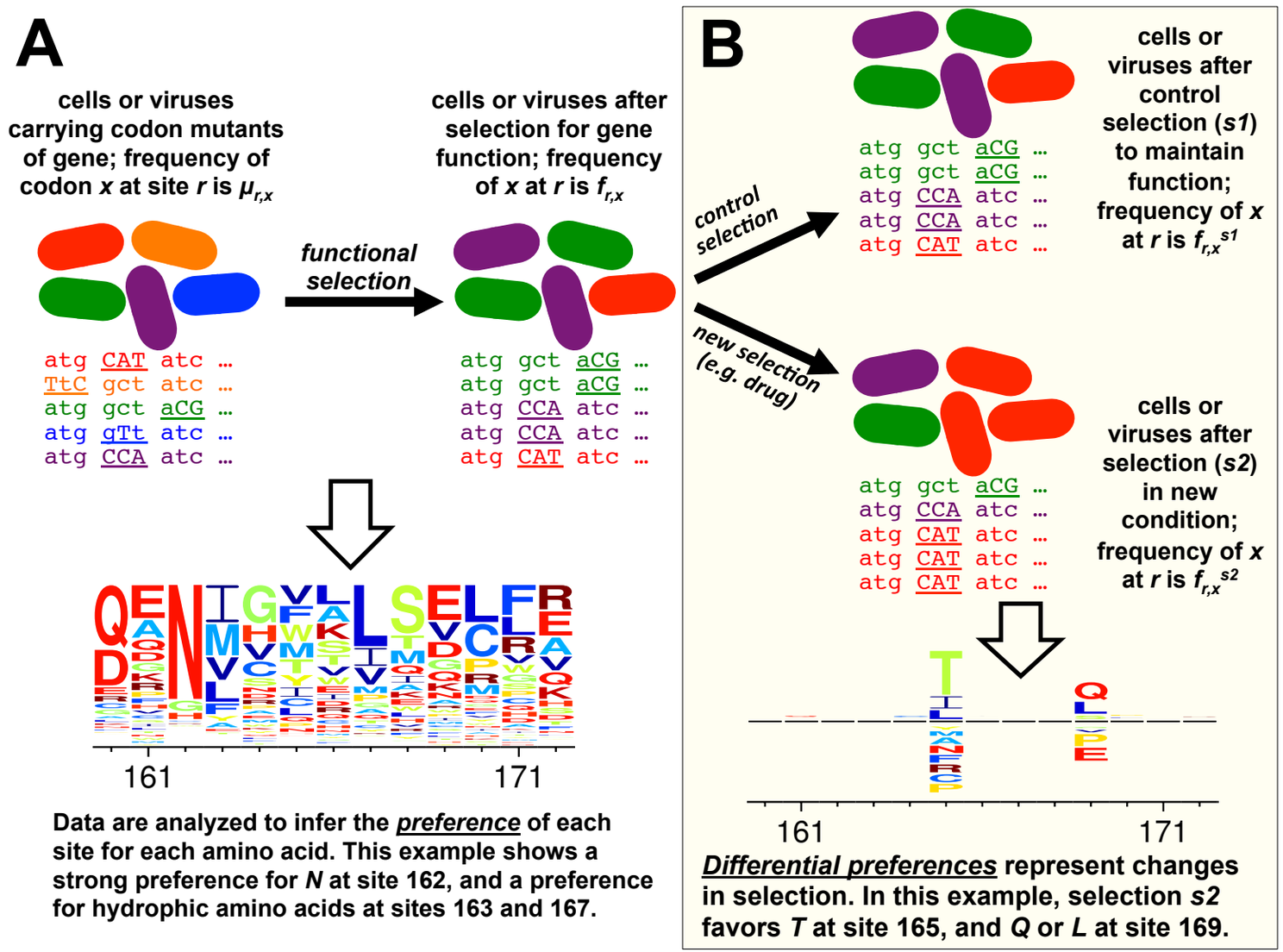
A
cells or viruses carrying codon mutants of gene; frequency of codon x at site r is $\mu_{r,x}$
functional selection
cells or viruses after selection for gene function; frequency of x at r is $f_{r,x}$
atg CAT atc …
TtC gct atc …
atg gct aCG …
atg gTt atc …
atg CCA atc …
atg gct aCG …
atg gct aCG …
atg CCA atc …
atg CCA atc …
atg CAT atc …
161
171
Data are analyzed to infer the preference of each site for each amino acid. This example shows a strong preference for N at site 162, and a preference for hydrophic amino acids at sites 163 and 167.
B
control selection
new selection (e.g. drug)
cells or viruses after control selection (s1) to maintain function; frequency of x at r is $f_{r,x}^{s1}$
atg gct aCG …
atg gct aCG …
atg CCA atc …
atg CCA atc …
atg CAT atc …
cells or viruses after selection (s2) in new condition; frequency of x at r is $f_{r,x}^{s2}$
atg gct aCG …
atg CCA atc …
atg CAT atc …
atg CAT atc …
atg CAT atc …
161
171
Differential preferences represent changes in selection. In this example, selection s2 favors T at site 165, and Q or L at site 169.