



5' - ATTCGA -

3'

3' - TAAGCT -

5'



The diagram shows a DNA double helix. The top strand is orange and reads 5' - ATTCGA - from left to right. The bottom strand is teal and reads 3' - TAAGCT - from left to right. The strands are antiparallel. A loop is formed in the top strand between the 'G' and 'A' bases, indicated by a black oval. Horizontal lines connect the base pairs: A-T, T-A, C-G, and G-C. The 'G' in the top strand is part of a loop and is not paired with a base in the bottom strand. Below the double helix, the equation  $\Delta G = \Delta g_1 + \Delta g_2 + \Delta g_3 \dots + IF$  is written.

$$\Delta G = \Delta g_1 + \Delta g_2 + \Delta g_3 \dots + IF$$

...ATGCTTTTCCGA<sup>0.1</sup>C<sup>0.9</sup>GTA...  
...TACGAAAAGGCTG<sup>0.1</sup>C<sup>0.9</sup>AT...

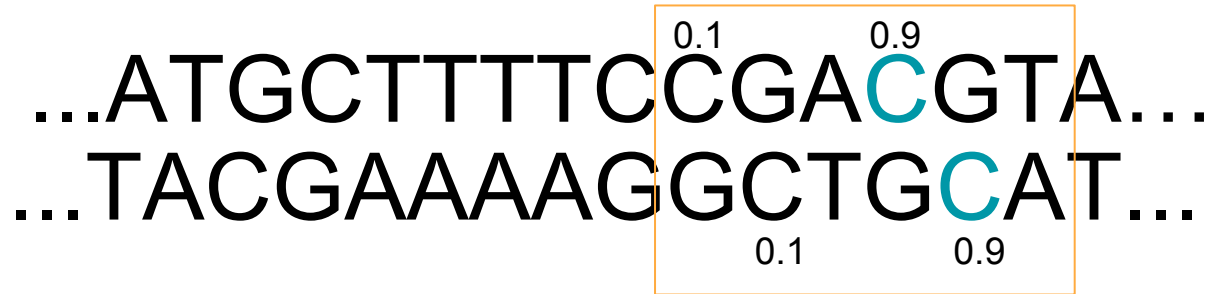
$$\text{CGATGT} = 0.1 \times 0.1$$

$$\text{CGACGT} = 0.1 \times 0.9$$

$$\text{TGATGT} = 0.9 \times 0.1$$

$$\text{TGACGT} = 0.9 \times 0.9$$

OT



$$\text{ATGTCG} = 0.1 \times 0.1$$

$$\text{ACGTCG} = 0.1 \times 0.9$$

$$\text{ATGTTG} = 0.9 \times 0.1$$

$$\text{ACGTTG} = 0.9 \times 0.9$$

OB

OT

$CGATGT = 0.1 \times 0.1$   
 $CGACGT = 0.1 \times 0.9$   
 $TGATGT = 0.9 \times 0.1$   
 $TGACGT = 0.9 \times 0.9$



$ACATCG = 0.1 \times 0.1$   
 $ACGTCG = 0.1 \times 0.9$   
 $ACATCA = 0.9 \times 0.1$   
 $ACGTCA = 0.9 \times 0.9$

CTOT

...ATGCTTTTCCGAC**C**GTA...  
 ...TACGAAAAGGCTG**C**AT...

0.1      0.9  
 0.1      0.9

OB

$ATGTCG = 0.1 \times 0.1$   
 $ACGTCG = 0.1 \times 0.9$   
 $ATGTTG = 0.9 \times 0.1$   
 $ACGTTG = 0.9 \times 0.9$



$CGACAT = 0.1 \times 0.1$   
 $CGACGT = 0.1 \times 0.9$   
 $CAACAT = 0.9 \times 0.1$   
 $CAACGT = 0.9 \times 0.9$

CTOB

...ATGCTTTTCCGACGTA...  
...TACGAAAAGGCTGCAT...

CGTTGT

*Mapped read*

...ATGCTTTTCCGACGTA...  
...TACGAAAAGGCTGCAT...

CGTTGT

*Mapped read*

ATGTCG

ACGTCG

ATGTTG

ACGTTG

**CGATGT** *Alignment score*

CGACGT

TGATGT

TGACGT

