

# Questions and Answers for Genetics and Genomics in Medicine

## Chapter 1

### Question 1

The sequence GATCCAGGACCATGTTATCCAGGATAA is part of a protein-coding gene. Write out the equivalent sequence on the template strand and on the mRNA that is produced.

### Answer

Template strand sequence: TTATCCTGGATAACATGGTCCTGGATC

mRNA sequence: GAUCCAGGACCAUGUUAUCCAGGAUAA

### Question 2

The nuclear DNA molecules in our cells need to be organized as complex structures called chromosomes. Why?

### Answer

A major reason is to allow the compaction of what are immensely long DNA molecules into a manageable size within cells. Naked DNA has a relatively rigid structure, and because nuclear DNA molecules are so long compared with the diameter of the cell, there is a serious risk of entanglement of the different DNAs. That possibility cannot be tolerated if the DNA molecules are to be accurately segregated into daughter cells. The binding of histones, non-histone proteins and some RNA molecules causes DNA folding and allows for different levels of compaction, especially as a cell prepares to divide.

Another important reason is that the chromosome structure allows epigenetic regulation, as explained in later chapters.