

# Agrupamento de Escolas Templários Semana da Cultura Científica

## Palestras

### 1. “Internet of Things”

Orador: Manuel Barros (Instituto Politécnico de Tomar)

### 2. Química e sociedade

Orador: Valentim Nunes (Instituto Politécnico de Tomar)



AGÊNCIA NACIONAL  
PARA A CULTURA  
CIENTÍFICA E TECNOLÓGICA

# 24 de novembro 2014

## 10h15m

### Auditório Jácome Ratton



MINISTÉRIO DA EDUCAÇÃO  
E CIÊNCIA



COMISSÃO  
DE REFERÊNCIA  
NACIONAL  
DE CIÊNCIAS

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Density of the acid  
nucleic acid  
DNA is a nucleic acid that contains the genetic  
instructions used in the development and functioning  
of all known living organisms. It is the primary  
carrier of genetic information. DNA is often compared to a set  
of blueprints or a recipe, or a code, since it contains the  
instructions needed to construct other molecules of  
cells, such as proteins, and RNA molecules. The DNA  
segments that carry the genetic information are called  
genes, but other DNA sequences have structural  
purposes, or are involved in regulating the use of this  
genetic information.

Chemically, DNA consists of two long polymers of  
simple units called nucleotides, with a backbone made  
of sugars and phosphate groups joined by ester bonds.  
These two strands run alongside each other and are  
held together by hydrogen bonds. Attached to each  
sugar is one of four types of molecules called bases. It is  
the sequence of these four bases along the backbone  
that encodes information. This information is read  
using the genetic code which specifies the sequence of  
the amino acids within proteins. This is done by  
copying stretches of DNA into the related molecule  
RNA in a process called transcription.

When cells, DNA is organized into long structures  
called chromosomes. These chromosomes are  
duplicated before cells divide, in a process called DNA  
replication. Eukaryotic organisms (animals, plants,  
fungi, and protists) have most of their DNA inside the  
cell nucleus and some of their DNA is contained  
as mitochondria or chloroplasts [1] In contrast,  
prokaryotes bacteria and archaea store their DNA only  
in the cytoplasm. Within the chromosomes, chromatin  
structures such as histones compact and organize DNA.  
These compact structures guide the interactions  
between DNA and other proteins, helping control  
which parts of the DNA are transcribed.

The first published reports of A-DNA X-ray diffraction  
patterns—and also B-DNA used analyses based on  
Patterson transforms that provided only a limited  
amount of structural information for oriented fibers of  
DNA [10][31] An alternative analysis was then proposed  
by Wilkins et al in 1953. By the 1960s B-DNA X-ray  
diffraction/scattering patterns of highly hydrated DNA  
fibers in terms of squares of spatial functions [32] In the  
background, Watson and Crick presented their  
molecular modeling analysis of the DNA X-ray  
diffraction patterns to suggest that the structure was a  
double helix [7].

Although the B-DNA form is most common under the  
conditions found in cells, it is not a well-defined  
conformation but a family of related DNA  
conformations [34] that occur at the high hydration  
level present in living cells. Their corresponding X-ray  
diffraction and scattering patterns are characteristic of  
disordered [35][36]

Compared to B-DNA, the A-DNA form is a wider,  
more compact, and more rigid structure. The A-DNA form  
occurs under very physiological conditions in partially  
dehydrated samples of DNA, while in the cell it may  
be present in regions of DNA and RNA strands,  
especially in DNA regions [37][38].  
Chemically modified DNA bases may undergo a  
conformational change and adopt the Z-form.

