

# ECOTOXICOLOGIA

## AULA TP 6

random] [plasmid

Chromosomes and plasmids are both DNA molecules, but they are not the same. Chromosomes are large, circular DNA molecules that contain all the genetic information of an organism. Plasmids are smaller, circular DNA molecules that contain only a few genes, but they can replicate independently of the chromosome. Plasmids are often used in genetic engineering to transfer genes between organisms.

Chemically, DNA consists of a backbone of sugar-phosphate groups and a nitrogenous base pair. The backbone is made of deoxyribose sugar and phosphate groups. The nitrogenous bases are adenine, thymine, cytosine, and guanine. Adenine pairs with thymine, and cytosine pairs with guanine. The sequence of these base pairs determines the genetic code. DNA is a polymer of nucleotides. Each nucleotide consists of a phosphate group, a deoxyribose sugar, and a nitrogenous base. The phosphate group is attached to the 5' carbon of the sugar, and the nitrogenous base is attached to the 1' carbon. The 3' carbon of the sugar is attached to the phosphate group of the next nucleotide, forming a continuous chain.

Water-soluble DNA is organized into very specific structures. These structures are called chromatin. Chromatin is a complex of DNA and proteins. The DNA is wrapped around a core of proteins called nucleosomes. The nucleosomes are connected by a protein called histone. The histone proteins are positively charged, and the DNA is negatively charged. This allows the DNA to be tightly packed into a chromatin fiber. The chromatin fiber is further condensed into a chromosome. The chromosome is a highly organized structure that contains all the genetic information of an organism.

The first published reports of A-DNA X-ray diffraction patterns were obtained by Rosalind Franklin and Maurice Wilkins in 1952. Their work showed that DNA has a helical structure. The helix is right-handed, and the distance between two full turns of the helix is 3.4 nm. The diameter of the helix is 2 nm. The distance between two adjacent base pairs is 0.34 nm. The base pairs are stacked on top of each other, and they are held together by hydrogen bonds. The hydrogen bonds are between the nitrogenous bases of opposite strands. Adenine forms two hydrogen bonds with thymine, and cytosine forms three hydrogen bonds with guanine. The hydrogen bonds are responsible for the stability of the DNA double helix.

The B-DNA form is the most common under the standard conditions. It is a right-handed helix with a diameter of 2 nm and a pitch of 3.4 nm. The distance between two adjacent base pairs is 0.34 nm. The base pairs are stacked on top of each other, and they are held together by hydrogen bonds. The hydrogen bonds are between the nitrogenous bases of opposite strands. Adenine forms two hydrogen bonds with thymine, and cytosine forms three hydrogen bonds with guanine. The hydrogen bonds are responsible for the stability of the DNA double helix.

The Z-DNA form is a left-handed helix with a diameter of 1.8 nm and a pitch of 3.6 nm. The distance between two adjacent base pairs is 0.36 nm. The base pairs are stacked on top of each other, and they are held together by hydrogen bonds. The hydrogen bonds are between the nitrogenous bases of opposite strands. Adenine forms two hydrogen bonds with thymine, and cytosine forms three hydrogen bonds with guanine. The hydrogen bonds are responsible for the stability of the DNA double helix.

## PLANEAMENTO DAS AULAS

AULA 1 – INTRODUÇÃO AOS TESTES DE ECOTOXICOLOGIA. BIOMARCADORES E DELINEAMENTO EXPERIMENTAL

AULA 2 – EFEITOS DO GLIFOSATO NO CRESCIMENTO DOS ORGANISMOS TESTE (TAXAS DE INIBIÇÃO E CONSTANTES DE INIBIÇÃO IC50). MARCADORES BIOFÍSICOS DE TOXICIDADE I

AULA 3 – MARCADORES BIOFÍSICOS DE TOXICIDADE II

AULA 4 – MARCADORES BIOQUÍMICOS DE TOXICIDADE I – PIGMENTOS VEGETAIS

AULA 5 – MARCADORES BIOQUÍMICOS DE TOXICIDADE II – PIGMENTOS VEGETAIS II

AULA 6 - MARCADORES BIOQUÍMICOS DE TOXICIDADE III – DANO MEMBRANAR

AULA 7 – MARCADORES BIOQUÍMICOS DE TOXICIDADE IV – DANO MEMBRANAR E ÁCIDOS GORDOS

AULA 8 - MARCADORES BIOQUÍMICOS DE TOXICIDADE III – SOD

AULA 9 – TÉCNICAS DE EXTRAÇÃO E ANÁLISE DE METAIS PESADOS

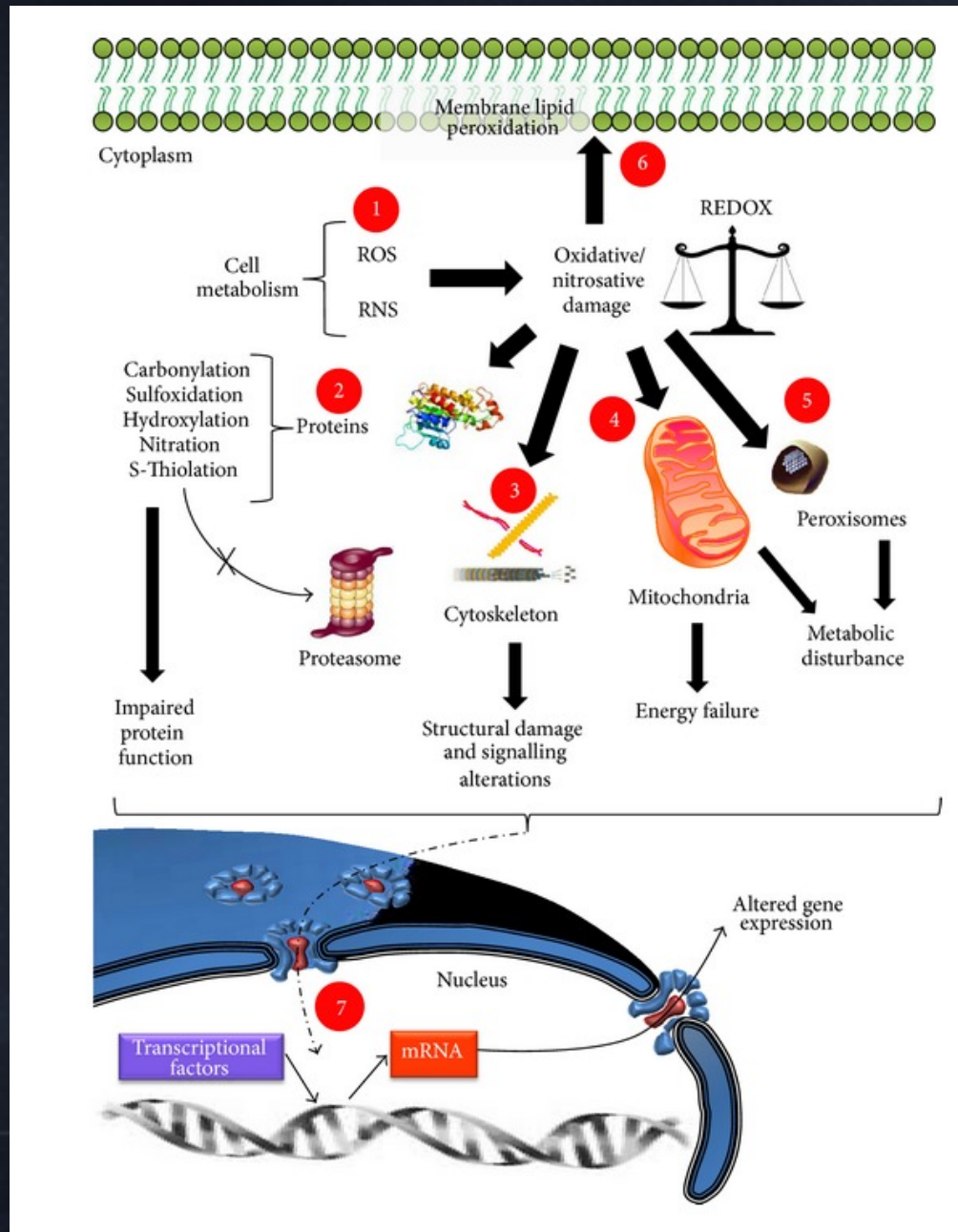
AULA 10 - NANOTOXICOLOGIA

## PEROXIDAÇÃO LÍPIDICA

- Homogenizar o material vegetal numa proporção de 1 mL de solução TBA/TCA a cada amostra de pellet.
  - TBA 0.5 %
  - TCA 20%
- Colocar o extrato a incubar durante 30 min a 95 °C.
- Ler a absorvância a 532 nm e 600 nm e aplicar a equação ( $\epsilon$  [MDA] = 155 mM<sup>-1</sup> cm<sup>-1</sup>):

$$A_{532 \text{ nm}} - A_{600 \text{ nm}} = [\text{MDA}] \text{mM} \times \epsilon \text{MDA}$$

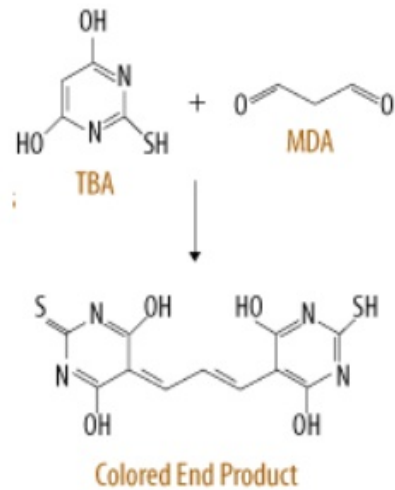
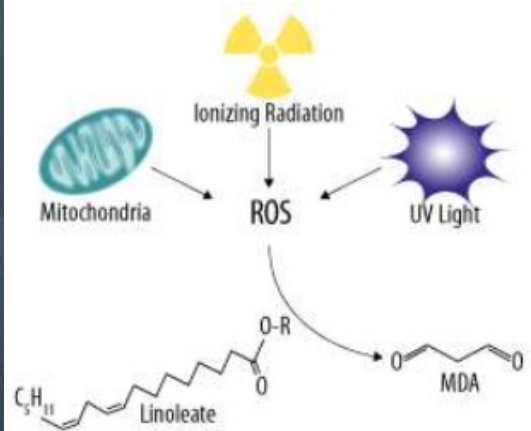
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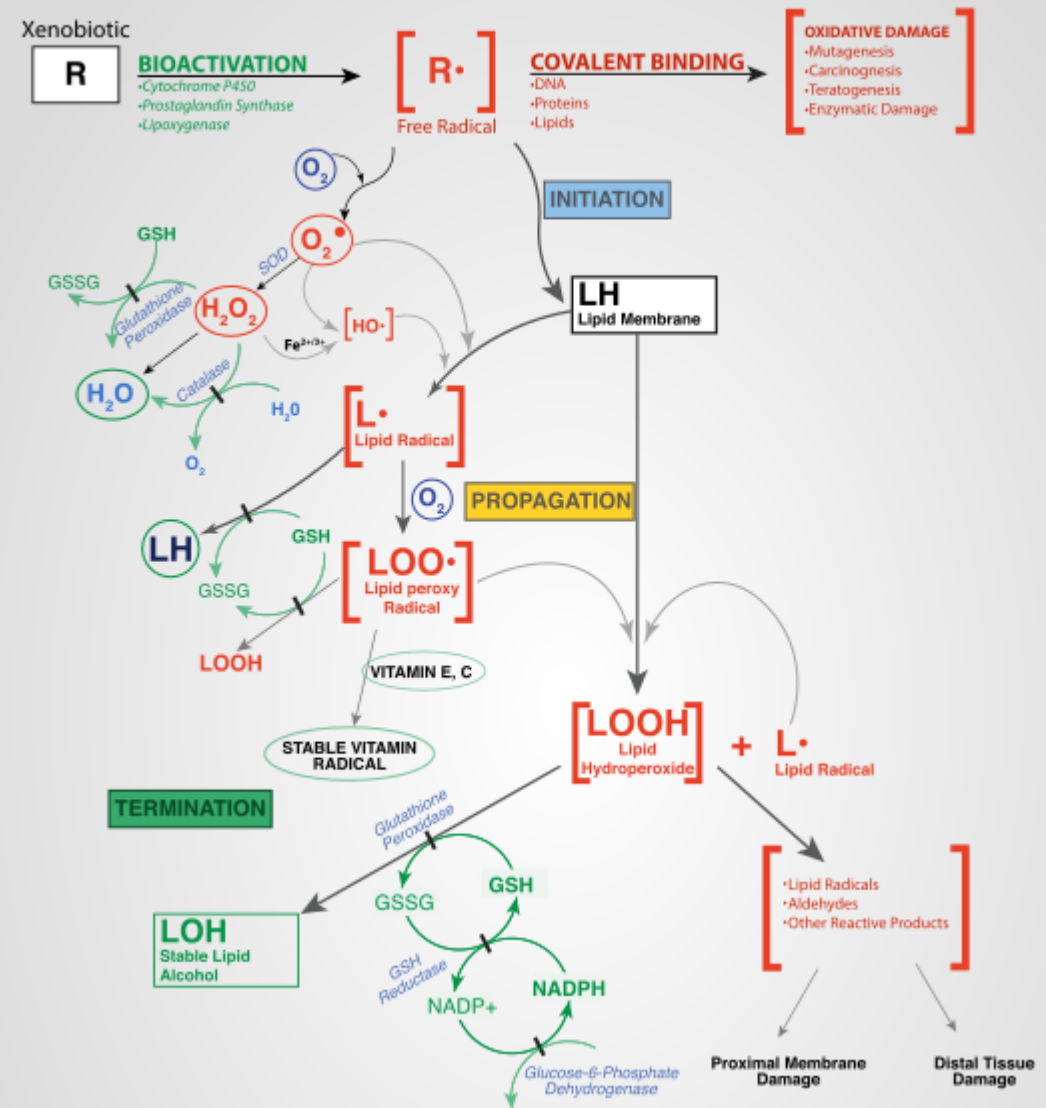
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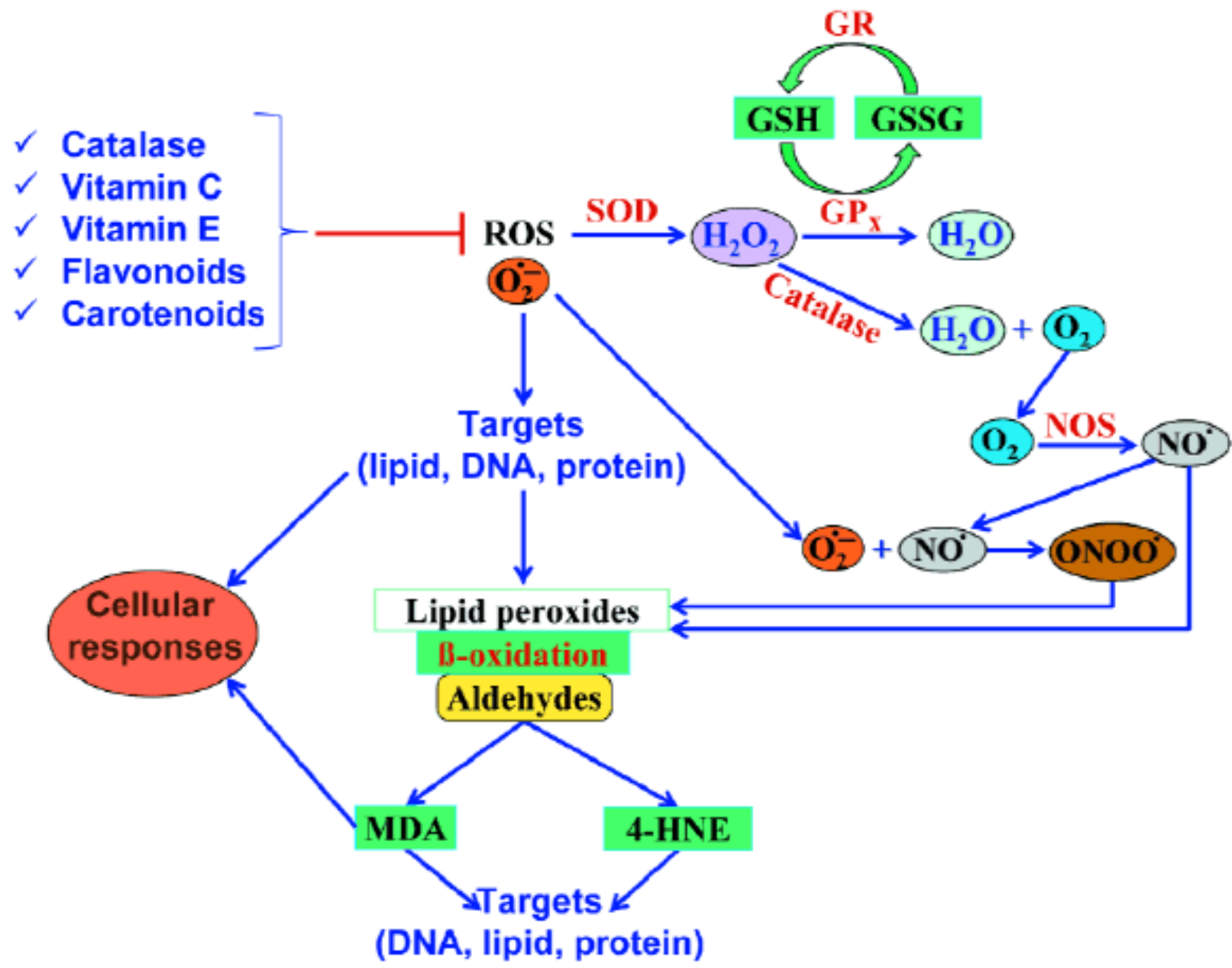


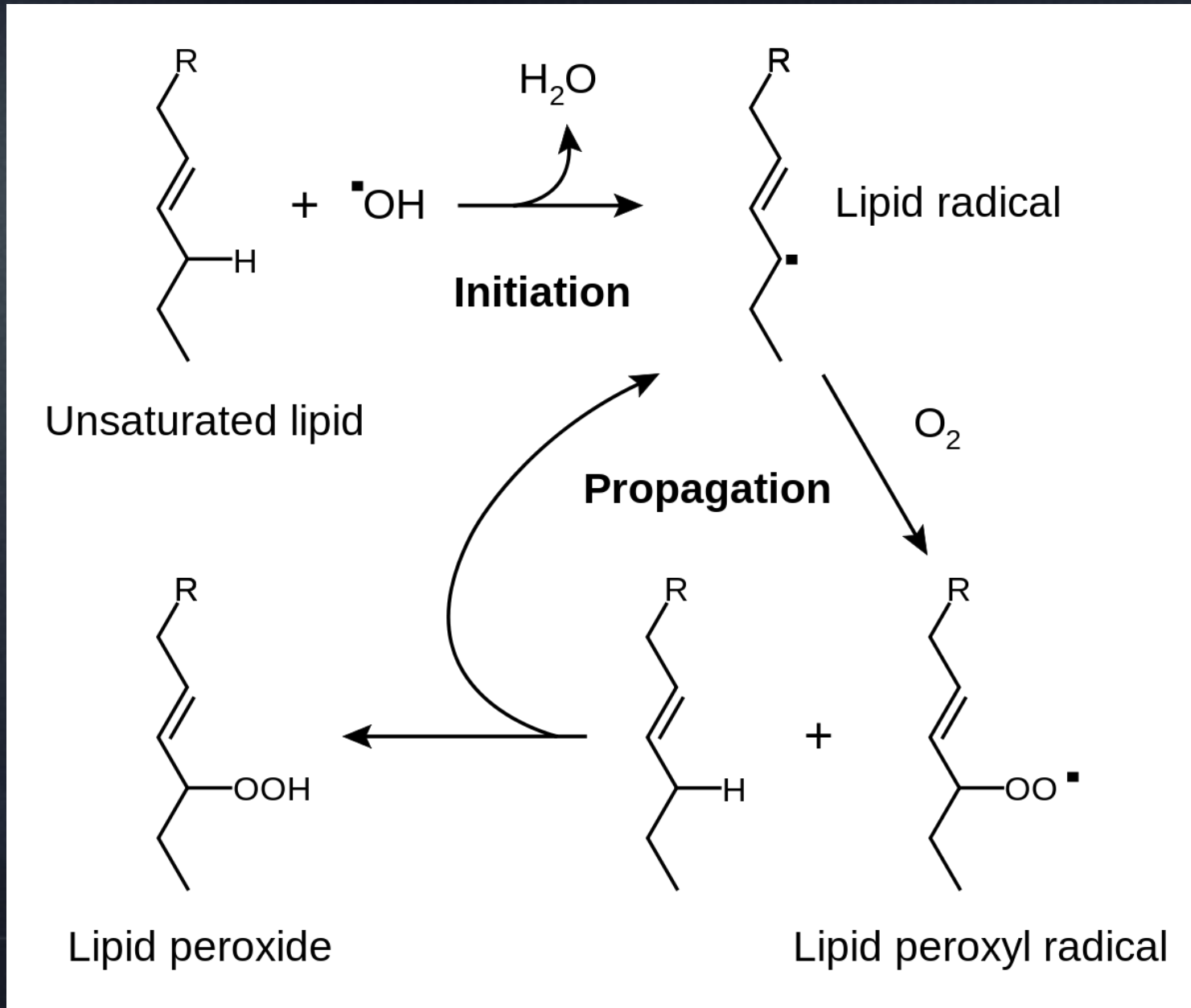
### Lipid peroxidation (Malonyldialdehyde, MDA)

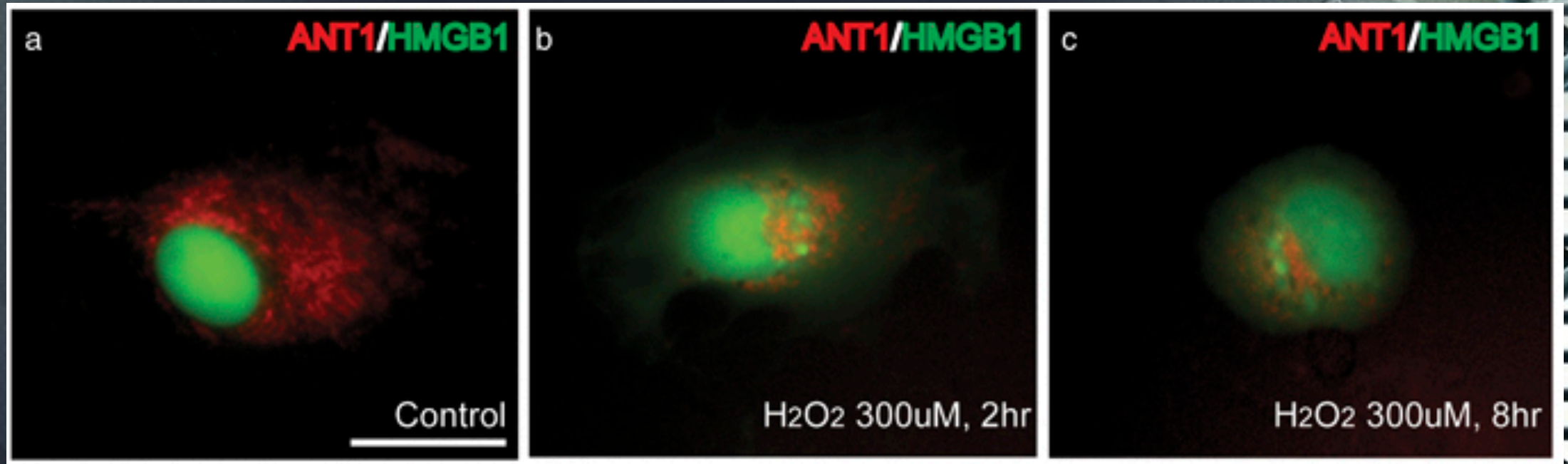


### FREE RADICAL TOXICITY







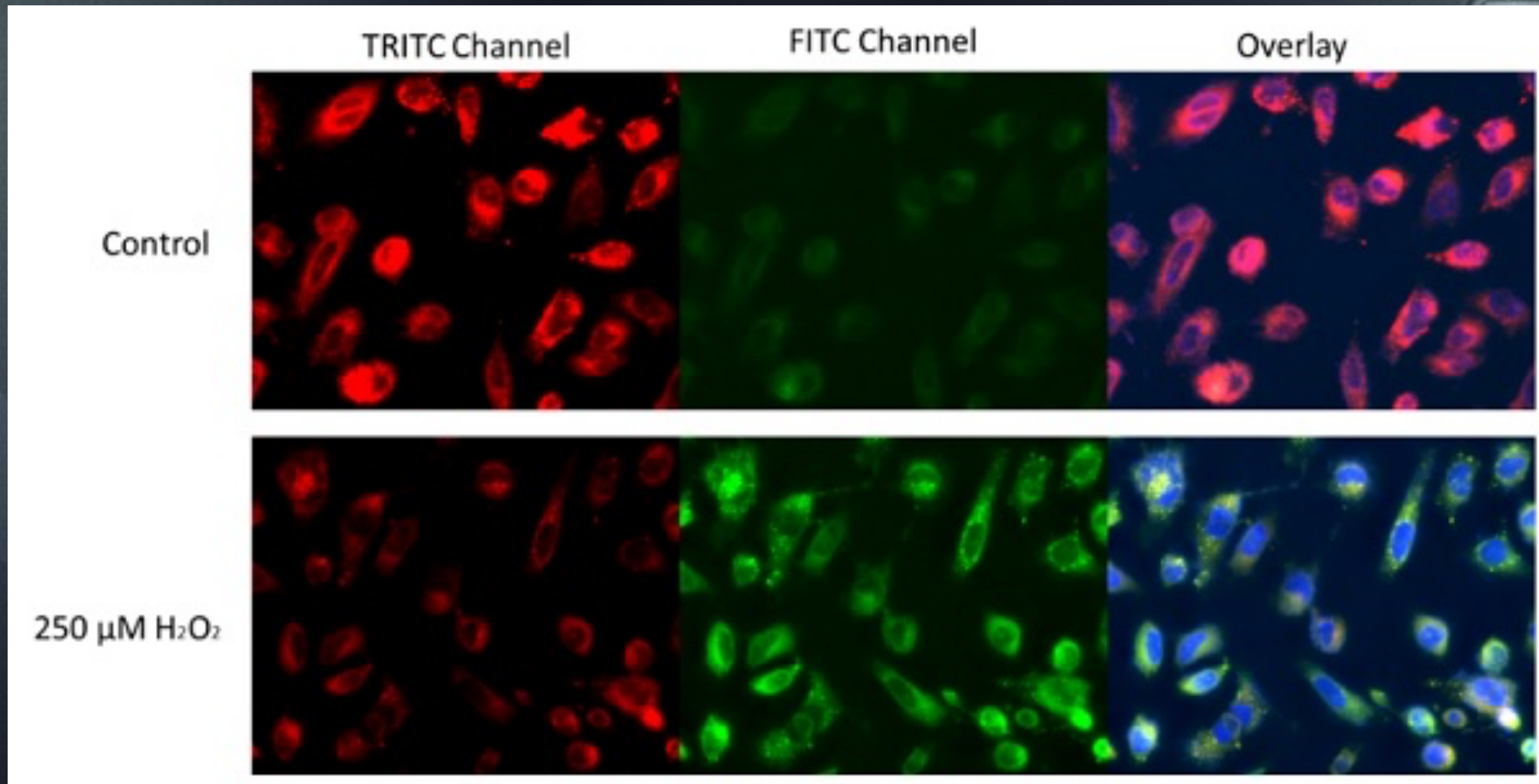


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simple units called nucleotides. Each nucleotide consists of a phosphate group, a sugar, and a nitrogenous base. The phosphate groups of adjacent nucleotides are linked together and are therefore not part of the base sequence. The sequence of the bases is the sequence of the genetic code. The bases are linked together by hydrogen bonds that provide information. This information is used to synthesize proteins using the genetic code. The bases are also used for copying the DNA into the RNA. The bases are also used for copying the RNA into the protein. The bases are also used for copying the protein into the DNA.

When cells, DNA is organized into long molecules called chromosomes. These chromosomes are duplicated before cells divide. In a process called cell replication, eukaryotic organisms produce identical copies of their DNA. Cells divide into two daughter cells. In prokaryotes, the cell nucleus and some of the DNA are located in the cytoplasm. In eukaryotes, the DNA is located in the nucleus. The DNA is also located in the mitochondria and chloroplasts. The DNA is also located in the nucleus of the cell.





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When cells, DNA is organized into long structures called chromosomes. These chromosomes are duplicated before cells divide. In a process called mitosis, eukaryotic organisms produce identical daughter cells. In a process called meiosis, eukaryotic organisms produce haploid gametes, such as sperm and egg cells. In some organisms, such as plants and fungi, the haploid gametes fuse to form a diploid zygote. This process is called fertilization.

