

DNA COPYING AND VARIATION

Chapter: How do organisms reproduce?

(Class X)

By

Dr Sanjoy Deka, TGT (Science)

Sainik School Goalpara, Assam

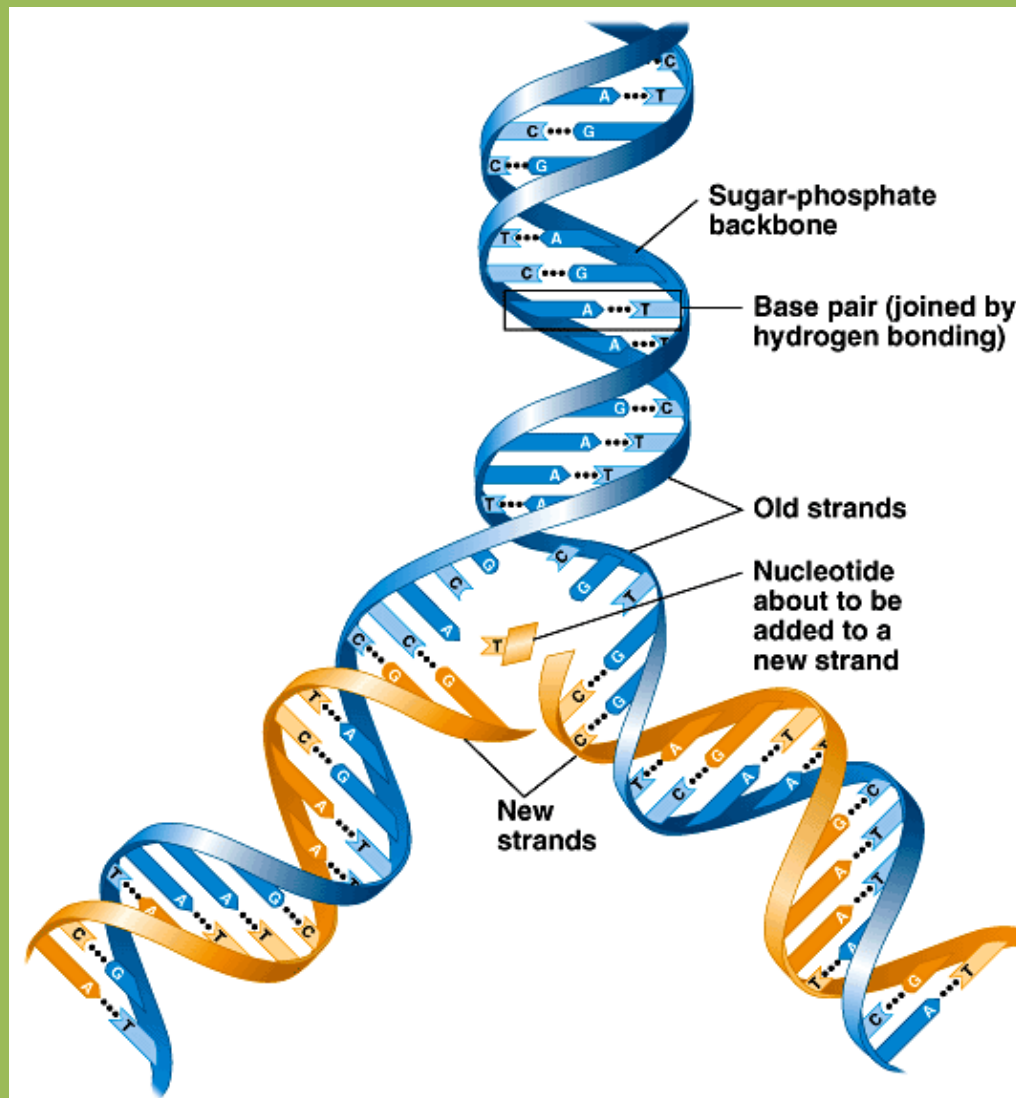
DNA Copying

- DNA -Deoxyribo Nucleic Acid
- **The DNA in the cell nucleus is the information source for making proteins (protein synthesis).**
- **If the information is changed, different proteins will be made. Different proteins will eventually lead to altered body designs**

Basic event in reproduction is the creation of a DNA copy

- Cell Cycle: Two phases
- (a) Interphase (b) M Phase
- (a) I-Phase: Preparatory phase, Synthesis of DNA by DNA replication
- Replication is semiconservative- one new strand and one parental strand.
- M-phase: Mitosis or meiosis
- Two/ four new cells are produced at the end of M phase.

Basic event in reproduction is the creation of a DNA copy



Basic event in reproduction is the creation of a DNA copy

- These two cells are of course similar, but are they likely to be absolutely identical?
- The answer to this question will depend on how accurately the copying reactions involved occur. No bio-chemical reaction is absolutely reliable. Therefore, it is only to be expected that the process of copying the DNA will have some variations each time. As a result, the DNA copies generated will be similar, but may not be identical to the original.
- Some of these variations might be so drastic that the new DNA copy cannot work with the cellular apparatus it inherits. Such a new-born cell will simply die.
- On the other hand, there could still be many other variations in the DNA copies that would not lead to such a drastic outcome. Thus, the surviving cells are similar to, but subtly different from each other.

Variation

- **Variation:**
- **Changes in genetic makeup of individual results variation in an organism.**
- **Niches** can change because of reasons beyond the control of the organisms. Temperatures on earth can go up or down, water levels can vary, or there could be meteorite hits, to think of a few examples.
- If a population of reproducing organisms were suited to a particular niche and if the niche were drastically altered, the population could be wiped out.
- However, if some variations were to be present in a few individuals in these populations, there would be some chance for them to survive. Thus, if there were a population of bacteria living in temperate waters, and if the water temperature were to be increased by global warming, most of these bacteria would die, but the few variants resistant to heat would survive and grow further. **Variation is thus useful for the survival of species over time.**

A stylized illustration of a green tree on a grassy hill. The tree is on the right side, with a thick brown trunk and a dense canopy of green leaves. The grass is a vibrant green, with some blades in the foreground being more detailed and upright. The background is a plain, light green color.

Thank You