

CLIL – DNA: THE DISCOVERY OF THE LANGUAGE OF LIFE TEST

Exercise 1 - Match each scientist with his/her discovery and then put the experiments that led to the understanding of the DNA structure in the correct chronological order (6 punti)

Matching

Scientists	Discovery
1. Avery, Mac Leod, McCarthy	DNA is the transforming principle because when removing DNA, Griffith experiment does not work
2. Griffith	In each molecule of DNA there is an equal amount of A and T and also an equal amount of G and C. The quantities of A/T and G/C vary depending on the species
3. Watson & Crick	DNA has a double helix structures, because X-ray cristallography demonstrates it
4. Hershey & Chase	DNA is the transforming principle and not protein because inside transformed bacteria external Phosphorus can be detected and not Sulphur
5. Wilkins & Rosalind Franklin	the phosphate groups of nucleotides are outside the backbone and DNA is made of two complementary strands
6. Chargaff	there is a molecule that can modify cells

Timeline (you can just put the number linked to the scientist in the table)

1928	1944	1950	1952	1952-3	1953

Exercise 2 - Write the name of enzymes involved in DNA duplication in the correct position (7 punti)

- _____ unzips and separates the 2 strands of DNA, forming the replication fork
- _____ synthesizes new DNA in 5'--> 3' but only if first _____ synthesizes a short RNA primer.
- The lagging strand is made in short fragments that at the end of the process are joined by _____
- _____ digests RNA primers and replaces it with DNA
- _____ helps the unwinding of DNA and _____ bind single strand DNA in order to avoid the re-closing of the molecule

Exercise 3- Choose the correct answer (6 punti)

1. By convention the sequence of bases in a nucleic acid is usually expressed in the _____ direction A) 3' to 1' B) 3' to 5'	2. Okazaki fragments are used to elongate A) the leading strand toward replication fork B) the lagging strand toward the replication fork C) the leading strand away from the replication fork
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C) 1' to 3' D) 5' to 3'	D) the lagging strand away from the replication fork E) both strands in both direction
3. DNA replication is called semi-conservative because _____ of the original duplex appears in the duplex formed in replication. A) none B) most C) half D) all	4. The identification of the transforming principle proved that a) dead bacteria are as lethal as live ones b) genetic information is contained in DNA c) genetic information was transmitted by a polysaccharide d) there is no protein in chromosomes
5. During your summer job at Virotech, you isolate a previously unknown virus. Analysis of its genome reveals that it is composed of a double stranded DNA molecule containing 14% T (thymine). Based on this information, what would you predict the %C (cytosine) to be? A)14% B)28% C)36% D)72%	6. Which statement about the elongation of the lagging strand during DNA replication is correct? a) It is synthesized in a 3' --> 5' direction. b) It grows toward the replication fork. c) It requires a short RNA primer to proceed. d) It is synthesized by DNA ligase. e) It is synthesized continuously.

Exercise 4 –True or false? Correct false statements (6 punti)

1. During the Meselson-Stahl experiment samples of DNA were isolated every 20 minutes because this was the time of replication in E. coli, the bacteria used in the experiment. T/F
2. If DNA duplication were conservative, after one replication cycle 100 % of the DNA would be marked with isotope ¹⁴N. T/F
3. DNA replication is necessary for mitosis but not for meiosis. T/F
4. Isotope ¹⁵N is lighter than ¹⁴N. T/F
5. In dispersive replication model, both strands of a DNA molecule are made of new and old nucleotides. T/F
6. In Meselson-Stahl experiment, the centrifugation in CsCl had the purpose to separate DNA with different weights. T/F

Evaluation:

25 points: 10

15 points: 6

Final CLIL assessment: 60 % test and 40% group work