Supplementary Material 1, SM1. Preliminary knowledge survey. This document presents the full list of questions from the diagnostic assessment administered to incoming students. The questions are mapped to the official Spanish high school curriculum, as outlined in the LOMCE (Organic Law for the Improvement of Educational Quality, established by Royal Decree 1105/2014) and the current LOMLOE (Organic Law for the Modification of the LOE, established by Royal Decrees 217/2022 and 243/2022). This survey served as the initial empirical evidence to diagnose the students' foundational knowledge.

1. Nonpolar substances are:

a. Amphoteric
b. Liposoluble
c. Inert
d. Amphipathic
e. Ionic

2. The peptide bond is:

a. A completely polar and rigid bond that has no freedom of rotation.
b. An amide-type bond that is usually in a trans configuration.
c. A simple C-N bond with a polar character.
d. A bond between the imino and carboxyl groups of amino acids.
e. A double bond between the amino and carboxyl groups of amino acids.

3. In hyperbolic enzyme kinetics, half the maximum velocity is reached when:

a. The substrate concentration is much higher than the K_M.
b. The substrate concentration and the K_M are not related.
c. The substrate concentration is much lower than the K_M.
d. The substrate concentration is the same as the K_M value.
e. We are in a zero-order equation, where the velocity is independent of [S].

4. A competitive inhibitor of an enzymatic reaction:

a. Increases V_{max} and decreases K_M.
b. Decreases V_{max} and increases K_M.
c. Decreases V_{max} and decreases K_M.
d. Decreases V_{max} and does not affect K_M.
e. Does not affect V_{max} and increases K_M.

5. Which of the following statements about nucleotides is true?

a. Nucleotides are named with the suffix -osine (purines) or -idine (pyrimidines).
b. The α phosphate group is linked to the pentose by a phosphodiester bond.
c. The bond that links the nitrogenous base to the pentose is an N-glycosidic bond.
d. Nucleotides can only be found in nucleic acids.
e. None of the above statements is completely correct.

6. Protein synthesis…

a. Proceeds from the C-terminal to the N-terminal via the mechanism of peptide bond formation.
b. Is defined by three different reading frames for each mRNA, which increases the variability of gene products.
c. Proceeds from the N-terminal to the C-terminal.
d. Requires only mRNA and ribosomes to be carried out.
e. Can be carried out without mRNA.

7. The energy charge is defined as [ATP]+1/2[ADP]/[ATP]+[ADP]+[AMP]. What would a low value, such as 0.5, determine?

a. The formation of ADP+Pi would be favored.
b. It would have no relationship whatsoever to the regulation of metabolism.
c. Catabolic reactions would be favored.
d. Reactions that consume ATP would be favored.
e. Anabolic reactions would be favored.

8. What is the name for the transformation of pyruvate to malate by the malic enzyme?

a. Amphibolic reaction
b. Transesterification
c. Anaplerotic reaction
d. Repositor reaction
e. Convertor reaction

9. In addition to activating the molecule, what is the implication of the cytosolic phosphorylation of glucose?

a. It can be transported through the bloodstream to reach any tissue.
b. The loss of glucose through the membrane, which lacks transporters for glucose 6P, is prevented.
c. 32 ATP are obtained for each phosphoryl group.
d. Increasing its activation energy
e. All statements are false.

10. Biosynthetic processes often use NADPH as an electron donor. When animal cells require a high supply, they obtain that NADPH through…

a. Photosynthesis
b. Glycolysis
c. Pentose phosphate pathway
d. Gluconeogenesis
e. Oxidative phosphorylation

11. In the β-oxidation of fatty acids,

a. Malonyl-CoA is used as a donor of C2 units.
b. NADH and $FADH_2$ are consumed.
c. It is carried out through an enzymatic complex.
d. Acetyl-CoA is generated as a C2 unit.
e. CO_2 participates.

12. What is the hormone that activates glycogen synthesis?

a. Carnitine
b. Insulin
c. Growth hormone
d. Glucagon
e. Cortisol