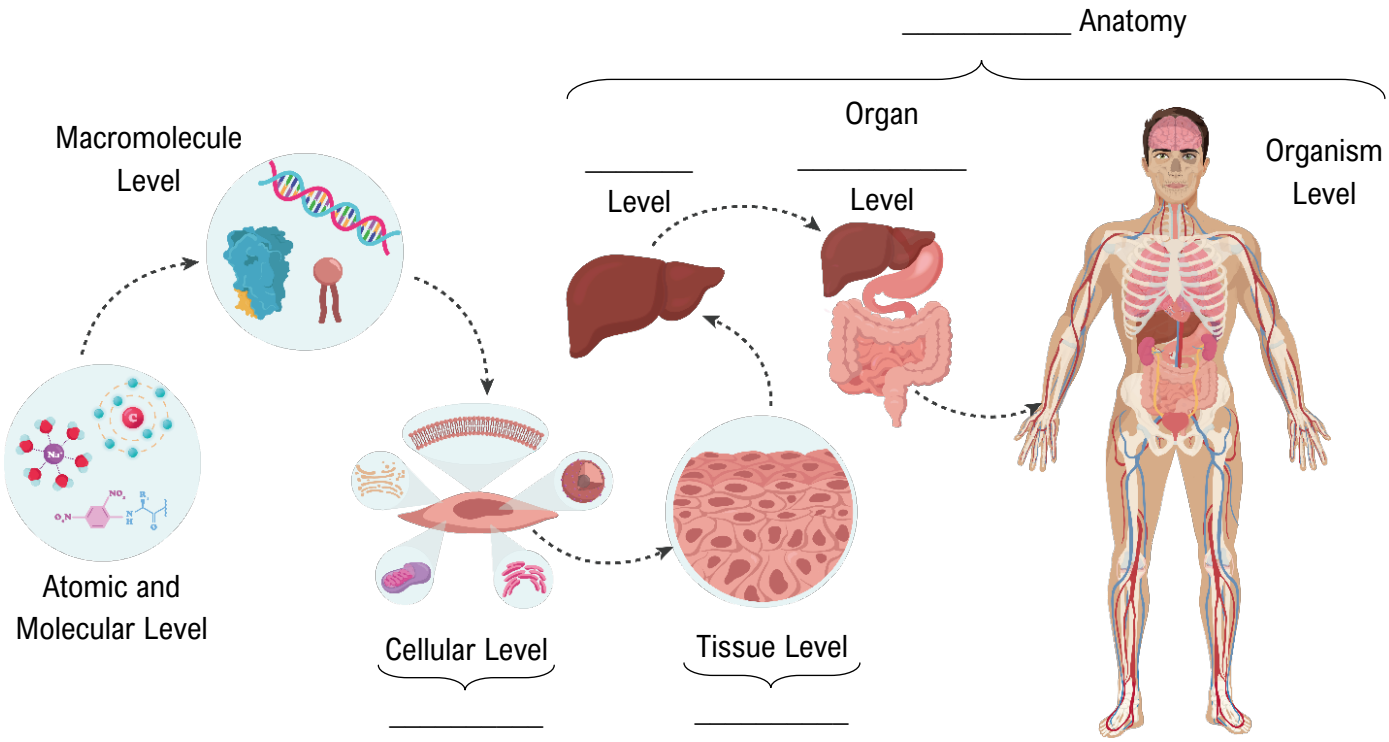
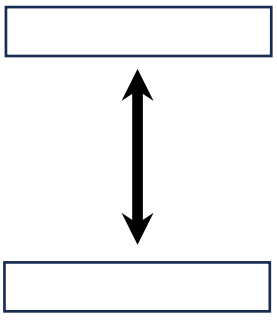
TOPIC: LEVELS OF ORGANIZATION



- Structure & function relationship exists at _____ levels of organization.
  - All levels or organization are _____.

EXAMPLE: Statins are some of the most prescribed medications in older adults. The following statements explain how statins work.

- Statins share a chemical similarity to the molecule HMG-CoA, leading them to them inhibit the enzyme HMG-CoA reductase.
- Inhibiting HMG-CoA reductase lowers overall cholesterol production in the liver.
- Lowering cholesterol production in the liver leads to lower blood cholesterol levels and less plaque formation on artery walls.
- Reducing plaque formation reduces the risk of death from heart attack, stroke, and other causes.



a) At what level of organization do statins work most directly?

_____

b) What other levels of organization do statins affect physiologically?

_____

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PRACTICE: Given the following 5 levels of organization, which represents the correct hierarchy from smallest to largest?

A) Tissue B) Organ C) Molecule D) Cell E) Organism

a) A, D, C, E, B.

b) B, E, D, A, C.

c) C, D, A, B, E.

d) C, A, B, D, E.

PRACTICE: Which statement about the levels of organization in anatomy and physiology is most correct.

a) To understand any other level, you must be an expert in atoms & molecules because they are the most basic.

b) The molecular and organ system levels are most closely related.

c) Changes to anatomy or physiology at one level are likely to affect function at many other levels.

d) People who study whole organ systems are unlikely to need to understand the behavior of atoms.

PRACTICE: During a cancer screening a doctor may choose to screen using histological or cytological methods. Cytological methods are often less invasive than histological methods. Why do you think this may be?

a) Histology usually requires intact tissue gathered from a biopsy or dissection, while cytology usually looks at individual cells which can be collected without greatly disturbing the entire tissue.

b) Histology often requires imaging of the whole body, while cytology requires an external exam of the body without any imaging tools.

c) Histology involves surgery so that whole organs can be examined, while cytology can be performed using genetic or molecular analysis of bodily fluids such as saliva or urine.

d) Histology requires removing and analyzing single cells from an intact tissue, while cytology can be performed using imaging techniques such as MRI and therefore does not require removing cells or tissue from the body.