

# **Basics of Biochemistry**

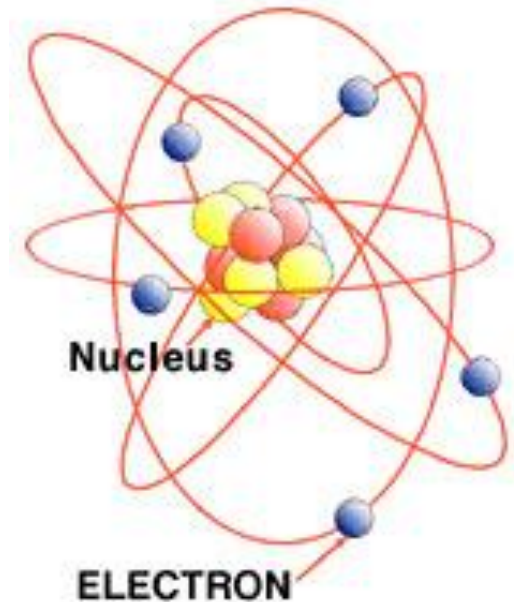
# Elements

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- An **element** is a substance that cannot be broken down by ordinary chemical reactions

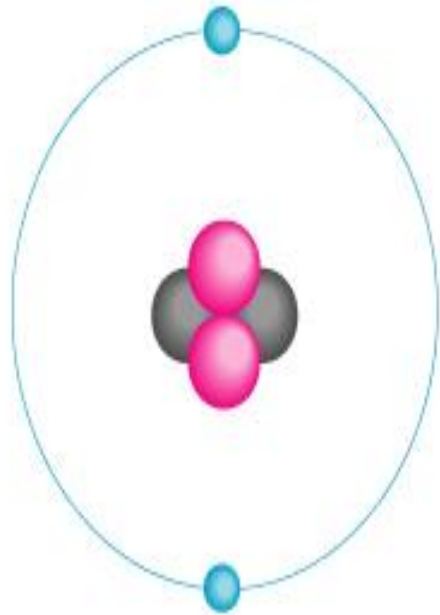
# The structure of the atom




- An atom is the smallest unit of matter that is **unique to a particular element**.



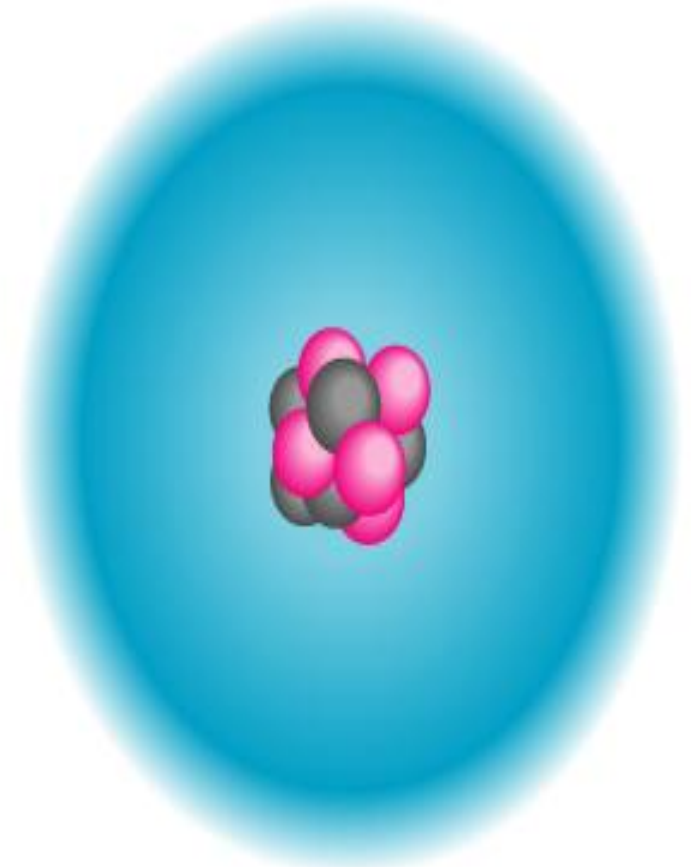
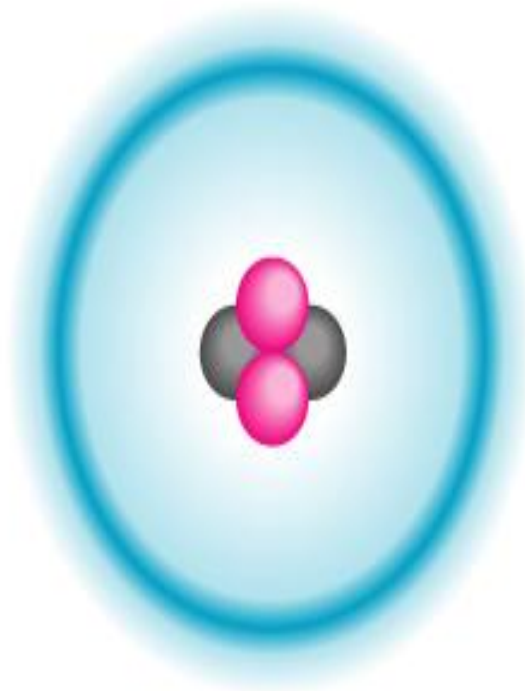
# Composed of...




- **Neutrons (n)**: part of nucleus, they are **neutral**
- **Protons (p<sup>+</sup>)**: part of atomic nucleus and have a **positive** charge
- **Electrons (e<sup>-</sup>)**: have a **negative** charge. They move around the nucleus in a **cloud**.



2  Protons  
2  Neutrons  
2  Electrons

} Nucleus



6  Protons  
6  Neutrons  
6  Electrons

} Nucleus

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- Roles of the nucleus and the electrons
    - The nucleus provides stability
    - The electrons interact with other atoms (e.g. form bonds) and capture and release energy.

# Atoms

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- Atoms are usually electrically neutral because they have an equal number of positive protons as negative electrons

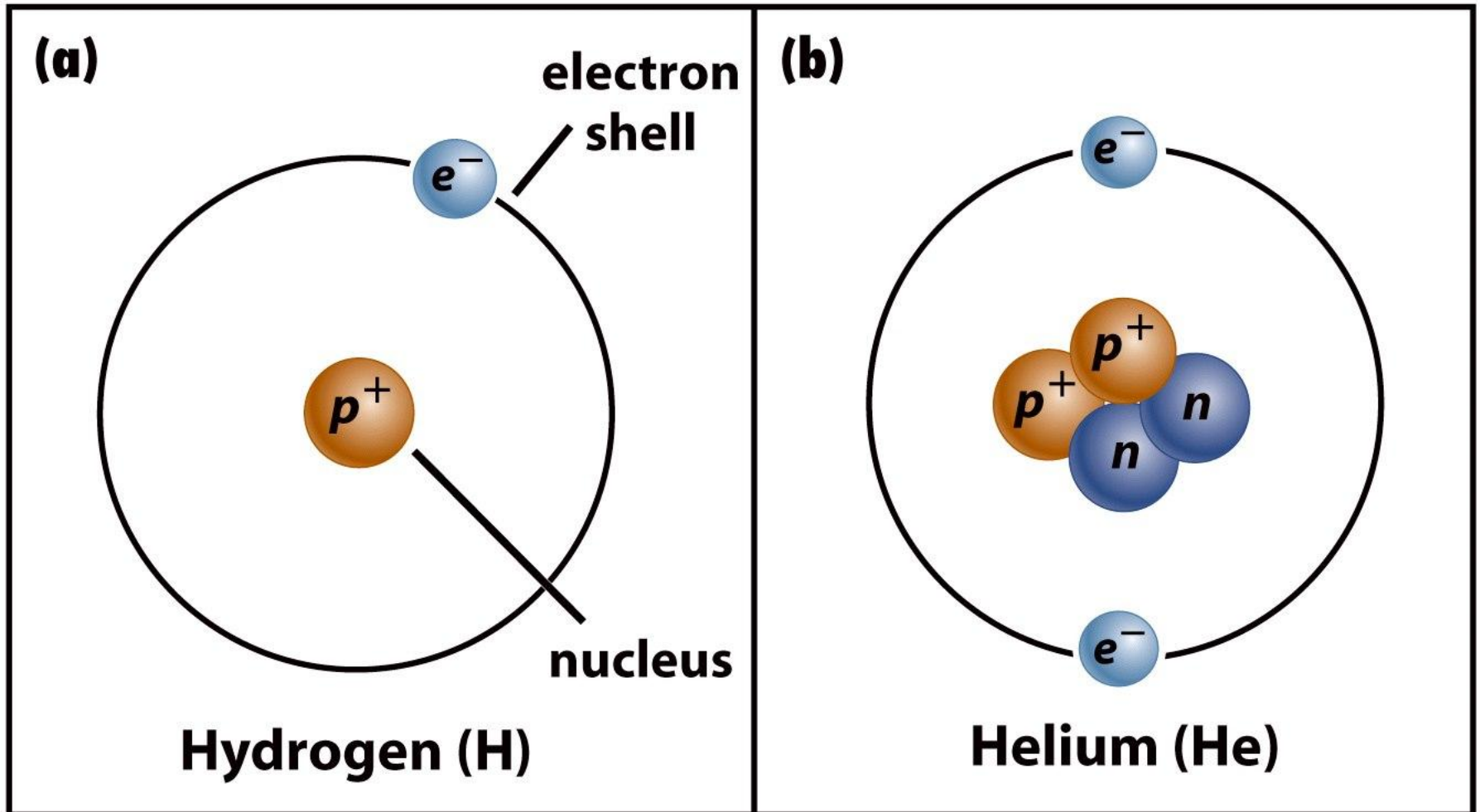


Figure 2-1 Biology: Life on Earth, 8/e  
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# Ions

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- Ions are atoms that are electrically charged because they gained or lost electrons

## – CATIONS:

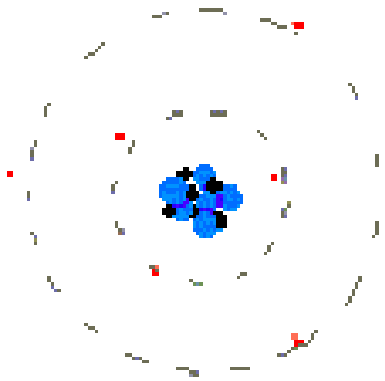
- Have lost electrons, resulting in a
- Positive charge
- Example:  $\text{Na}^+$

## – ANIONS:

- Have gained electrons, resulting in a
- Negative charge
- Example:  $\text{Cl}^-$

## This Atom is Neutral

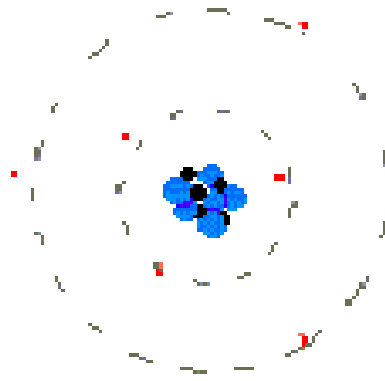
*Same number of protons and electrons*



- 6 Protons
- 6 Neutrons
- 6 Electrons

## This Atom is Negatively Charged

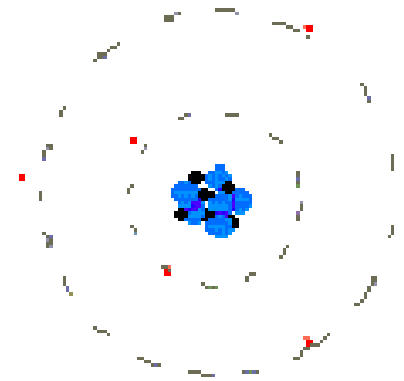
*More electrons than protons*



- 5 Protons
- 6 Neutrons
- 6 Electrons

## This Atom is Positively Charged

*More protons than electrons*



- 6 Protons
- 6 Neutrons
- 5 Electrons

# Some Common Elements in Living Organisms

1. Use a book or internet to complete the table. [Here's a good website.](#)
2. Highlight the names of the 4 most frequently occurring elements
3. Be able to define “trace.”