

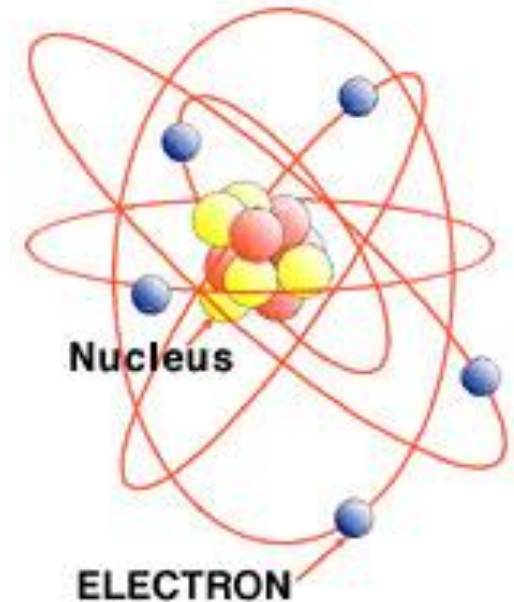
Basics of Biochemistry

Elements

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

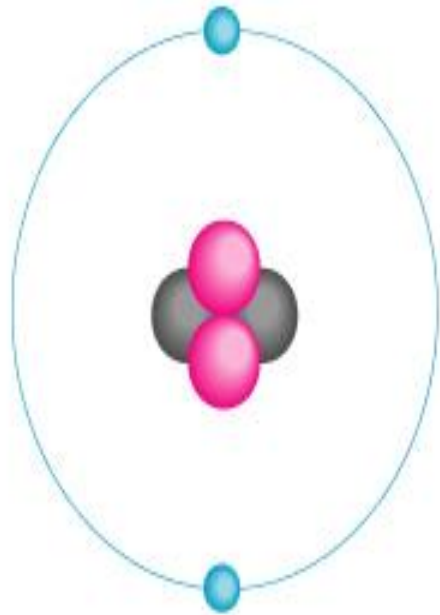
The structure of the atom




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



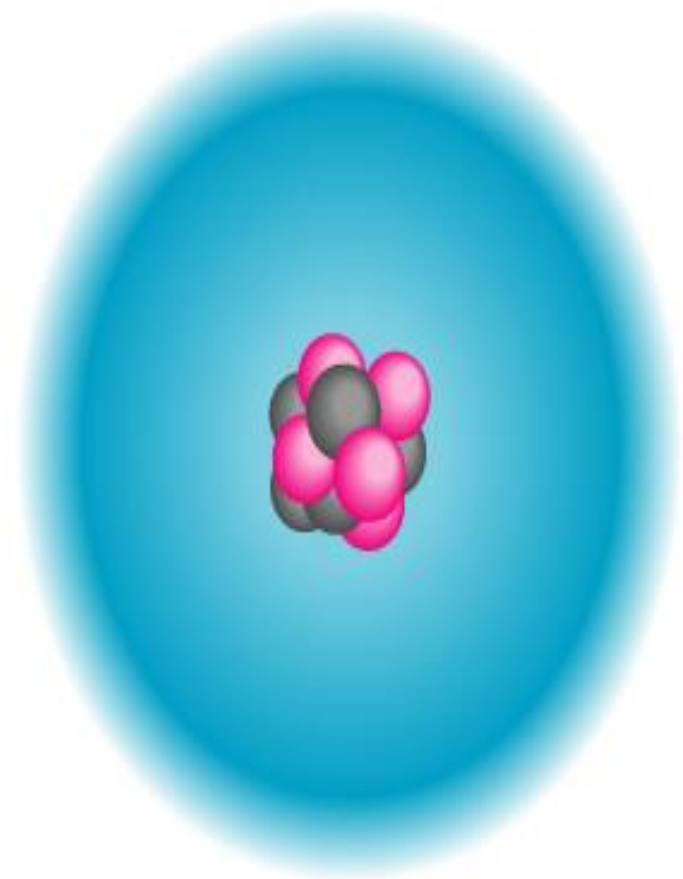
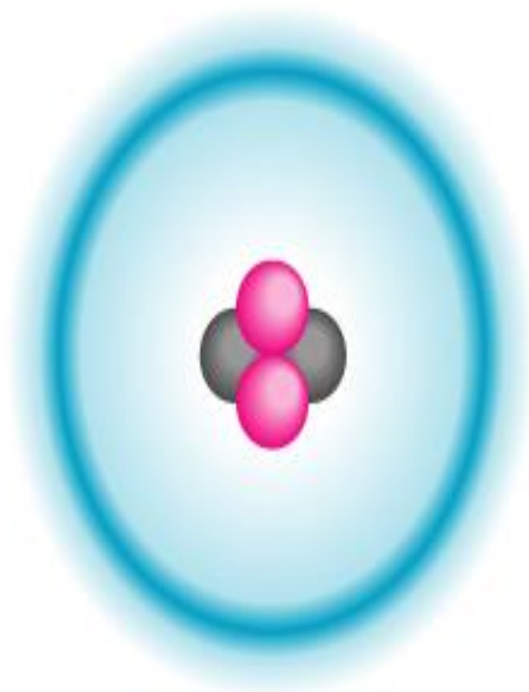
Composed of...




- **Neutrons (n)**: part of nucleus, they are **neutral**
- **Protons (p⁺)**: part of atomic nucleus and have a **positive** charge
- **Electrons (e⁻)**: 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

-
- 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

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

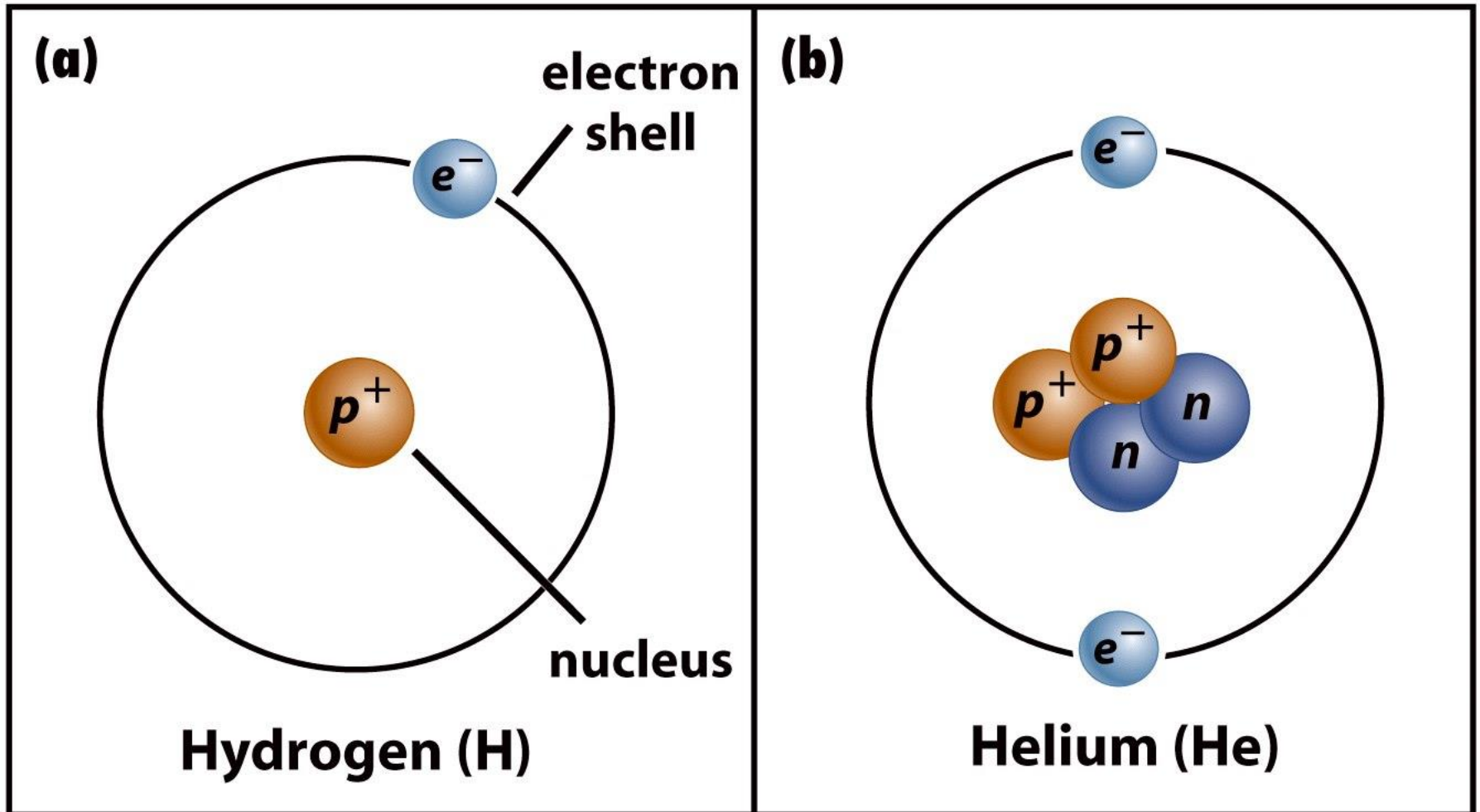


Figure 2-1 Biology: Life on Earth, 8/e
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Ions

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

– CATIONS:

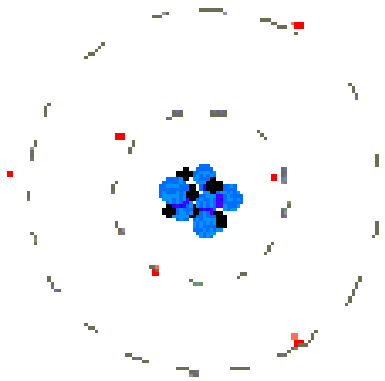
- Have lost electrons, resulting in a
- Positive charge
- Example: Na^+

– ANIONS:

- Have gained electrons, resulting in a
- Negative charge
- Example: Cl^-

This Atom is Neutral

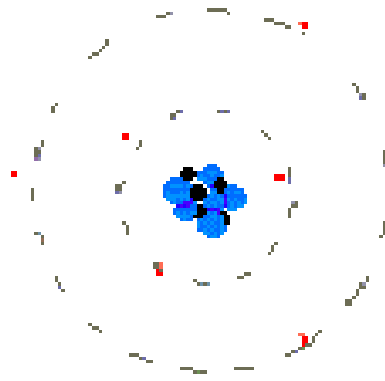
*Same number of protons
and electrons*



- 6 Protons
- 6 Neutrons
- 6 Electrons

This Atom is Negatively Charged

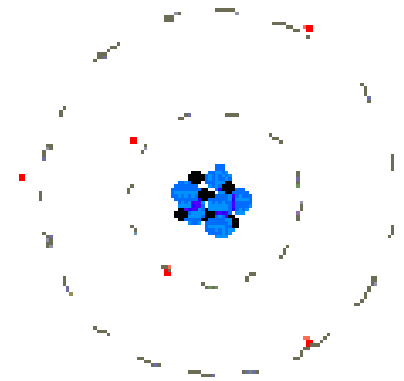
More electrons than protons



- 5 Protons
- 6 Neutrons
- 6 Electrons

This Atom is Positively Charged

More protons than electrons



- 6 Protons
- 6 Neutrons
- 5 Electrons