Chemistry 1

- Atomic Structure
- Rules for Electrons
- Predicting Properties of Atoms
- Examples
- Answer to iClicker 8B

- Due in Lab this week
  - Pre-Lab 3
  - LEGO Mitosis lab report

premed society email

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Chemistry

Atoms for Bio III

H - hydrogen

C - carbon

N - nitrogen

O - oxygen

S - sulfur

P - phosphorus

Bonds in Bio III

- covalent bonds

non-covalent bonds:

- ionic or electrostatic bonds
- hydrogen bonds
- van der Waals bonds
- hydrophobic interactions

Chemistry in Bio III → predict molecular properties

★ ① atomic structure → outer shell electrons "e⁻"

prediction

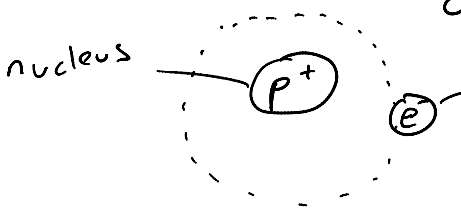
— bonding within molecules (covalent bonds)

— bonding between molecules (non-covalent bonds)

bonding & shape will predict molecular properties

Atomic Structure -> outer shell electrons "e^-"

ex. Hydrogen 1 proton 0 neutrons



Same number of e^- as protons in nucleus

∴ atom is neutral

Rules for e^- in atoms

1. orbit nucleus in shells
2. first shell holds up to 1 pair of e^- ($2e^-$)
3. next shell holds upto 4 pair of e^- ($8e^-$)
4. fill shells from the inside -> out
5. when filling a shell, first put $1e^-$ in each pair - only complete pairs if you have to

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Atomic Struture predicts atomic properties

1. # covalent bonds an atom will form?

   rule: atoms want to have their outer shell and will share e^- to do this
   ↳ covalent bond

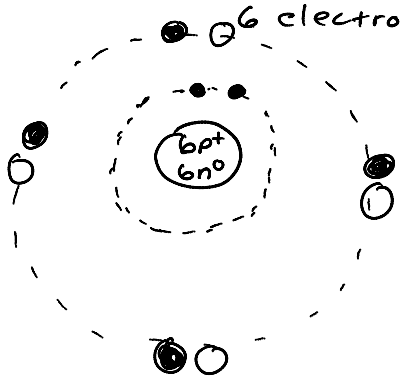
2. electronegativity (EN) -> how strongly an atom will hold onto the e^- in its outer shell

EN depends on the kernal charge

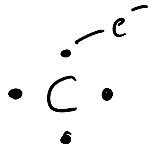
kernal charge = (# protons in nucleus − # e^- in the inner shell)

-> charge an outer shell e^- "sees" as it orbits the nucleus & inner shell

example Carbon → 6 protons$^+$
6 neutrons
6 electrons

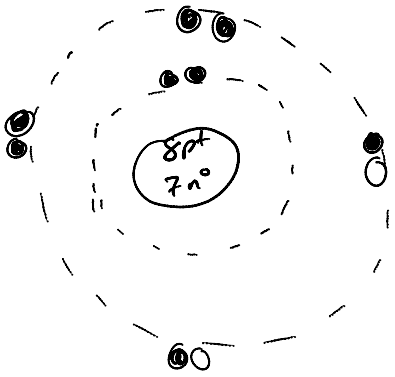


O → open spot for an e$^-$



Kernal charge = (6) − (2)
= 4$^+$
~ moderately EN
4 covalent bonds

ex Oxygen 8p$^+$ → 8e$^-$
8p$^+$
7 n°

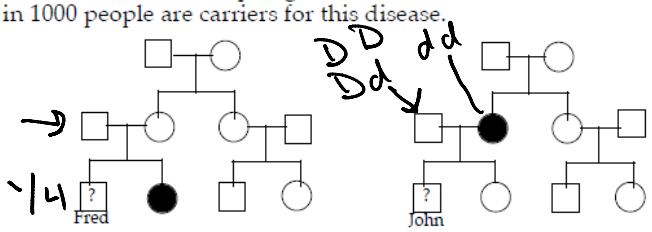


Kernal charge = 6

2 covalent bonds

iClicker Question #7B - <u>after</u> lecture

Shown below are two pedigrees for a **<u>rare autosomal recessive</u>** genetic disease. Fewer than 1 in 1000 people are carriers for this disease.



Dd Dd dd

1/4

1/2 if dad is carrier

1/2000 of being dd

Fred and John are as-yet unborn children of parents who are concerned that they may be affected with the genetic disease. Based on the above information, which individual, Fred or John, has a greater risk of being affected by the disease.

A. Fred has a greater risk of being diseased
B. John has a greater risk of being diseased
C. Both have an equal risk of being diseased
D. It is not possible to tell who has the higher risk of being diseased
E. I don't know.