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| --- | --- | --- | --- | --- | --- |
|  | **monomer**  **(name & what it looks like)** | **functional group(s)** | **connection between monomers** | **functions & examples** | **miscellaneous** |
| **proteins** | Amino acids  (20) | Carboxyl  Amino  (Sulfhydryl on R group of 1 amino acid) | Peptide bond | catalysis – enzymes  defense – antibodies  movement – contractile proteins  signaling – hormones &   cell receptors structure – keratin   (hair, nails), collagen (beneath skin, ends of bones) | * 4 levels of structure * denaturation * molecular chaperones * folding & function |
| **nucleic acids** | Nucleotides | Phosphate | Phosphodiester linkage | DNA – stores genetic information & passes it to next generation  RNA – allows DNA to express itself (for proteins to be made based on DNA instructions) | * purines vs. pyrimidines * DNA vs. RNA * DNA structure (complementary bases, H bonds, 3’ & 5’, parts of nucleotide) * DNA function * ATP |
| **carbohydrates** | Monosaccharide | Hydroxyl | Glycosidic linkage | monosaccharides:  glucose – energy source + monomer of larger carbs fructose, galactose | * -ose * isomers * numbering carbons * α vs. β bonds (digestibility in humans) |
| polysaccharides:  starch & glycogen – energy storage  cellulose & chitin – structure  peptidoglycan – bacterial cell wall |
| **lipids** | No common monomer but all are…  hydrophobic | All are mainly hydrocarbon chains or rings; phospholipids have phosphate groups. | in triglycerides:  Ester linkage | triglycerides:  saturated fat – main energy storage in animals (+ padding, insulation)  unsaturated oil – some energy storage in plants | * isoprene vs. fatty acid * saturated vs. unsaturated fatty acids (and membrane permeability) * amphipathic (steroids & phospholipids) * phospholipid bilayers * selective permeability * movement of ions/molecules across membranes |
| steroids:  cholesterol – cell membrane component, base molecule from which other steroids are made  sex hormones – testosterone, estrogen, progesterone |
| phospholipids:  main component of plasma (cell) membranes |



