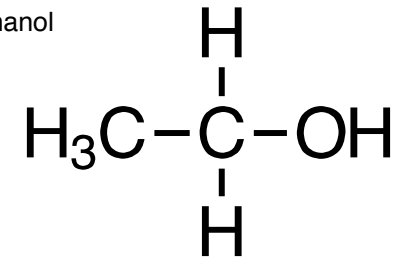
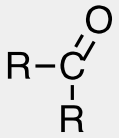
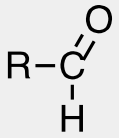
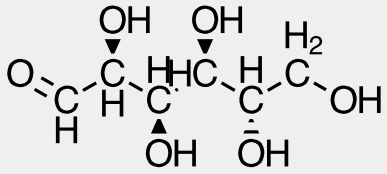
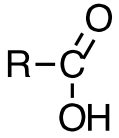
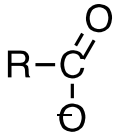
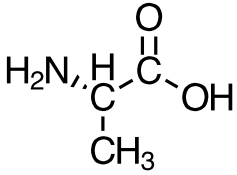
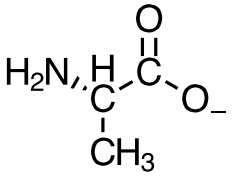
Functional Groups in Biology

not at all complete!

Name	prefix or suffix	Structure	Found in	What's it good for?	Example
Hydroxyl or alchohol	"-ol"		Almost everything: Sugars and other carbohydrates. Important in DNA. Can be important in proteins.	Good H-bond donor. The O can be an acceptor. **Attacks and reacts with Phosphate!!!!! (did I emphasize that enough?)**	Ethanol 
Carbonyl	Aldo or aldehyde if at end of carbon chain, Keto or Ketone if not at end	Keto:  Aldo 	Almost everything. DNA Base pairs, all sugars, Proteins.	Great H-bond acceptor. Important intermediate in some chemical reactions.	Glucose: Note the hydroxyls too 
Carboxyl or organic acid (sometimes simply "acid")	Carboxyl or "acid." When deprotonated: "-ate"	Protonated (acid)  Deprotonated (conjugate base) 	All Amino Acids (as well as additional sites in some amino acids) Important reactive intermediates in metabolism. **NOT in DNA** (I know…it's called an acid for a different reason).	Can be very good H-bond acceptor. **NOT** an H-bond donor under most circumstances because the H comes off. Important reactive group.	Amino acid "Alanine" This is protonated  De-protonated: 

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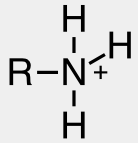
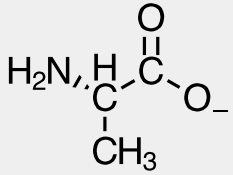
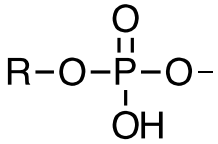
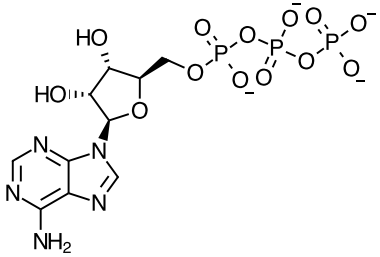
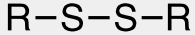
Amine	amino-	Neutral (base)  Conjugate acid 	All Amino acids (as well as additional sites in some amino acids) DNA "bases" Derivatives of sugars	Excellent H-bond donor. Can act as a base. Important in DNA -base-pairing and in many chemical reactions.	Alanine (other end) 
Phosphate	Phospho- or just -phosphate as ending.	In the single de-protonated form: 	DNA and it's components. ATP. Added to many things to modify shape or chemistry	The other half of the most fundamental chemistry with hydroxyls. Used to make high-energy intermediates and to regulate shape of proteins	Adenosine triphosphate (ATP)  Mn
Thiol or sulphydryl	thio-	Single  "Disulfide" 	Lots of enzyme cofactors (help with the chemistry of reactions) in proteins to hold structure tightly together (disulfide).	Good for reversible redox reactions. Can be a reactive group in some proteins, or used for structure.	The amino acid cysteine