

I gruppi funzionali

Gruppo Funzionale (GF)

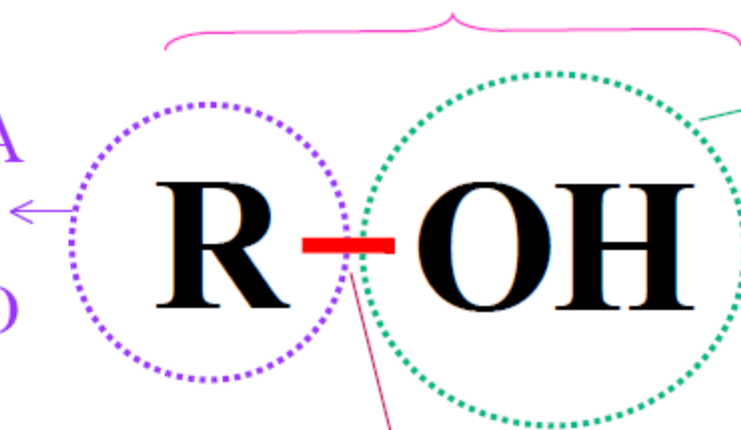
1. Definisce una classe di composti
 - Composti appartenenti ad una stessa classe hanno **proprietà simili e simile reattività**.
2. È il **sito di reazione**
 - Determina la chimica della molecola, ossia la sua reattività
3. Fornisce una base per la nomenclatura
 - Ad esempio, tutti i chetoni hanno nei loro nomi il suffisso **–one**:
 - » acetone
 - » ciclopropanone
 - » cortisone

INTERA STRUTTURA

determina: le proprietà fisiologiche

STRUTTURA
DELLO
SCHELETRO

- determina:
- parte delle proprietà fisiche



GRUPPO
FUNZIONALE

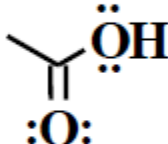
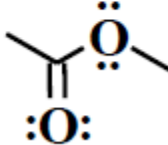
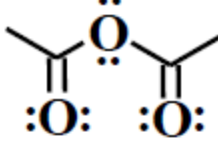
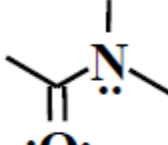
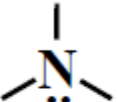
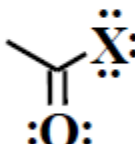
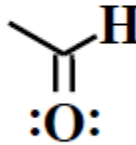
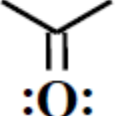
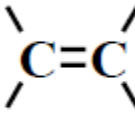
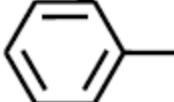
- determina:
- le principali proprietà chimiche
 - parte delle proprietà fisiche
 - il nome generico

LEGAME

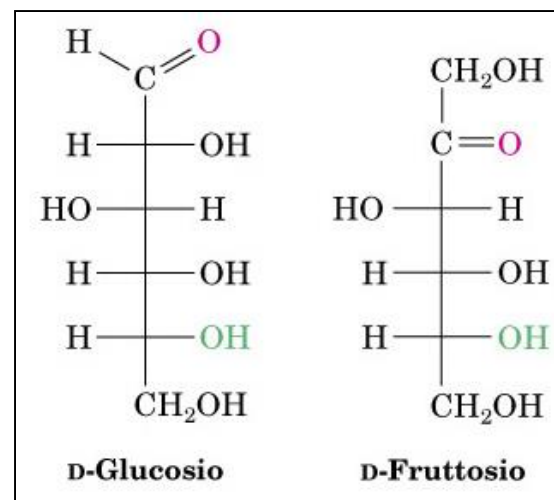
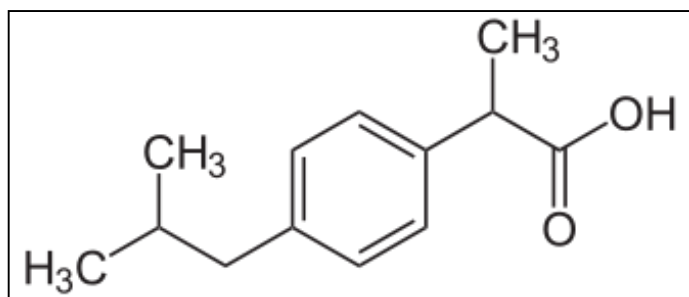
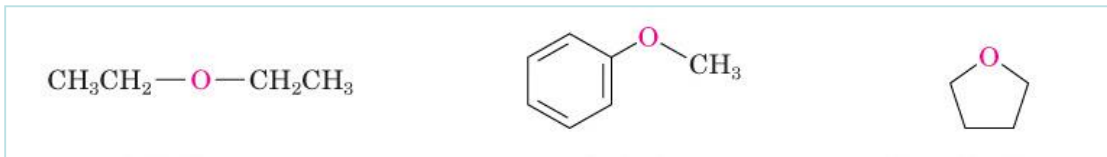
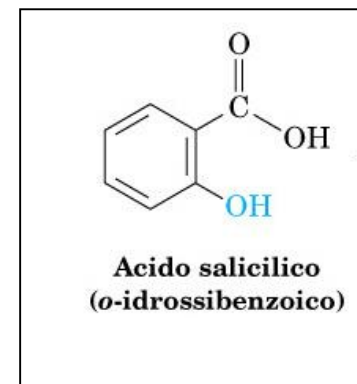
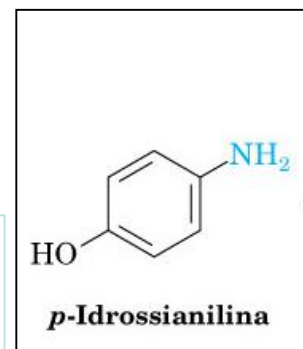
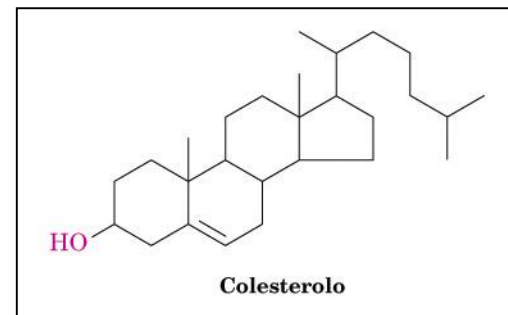
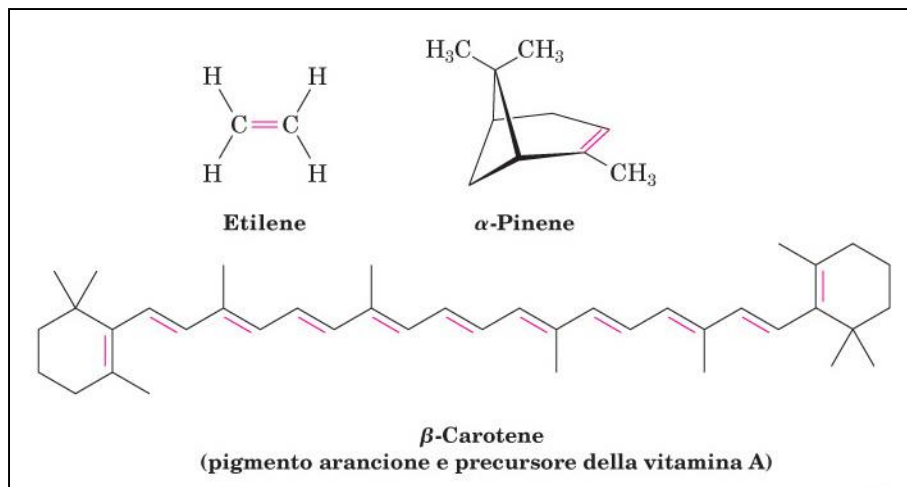
tra il residuo e il gruppo funzionale

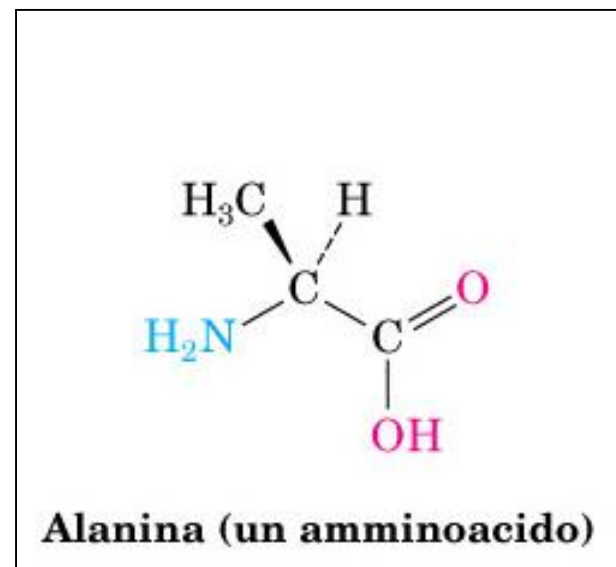
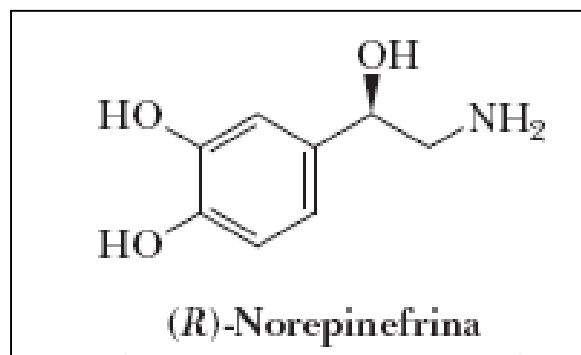
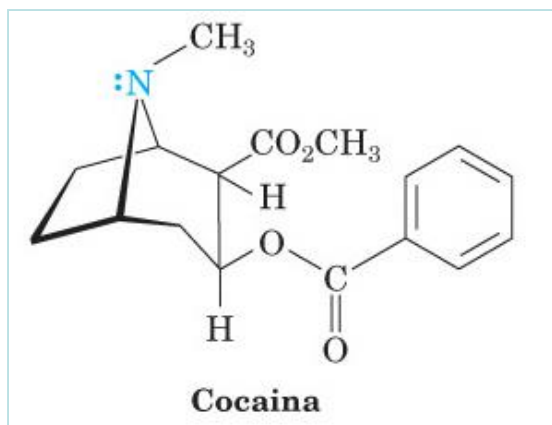
- determina:
- dettagli di proprietà chimiche
 - parte delle proprietà fisiche

Comuni Gruppi Funzionali

GF	Classe	GF	Classe
$\text{-}\ddot{\text{X}}\text{:}$	Alogenuri (X = F, Cl, Br, I)		Acidi carbossilici
$\text{-}\ddot{\text{O}}\text{H}$	Alcoli		Esteri carbossilici
$\text{-}\ddot{\text{S}}\text{H}$	Tioli		Anidridi
$\text{-}\ddot{\text{O}}\text{-}$	Eteri		Ammidi
	Ammine		Acil alogenuri (X = Cl, Br)
	Aldeidi	$\text{-C}\equiv\text{N:}$	Nitrili
	Chetoni		Alcheni
		$\text{-C}\equiv\text{C-}$	Alchini
			Areni

Riconoscimento dei gruppi funzionali





Acido stearico

Regole generali:

**NOMENCLATURA ALIFATICA dei composti
MONOFUNZIONALI**

- 1. Identificazione del gruppo funzionale**
- 2. Identificazione catena principale: deve contenere il gruppo funzionale**

3. Numerazione catena principale

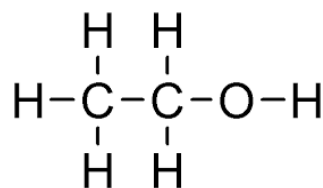
Costruzione del nome

prefisso + infisso + suffisso

a) numero di carboni (but-, pent- ecc.)

b) presenza di doppi o tripli legami (an-, en-, in-)

c) classe chimica e desinenza relativa (-o, -e, -olo, -ale, -one, ecc.)



per es. et-an-olo : un alcol a 2 carboni senza doppi legami

TABELLA 3.1 Struttura di alcuni comuni gruppi funzionali



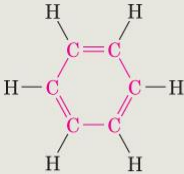
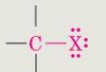
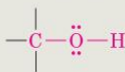

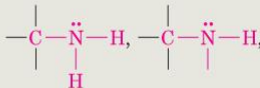
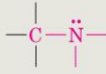
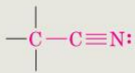
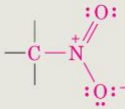
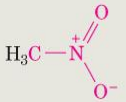
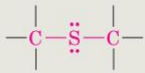
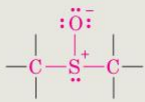
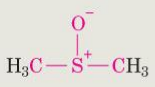
Nome della famiglia	Struttura del gruppo funzionale ^a	Esempi semplici	Desinenza del nome
Alcano	(Contiene solo legami singoli C—H e C—C)	CH ₃ CH ₃	-ano Etano
Alchene		H ₂ C=CH ₂	-ene Etere (Etilene)
Alchino	—C≡C—	H—C≡C—H	-ino Etino (Acetilene)
Arene			nessuna Benzene
Alogenuro	 (X = F, Cl, Br, I)	H ₃ C—Cl	nessuna Clorometano
Alcol		H ₃ C—O—H	-olo Metanolo
Etere		H ₃ C—O—CH ₃	etere Dimetiletere
Ammina	 	H ₃ C—NH ₂	-ammina Metilammina
Nitrile		H ₃ C—C≡N	-nitrile Etanonitrile (Acetonitrile)
Nitro			nessuna Nitrometano
Solfuro		H ₃ C—S—CH ₃	solfuro Dimetilsolfuro
Solfossido			solfossido Dimetilsolfossido

TABELLA 3.1 (continuazione)

Nome della famiglia	Struttura del gruppo funzionale ^a	Esempi semplici	Desinenza del nome
Solfone	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \\ \\ -\text{C}-\text{S}^{2+}-\text{C}- \\ \\ \text{:}\ddot{\text{O}}\text{:} \end{array}$	$\text{H}_3\text{C}-\overset{\text{O}^-}{\underset{\text{O}^-}{\text{S}^{2+}}}-\text{CH}_3$	<i>solfone</i> Dimetilsolfone
Tiolo	$\begin{array}{c} \text{:}\ddot{\text{S}}\text{:} \\ \\ -\text{C}-\text{S}-\text{H} \end{array}$	$\text{H}_3\text{C}-\text{SH}$	<i>-tiolo</i> Metantiolo
Carbonile, $\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \\ \\ -\text{C}- \end{array}$			
Aldeide	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \\ \\ -\text{C}-\text{C}-\text{H} \\ \end{array}$	$\text{H}_3\text{C}-\overset{\text{O}}{\text{C}}-\text{H}$	<i>-ale</i> Etanale (Acetaldeide)
Chetone	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \\ \\ -\text{C}-\text{C}-\text{C}- \\ \quad \end{array}$	$\text{H}_3\text{C}-\overset{\text{O}}{\text{C}}-\text{CH}_3$	<i>-one</i> Propanone (Acetone)
Acile			
Acido carbossilico	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \\ \\ -\text{C}-\text{C}-\ddot{\text{O}}\text{H} \\ \end{array}$	$\text{H}_3\text{C}-\overset{\text{O}}{\text{C}}-\text{OH}$	<i>Acido -oico</i> Acido etanoico (Acido acetico)
Estere	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \\ \\ -\text{C}-\text{C}-\ddot{\text{O}}-\text{C}- \\ \quad \end{array}$	$\text{H}_3\text{C}-\overset{\text{O}}{\text{C}}-\text{O}-\text{CH}_3$	<i>-oato</i> Metil etanoato (Metil acetato)
Ammide	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \\ \\ -\text{C}-\text{C}-\ddot{\text{N}}\text{H}_2 \\ \end{array}$	$\text{H}_3\text{C}-\overset{\text{O}}{\text{C}}-\text{NH}_2$	<i>-ammide</i> Etanammide (Acetammide)
	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \\ \\ -\text{C}-\text{C}-\ddot{\text{N}}-\text{H} \\ \end{array}$		
	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \\ \\ -\text{C}-\text{C}-\ddot{\text{N}}- \\ \end{array}$		
Cloruro di un acido carbossilico	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \\ \\ -\text{C}-\text{C}-\text{Cl} \\ \end{array}$	$\text{H}_3\text{C}-\overset{\text{O}}{\text{C}}-\text{Cl}$	<i>-oile cloruro</i> Etanoile cloruro (Acetile cloruro)
Anidride di un acido carbossilico	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \quad \text{:}\ddot{\text{O}}\text{:} \\ \quad \\ -\text{C}-\text{C}-\ddot{\text{O}}-\text{C}-\text{C}- \\ \quad \end{array}$	$\text{H}_3\text{C}-\overset{\text{O}}{\text{C}}-\text{O}-\overset{\text{O}}{\text{C}}-\text{CH}_3$	<i>anidride -oica</i> Anidride etanoica (Anidride acetica)

^aI legami le cui connessioni non sono specificate si suppongono attaccati ad atomi di carbonio o di idrogeno nella restante parte della molecola.

Notare !

- Il doppio legame $C=C$, il triplo legame $C\equiv C$ e l'anello aromatico sono considerati gruppi funzionali pur avendo solo carboni e idrogeni perché sono **siti di reattività**.
- Una molecola può possedere un solo gruppo funzionale (**molecola monofunzionale**) o più di uno (**molecola polifunzionale**).