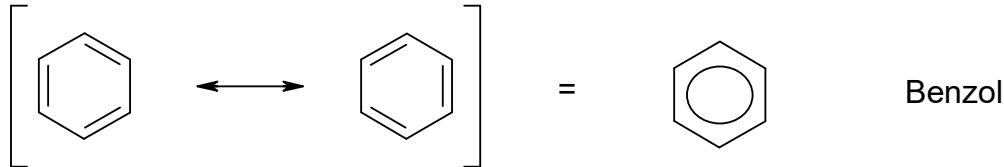


# Chemie für Medizinstudierende: Formeln OC

In diesem Dokument sind die wichtigsten **Formeln** der Vorlesung zusammengestellt, die man für die Klausur auswendig kennen sollte. Das bedeutet nicht, dass dieses Dokument die gesamten notwendigen Kenntnisse für den OC-Teil zusammenfasst.

Fehlerhinweise bitte an: [strater@bbz.uni-leipzig.de](mailto:strater@bbz.uni-leipzig.de)

## Cyclisch konjugierte $\pi$ -Systeme (Aromatizität und Mesomerie)



## Gesättigte und ungesättigte Kohlenwasserstoffe

Methan, Ethan, Propan, Butan, Pentan, Hexan

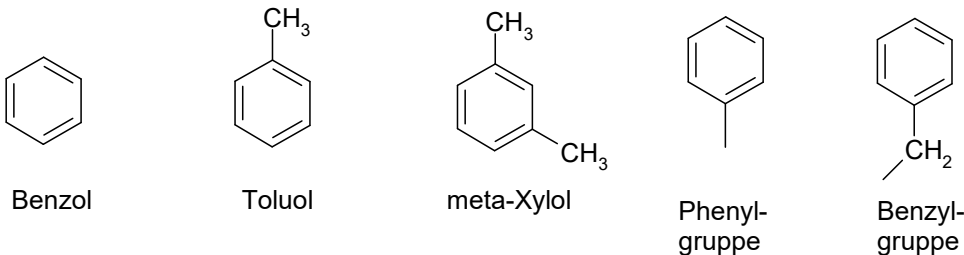
Cyclopropan bis Cyclohexan

Ethen bis Hexen

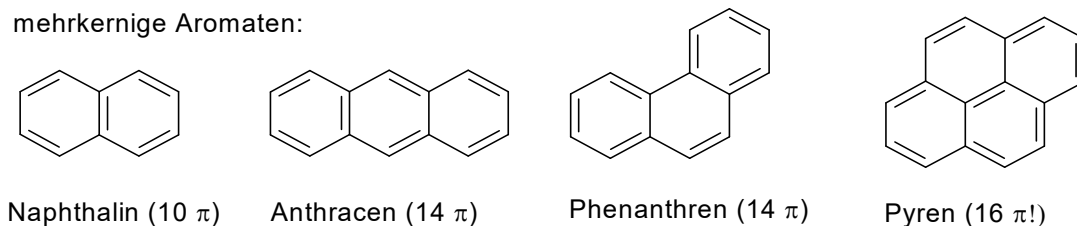
Ethin (Azetylen) bis Hexin

**Generell kann man für jede Stoffgruppe (Alkohole etc.) die Strukturformeln aus dem Namen der Stammverbindung mit bis zu sechs Kohlenstoffatomen ableiten, z.B. 1-Hexanol, oder 2-Propanon.**

## Aromatische Kohlenwasserstoffe



mehrkernige Aromaten:



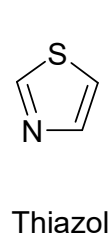
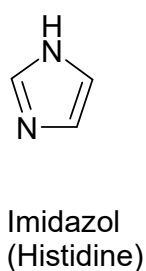
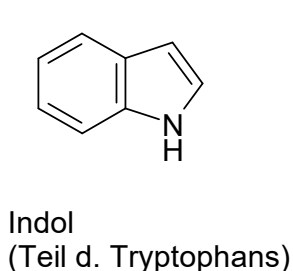
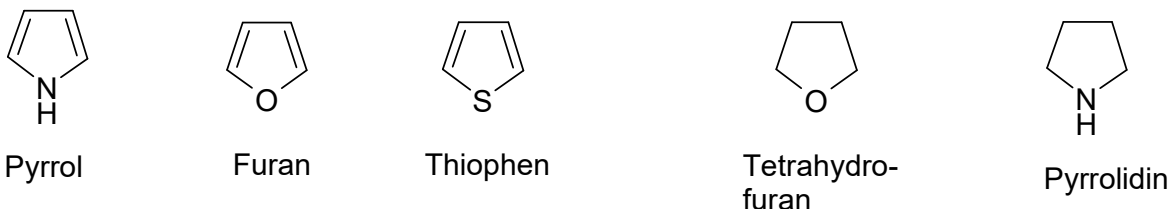
Naphthalin (10  $\pi$ )

Anthracen (14  $\pi$ )

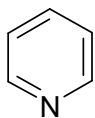
Phenanthren (14  $\pi$ )

Pyren (16  $\pi$ !)

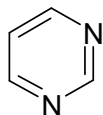
## Fünfringheterozyklen



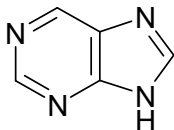
## Sechsringheterozyklen



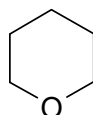
Pyridin



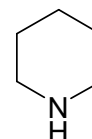
Pyrimidin



Purin



Tetrahydropyran



Piperidin

## Alkohole

$\text{H}_3\text{C-OH}$   
Methanol

$\text{H}_3\text{C-CH}_2\text{-OH}$   
Ethanol

$\text{H}_3\text{C-CH}_2\text{-CH}_2\text{-OH}$   
Propanol

etc. bis Hexanol

$\text{HO-CH}_2\text{-CH}_2\text{-OH}$

1,2-Ethandiol = (Ethylen)-Glycol

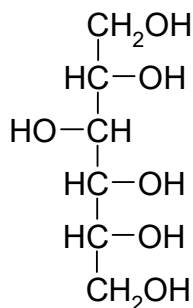
$\text{HO-CH}_2\text{-CH(OH)-CH}_3$

1,2-Propandiol

etc., z.B. Cyclohexanol

$\text{HO-CH}_2\text{-CH(OH)-CH}_2\text{-OH}$

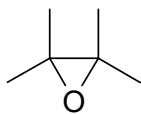
1,2,3-Propantriol, Glycerin



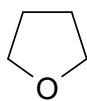
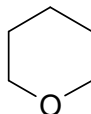
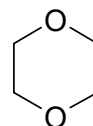
D-Sorbitol  
D-Sorbit  
süßer Geschmack

einfach merken als Reduktionsprodukt der D-Glucose  
Aldehydgruppe  $\rightarrow$  Alkoholgruppe

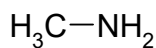
Phenole			
 Phenol "Carbolsäure" (5%ige wässr. Lsg.)	 1,2-Dihydroxybenzol ortho-Brenzcatechin ↓ Oxidation  1,2-Benzochinon	 1,3-Dihydroxybenzol meta-Resorcin ↓ <del>Oxidation</del> keine Oxidation möglich	 1,4-Dihydroxybenzol Hydrochinon ↓ Oxidation  para-Chinon

**Ether** $\text{H}_3\text{C}-\text{O}-\text{CH}_3$  Dimethylether $(\text{C}_2\text{H}_5)_2\text{O}$  Diethylether, "Ether" $\text{H}_3\text{C}-\text{CH}_2-\text{O}-\text{CH}_3$  Ethylmethylether (eine Form der Benennung einfacher Ether)

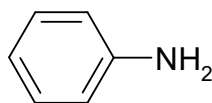
Epoxide

Tetrahydro-  
furanTetrahydro-  
pyran

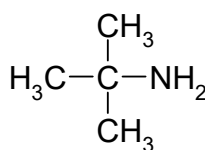
1,4-Dioxan

**Amine****primäres Amin**  $\text{R}-\text{NH}_2$ 

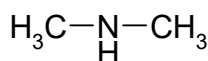
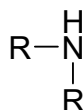
Methylamin



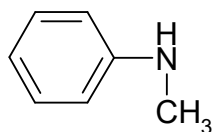
Anilin



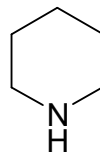
t-Butylamin

**sekundäres Amin**

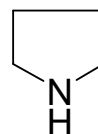
Dimethylamin



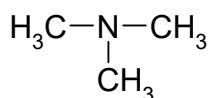
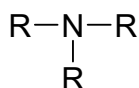
Methyl-Anilin



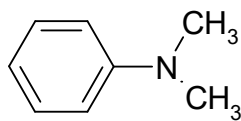
Piperidin



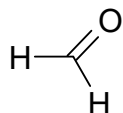
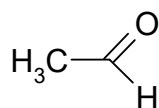
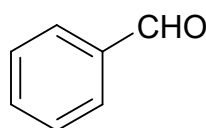
Pyrrolidin

**tertiäres Amin**

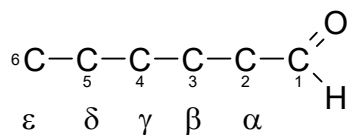
Trimethylamin



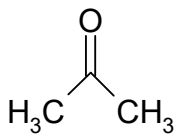
Dimethylanilin

**Aldehyde und Ketone**Formaldehyd  
MethanalAcetaldehyd  
Ethanal

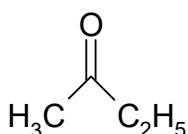
Benzaldehyd



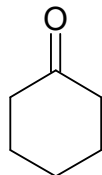
**Ketone:** all. R-C=O-R'



Aceton  
Propanon

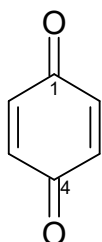


Methylethylketon  
Butanon

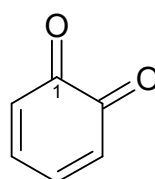


Cyclohexanon

### Chinone

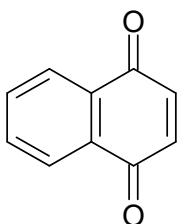


p-Chinon  
1,4-Benzochinon

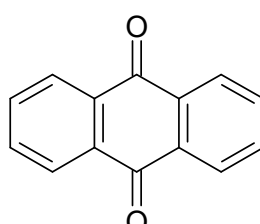


o-Chinon  
1,2-Benzochinon

kondensierte Chinone:



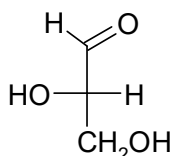
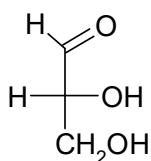
1,4-Naphthochinon



Anthrachinon

### Monosaccharide

#### Triosen

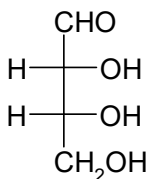


D-(+)-Glycerinaldehyd

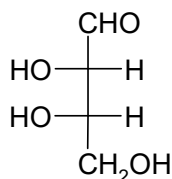
L-(-)-Glycerinaldehyd

#### Tetrosen

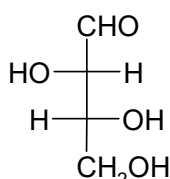
4 Stereoisomere als 2 Enantiomerenpaare d. Aldotetraosen



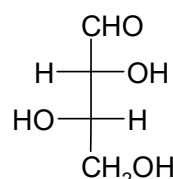
D-Erythrose



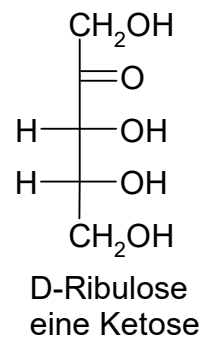
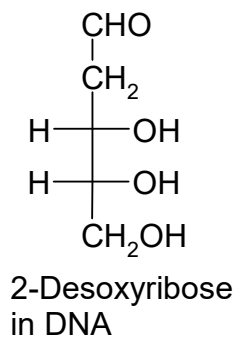
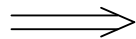
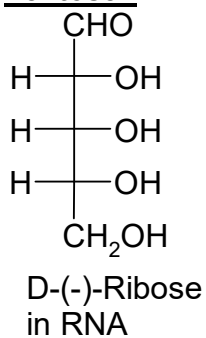
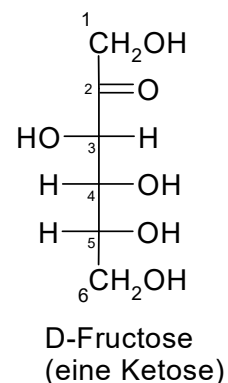
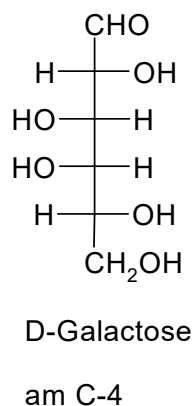
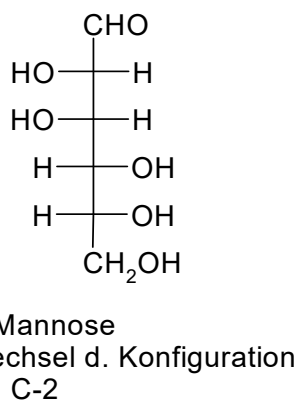
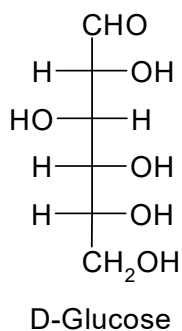
L-Erythrose



D-Threose



L-Threose

**Pentosen****Hexosen****Disaccharide**

Saccharose:  $\alpha$ -1,2-glykosidisch verknüpfte Glucose und Fructose

Maltose:  $\alpha$ -1,4-glykosidisch verknüpfte Glucose

Lactose:  $\beta$ -1,4-glykosidisch verknüpfte Galactose und Glucose

**Polysaccharide**

Amylose (Teil der Stärke):  $\alpha$ -1,4-glykosidisch verknüpfte Glucose

Glykogen:  $\alpha$ -1,4-glykosidisch verknüpfte Glucose

Cellulose:  $\beta$ -1,4-glykosidisch verknüpfte Glucose

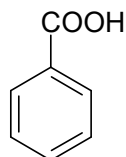
**Carbonsäuren und Carbonsäurederivate****Monocarbonsäuren**

Formel	Säure	Salze*
HCOOH	Ameisensäure (Methansäure)	Formiate
CH <sub>3</sub> -COOH	Essigsäure (Ethansäure)	Acetate
CH <sub>3</sub> -CH <sub>2</sub> -COOH	Propionsäure (Propansäure)	Propionate
CH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -COOH	n-Buttersäure (Butansäure)	Butyrate
CH <sub>3</sub> -(CH <sub>2</sub> ) <sub>14</sub> -COOH	Palmitinsäure	Palmitate
CH <sub>3</sub> -(CH <sub>2</sub> ) <sub>16</sub> -COOH	Stearinsäure	Stearate

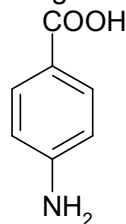
Ölsäure: einfach ungesättigt, linear, 18 C-Atome

Linolsäure: zweifach ungesättigt, linear, 18 C-Atome, essentiell

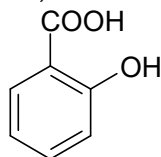
Linolensäure: dreifach ungesättigt, linear, 18 C-Atome, essentiell



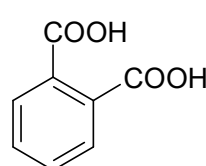
Benzoessäure



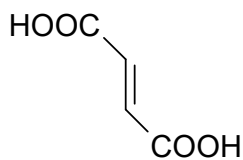
p-Amino-  
benzoessäure  
(PABS)



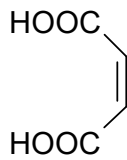
Salicyl-  
säure



Phthal-  
säure



Fumarsäure

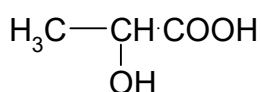


Maleinsäure

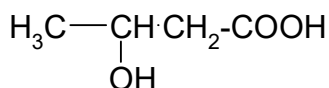
**Dicarbonsäuren**

und ihre Salze, viele physiol. wichtige Vertreter

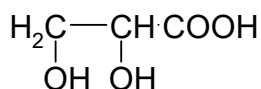
C-Zahl	Formel	Name	Salze
2	HOOC-COOH	Oxalsäure	Oxalate
3	HOOC-CH <sub>2</sub> -COOH	Malonsäure	Malonate
4	HOOC-(CH <sub>2</sub> ) <sub>2</sub> -COOH	Bernsteinsäure	Succinate
5	HOOC-(CH <sub>2</sub> ) <sub>3</sub> -COOH	Glutarsäure	Glutarate

**Hydroxycarbonsäuren**

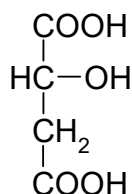
Milchsäure, Lactate



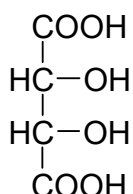
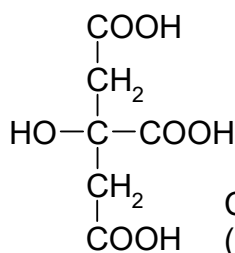
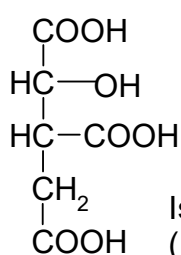
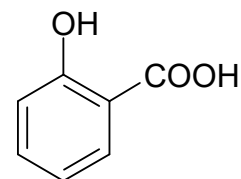
3-Hydroxybuttersäure, 3-Hydroxybutyrate



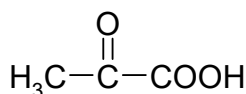
Glycerinsäure, Glycerate

Äpfelsäure  
(Malate)

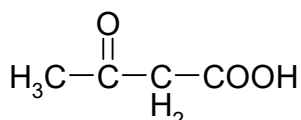
2 Enantiomere

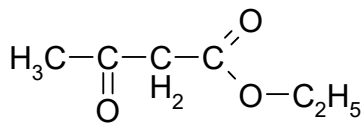
Weinsäure  
(Tartrate)3 Stereoisomere  
hier gezeigt nur MesoformCitronensäure  
(Citrate)Isocitronensäure  
(Isocitrate)

Salicylsäure

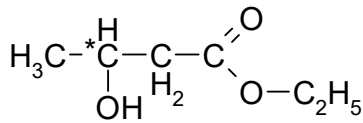
**Ketocarbonsäuren**

Brenztraubensäure (Salze: Pyruvate)

Acetessigsäure,  $\beta$ -Ketobuttersäure

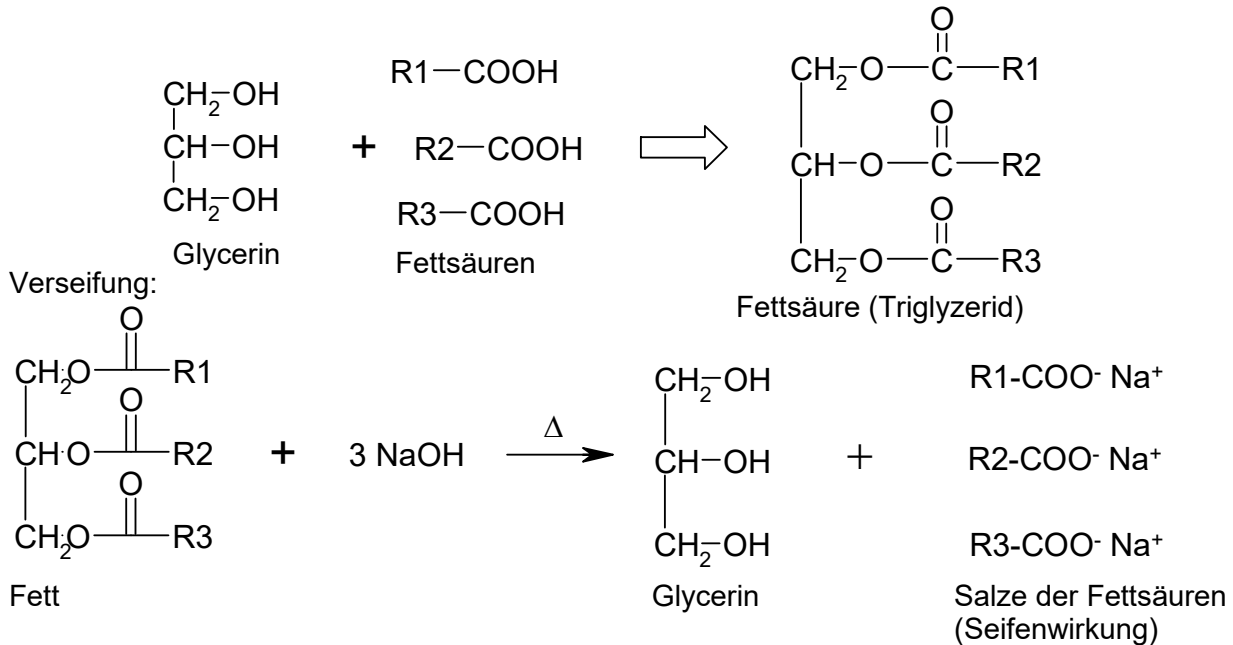


Acetessigsäureethylester  
"Acetessigester"



$\beta$ -Hydroxybuttersäureester

## Fette und Öle



**Aminosäuren, Peptide und Polypeptide** (die eingerahmten sollte jeder zeichnen können, die anderen nur erkennen und benennen, wenn sie gezeigt sind)

