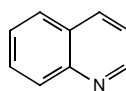


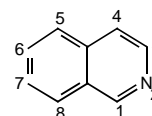
## Grundlagen der organischen Chemie II Heterocyclen

Tim Clark  
Computer-Chemie-Centrum  
Universität Erlangen-Nürnberg  
clark@chemie.uni-erlangen.de

### Chinolin und Isochinolin



Chinolin  
Bp 238°  
pKa = 4.8

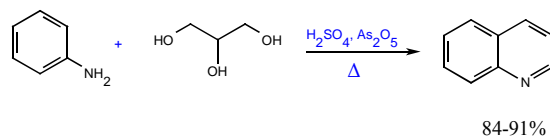


Isochinolin  
Bp 243°  
pKa = 5.4

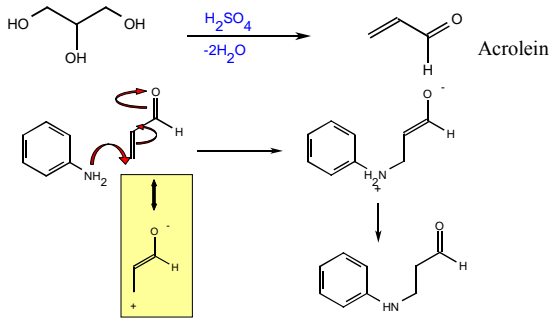
### 6-Ring-Heterocyclen

- Chinolin und Isochinolin
- Diazine
  - Purine
  - Pyrimidine
  - Nucleinsäuren
- Pyrone, Pyrilliumsalze

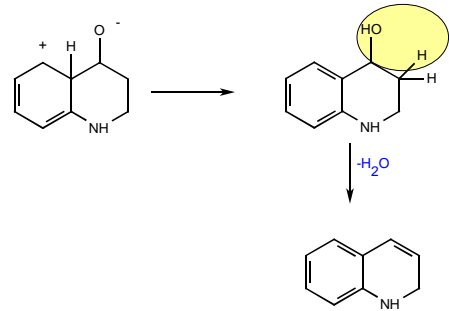
### Synthese: Skraup- Reaktion



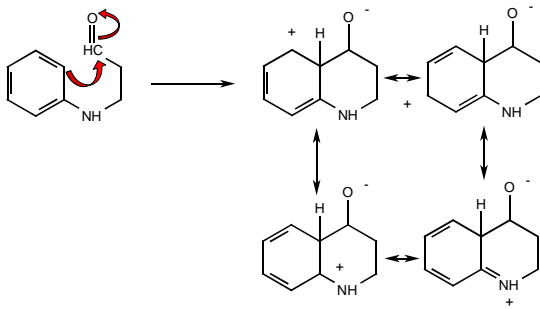
### Mechanismus



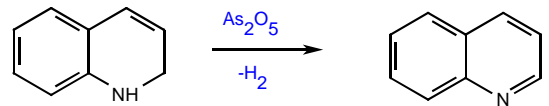
### Mechanismus



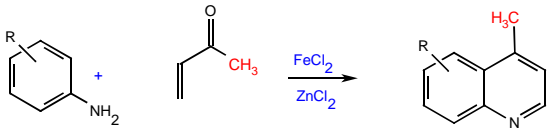
### Mechanismus



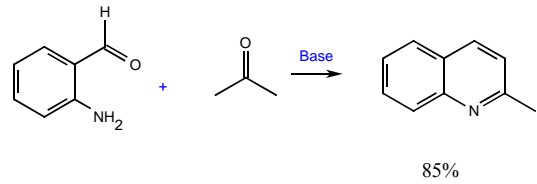
### Mechanismus



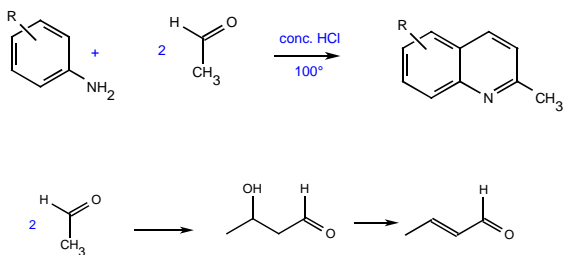
### Variation



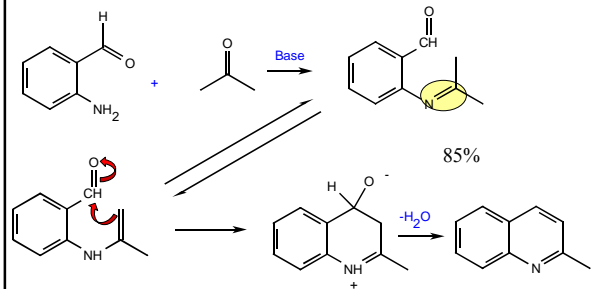
### Friedländer-Synthese



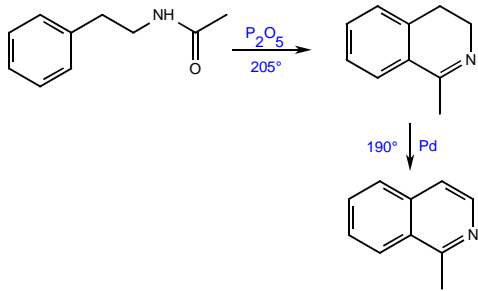
### Döbner-Miller-Reaktion



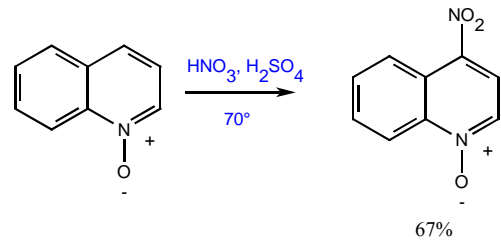
### Mechanismus



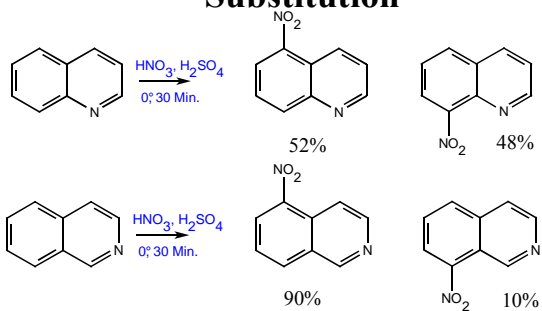
### Isochinoline: Bischler-Napieralski-Synthese



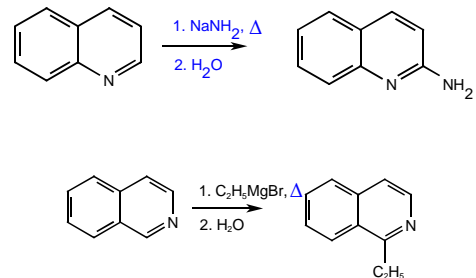
### N-Oxid



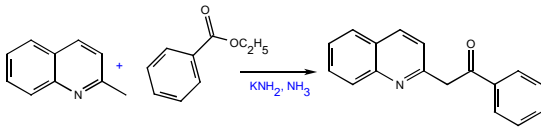
### Reaktionen: Elektrophile Substitution



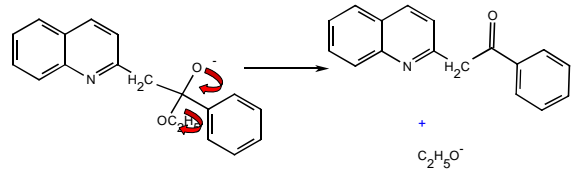
### Nukleophile Substitution



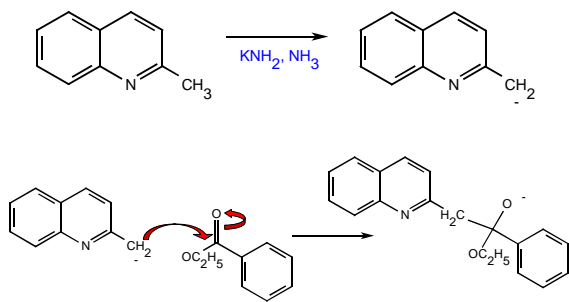
### Azidität in $\alpha$ -Stellung



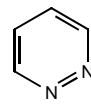
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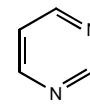
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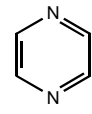
### Diazine



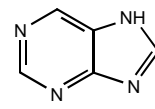
Pyridazin



Pyrimidin

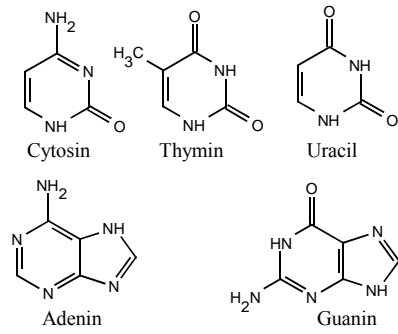


Pyrazin

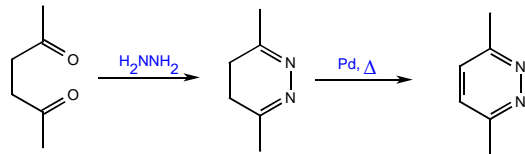


Purin

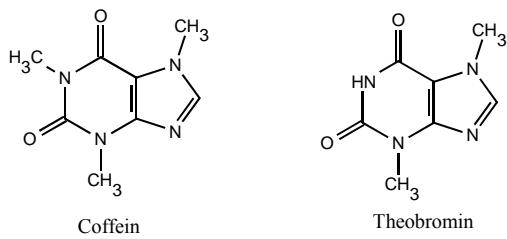
## DNA und RNA-Basen



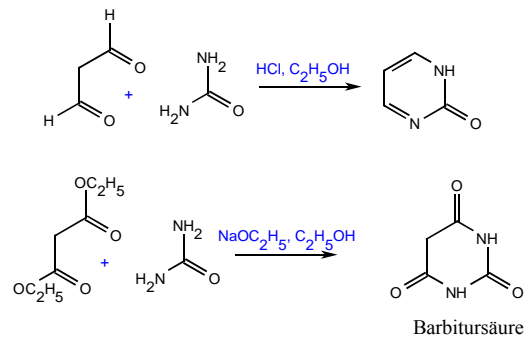
## Synthese: Pyridazine



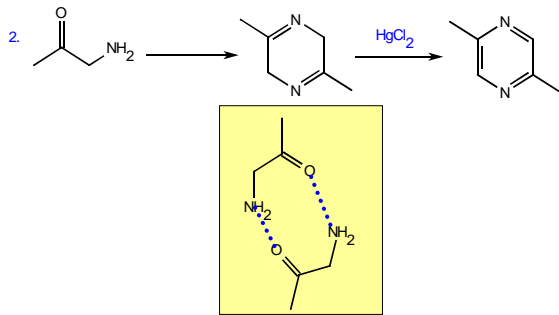
## Natürliche Purine



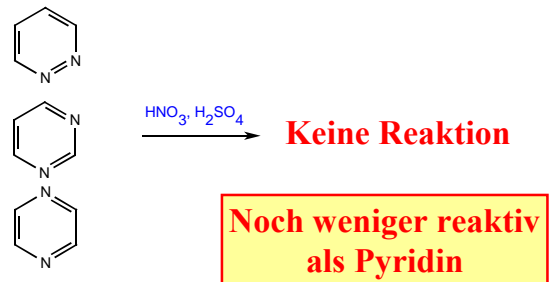
## Synthese: Pyrimidine



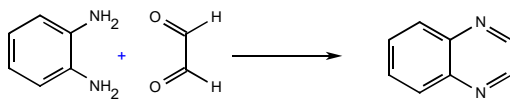
## Synthese: Pyrazine



## Reaktionen: Elektrophile Substitution

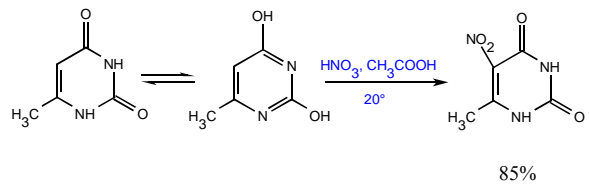


## Synthese: Quinoxalin

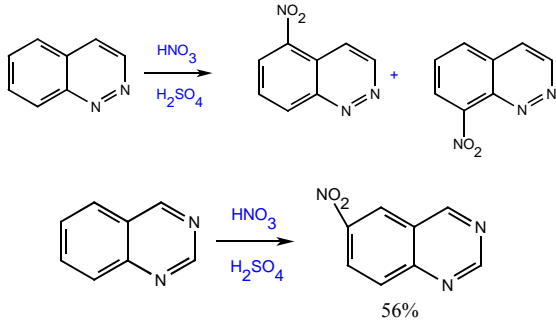


Test für 1,2-Dicarbonylverbindungen

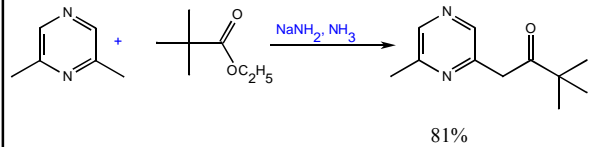
## Aktivierte Diazine



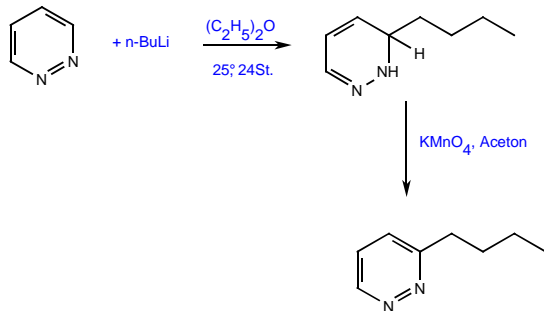
### Benzodiazene



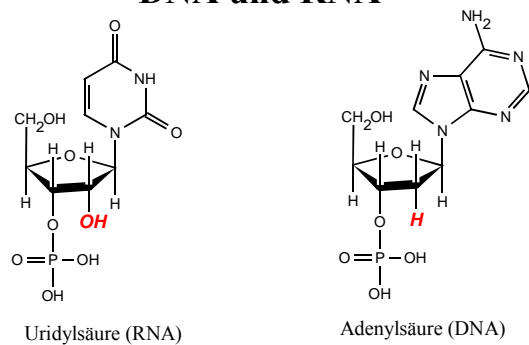
### Azidität in $\alpha$ -Stellung



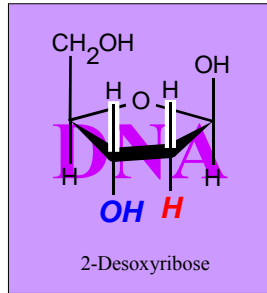
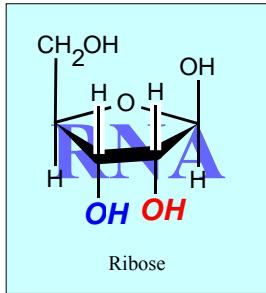
### Nukleophile Substitution



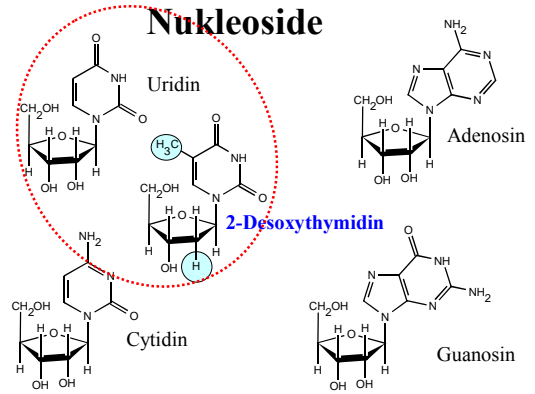
### DNA und RNA



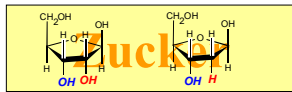
## DNA und RNA



## Nukleoside



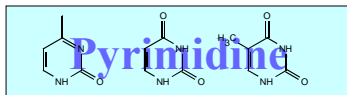
## DNA- und RNA-Bausteine



Ribose, 2-Desoxyribose



Phosphat

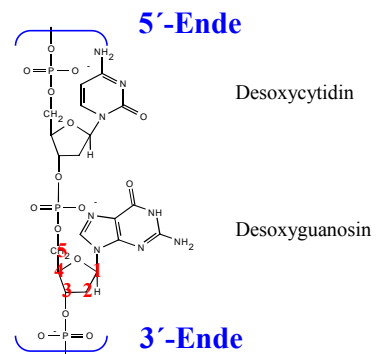


Cytosin, Uracil, Thymin

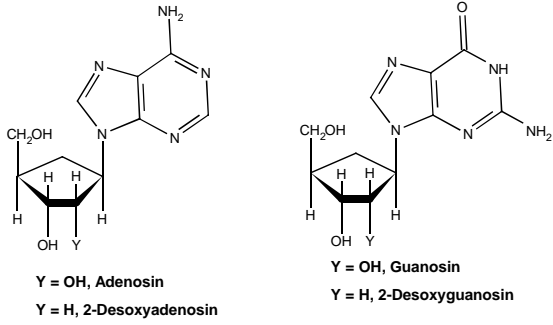


Adenin, Guanin

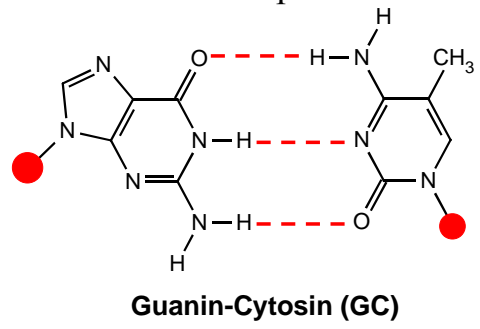
## Nukleinsäuren



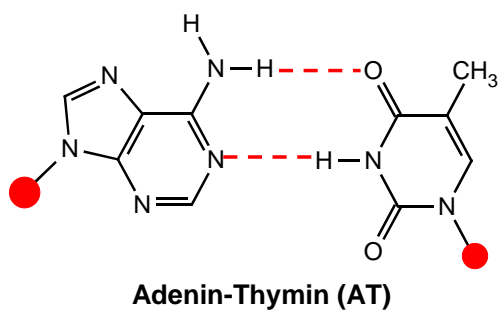
### Nucleoside



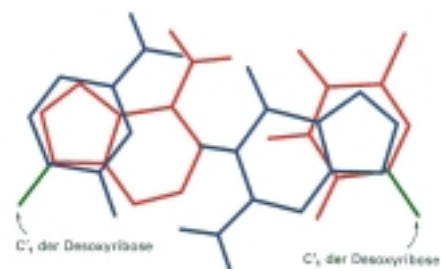
### Basenpaare



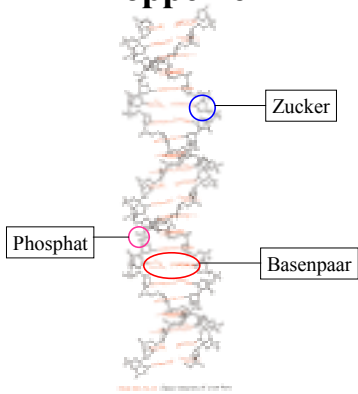
### Basenpaare



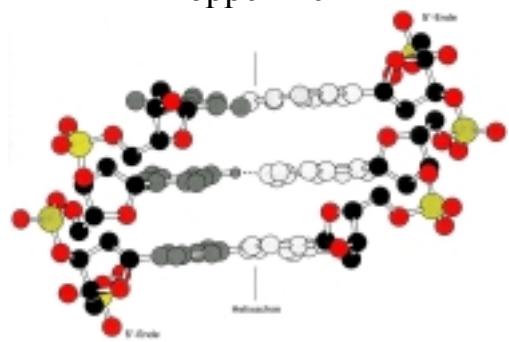
### Basenpaare



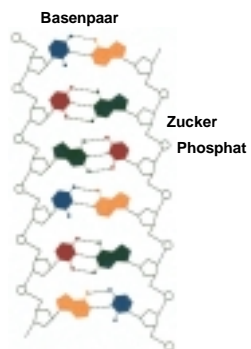
### Doppelhelix



### Doppel-Helix



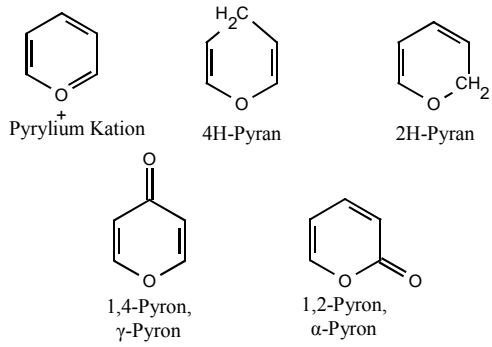
### DNA-Strang



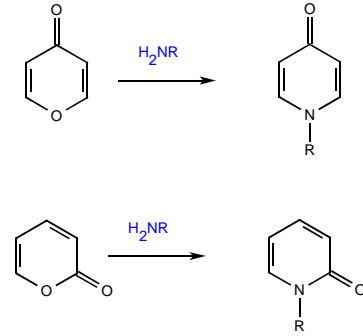
### Doppel-Helix



### Pyrone, Pyryliumsalze



### Pyron $\rightarrow$ Pyridon



### Diels-Alder: $\alpha$ -Pyrone

