

생유기화학  
(*Bioorganic Chemistry*)

Amino Acids, Peptides, and Proteins-II  
(아미노산, 펩타이드, 단백질-2)

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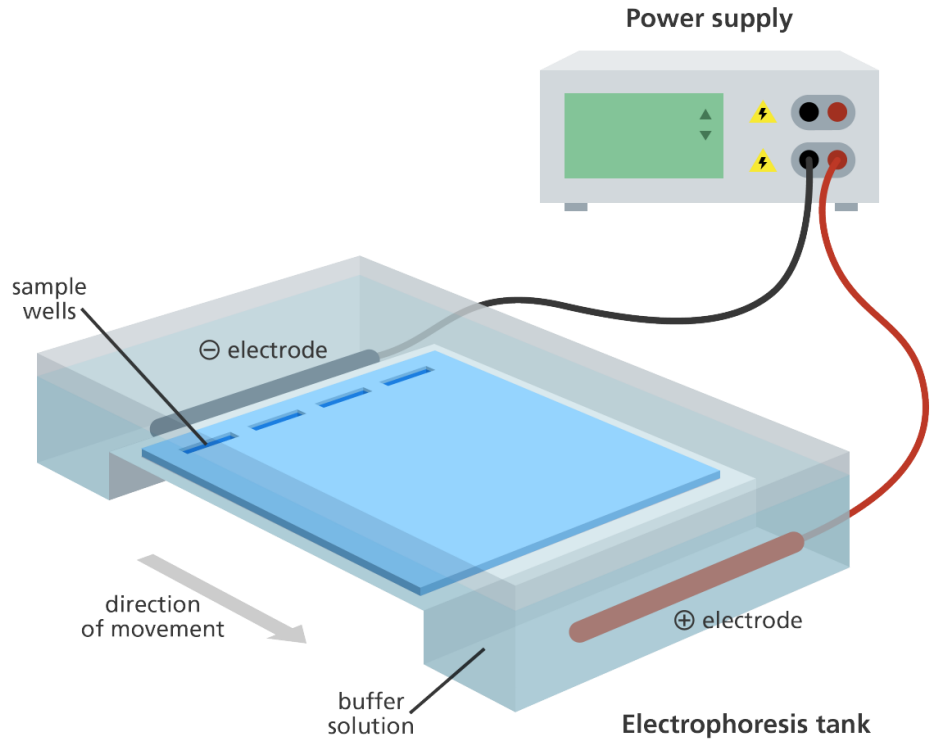
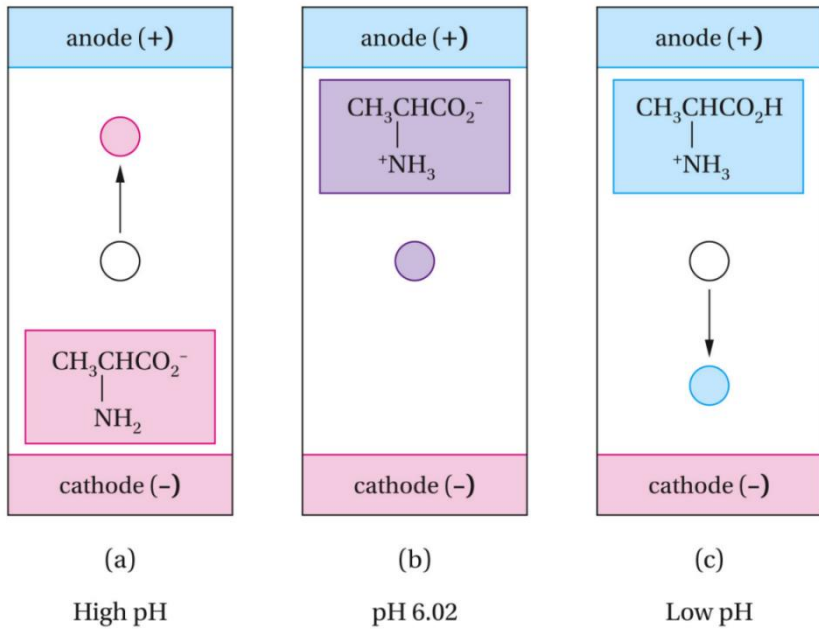
순천향대

나노화학공학과

임정균 교수



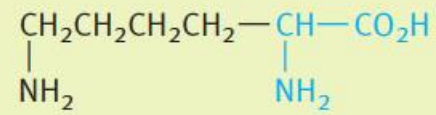
# 전기영동(electrophoresis)



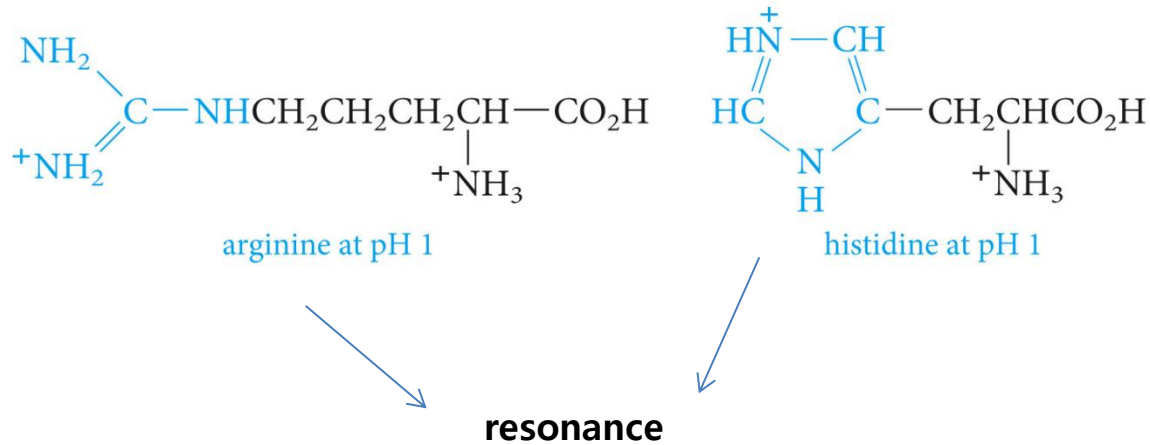
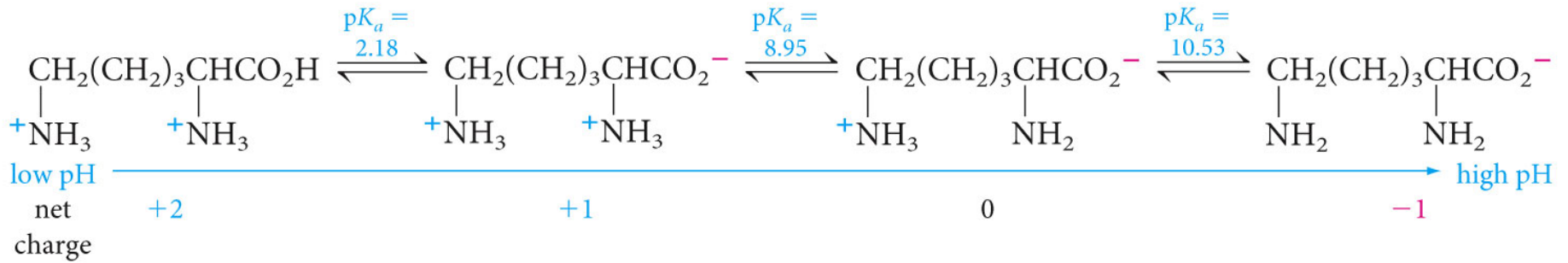


lysine

Lys (9.7)  
K

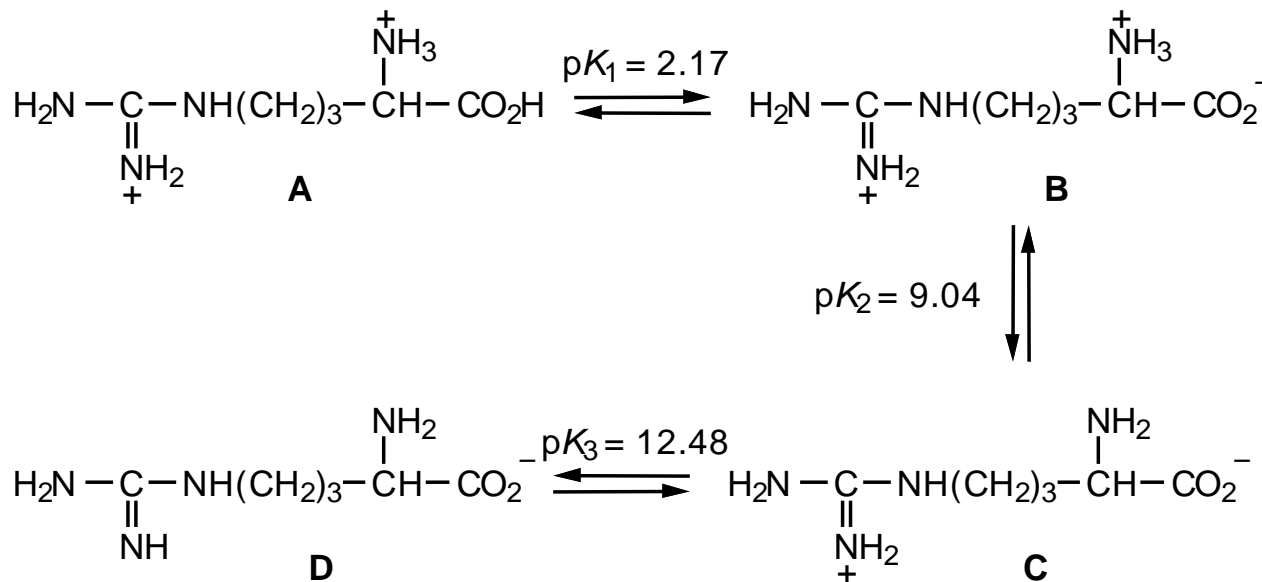


pI는 9.74이다.



Problem 6. Arginine shows three pKa's : at 2.17 (the -COOH group), at 9.04 (the -N<sup>+</sup>H<sub>3</sub> group), and at 12.48 (the guanidinium ion).

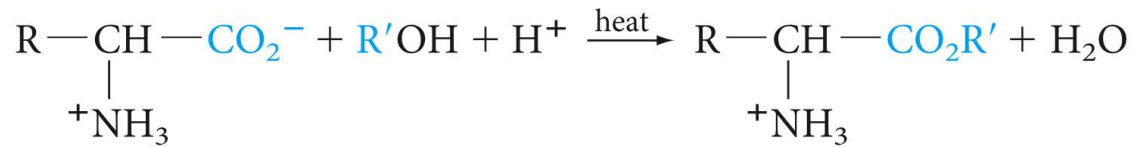
Write equilibria for its dissociation. At approximately what pH will the isoelectric point come, and what is the structure of the dipolar ion?



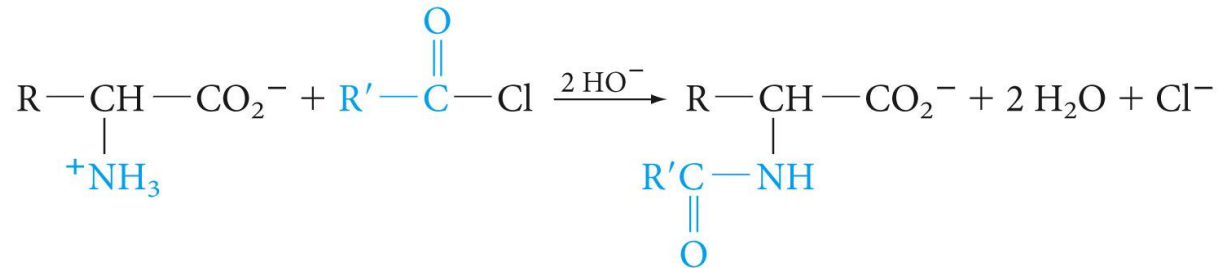
The dipolar ion has structure **C** and the isoelectric point (pI) will be the average of the pK<sub>a</sub>s of **B** and **D**.

$$\text{pI} = [\text{p}K_2 + \text{p}K_3] / 2 = [9.04 + 12.48] / 2 = 10.76$$

## 5. Reactions of amino acids

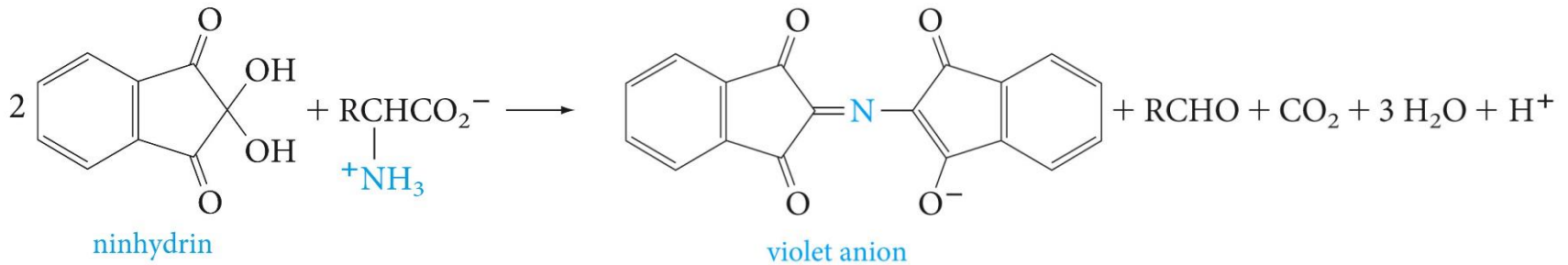


산조건 하에서는 아미노산의 carboxylate가 ester반응으로 ester로 변할 수가 있다.



아미노산의 amino group이 acyl chloride에 의해 acylation 될 수 있다.

## 6. The Ninhydrin reaction



Ninhydrin은 아미노산과 선택적으로 반응을 잘하여 새로운 화합물로 변형이 될 수 있다.

보라색 또는 진한 빨강색의 violet anion으로 쉽게 형성이 된다.

미량의 아미노산을 감지하거나 분석용으로 적합하다.

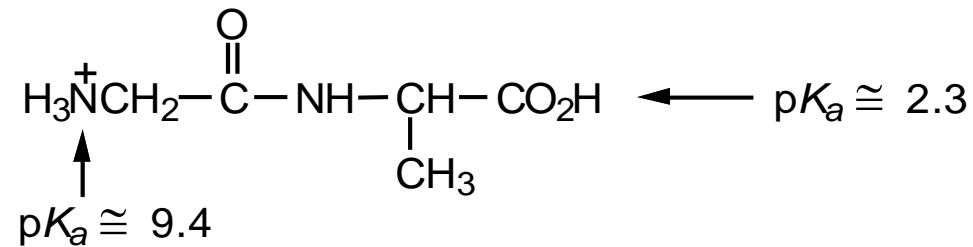
Thin layer chromatography에 발색제로 사용하여 아미노산 뿐만 아니라 amine이 존재하는 화합물들을 발색시켜 분석 가능하다.



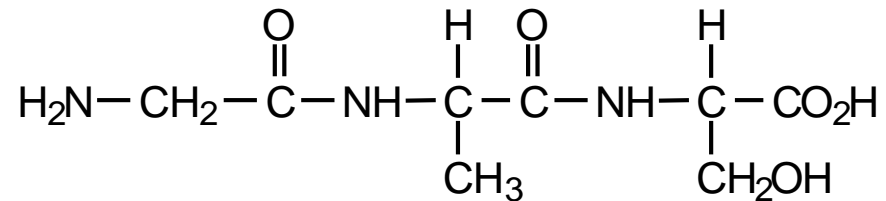


**Problem 10.** Draw the expected structure of Gly-Ala in solution at pH 3 and at pH 9.

(pI = 6)

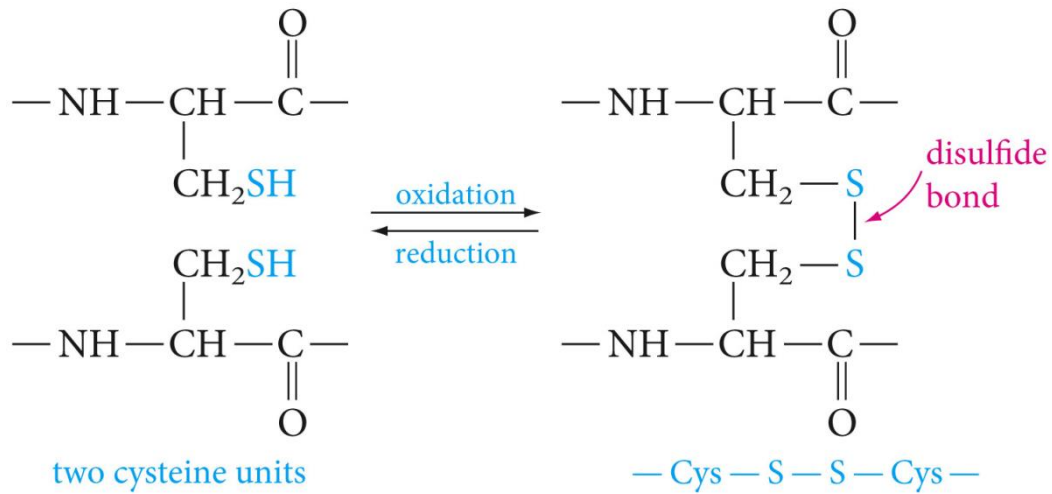


**Problem 12.** Write out the complete structural formula for Gly-Ala-Ser.

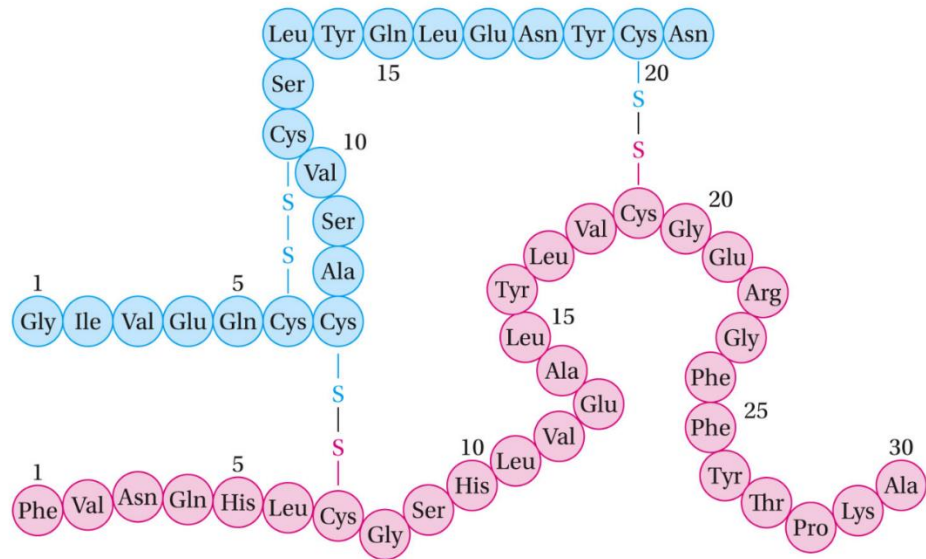


Tripeptide일 경우, 20X20X20의 조합이 가능하다.

# 8. The Disulfide Bond



**(-SH, thiol)**

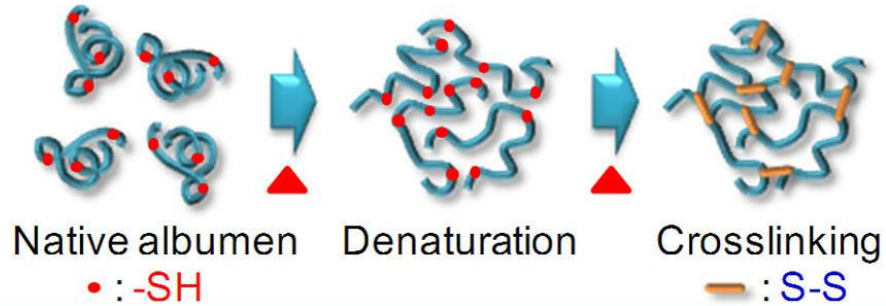


**( Beef Insulin )**

(a)



(b) Protein Thermal Irreversible Denaturation



Hair structure, strong links and weak links

