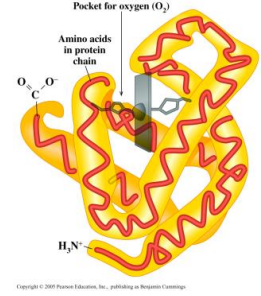


البناء الثالث للبروتين

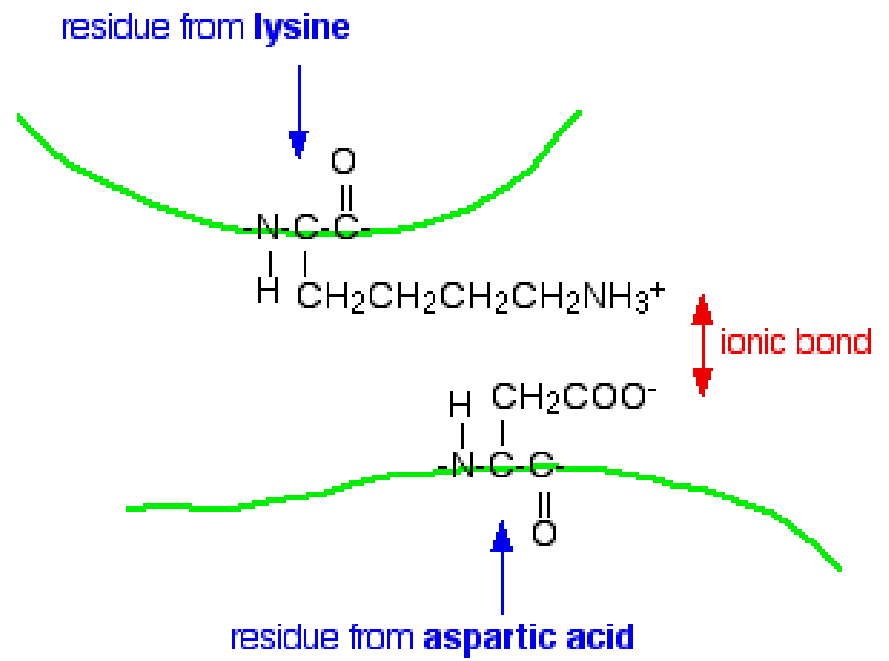


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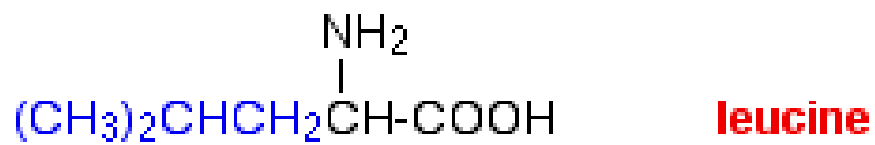
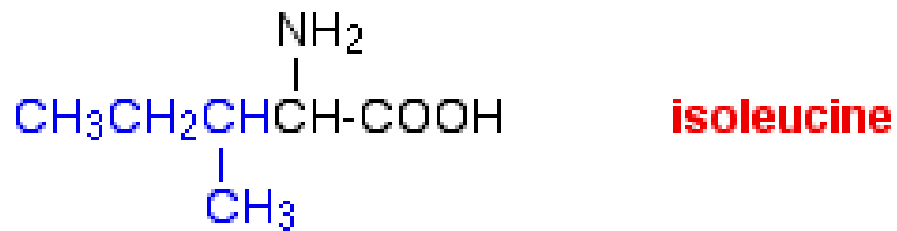
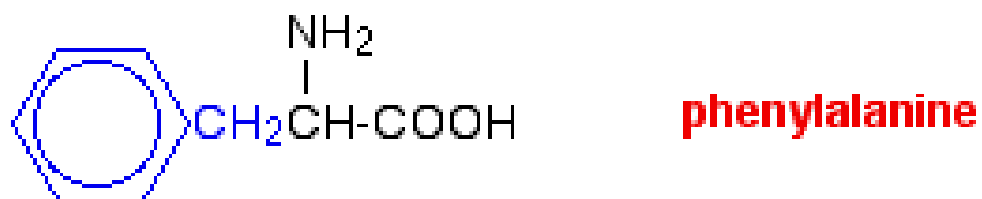
.....

الروابط التي تثبت البروتين في البناء الثالث

1-Ionic interactions

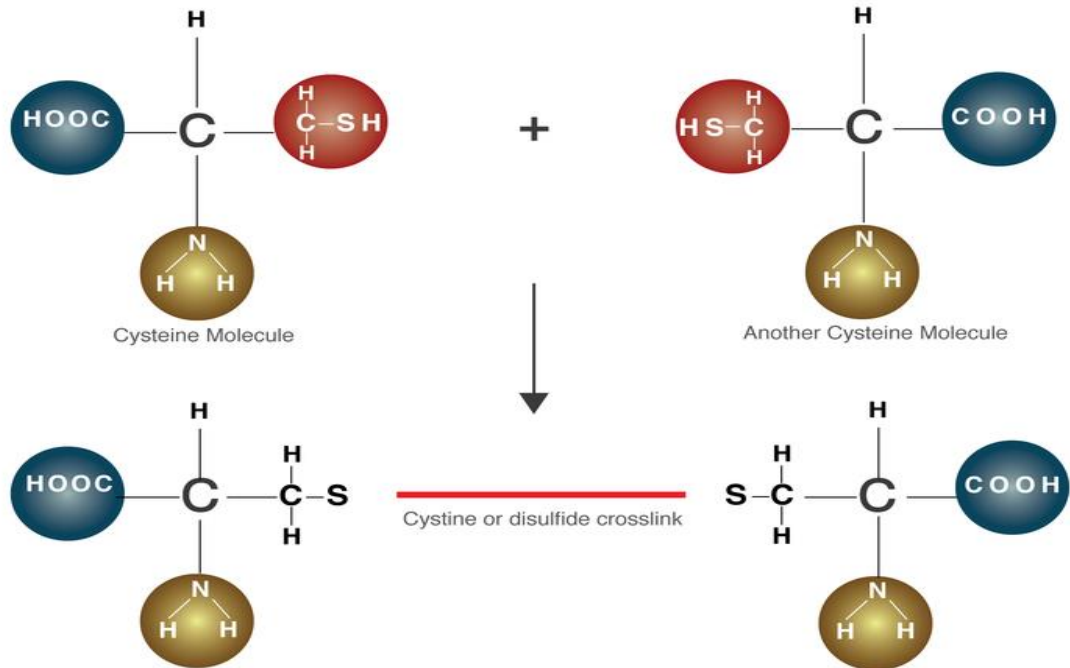


2-van der Waals dispersion forces

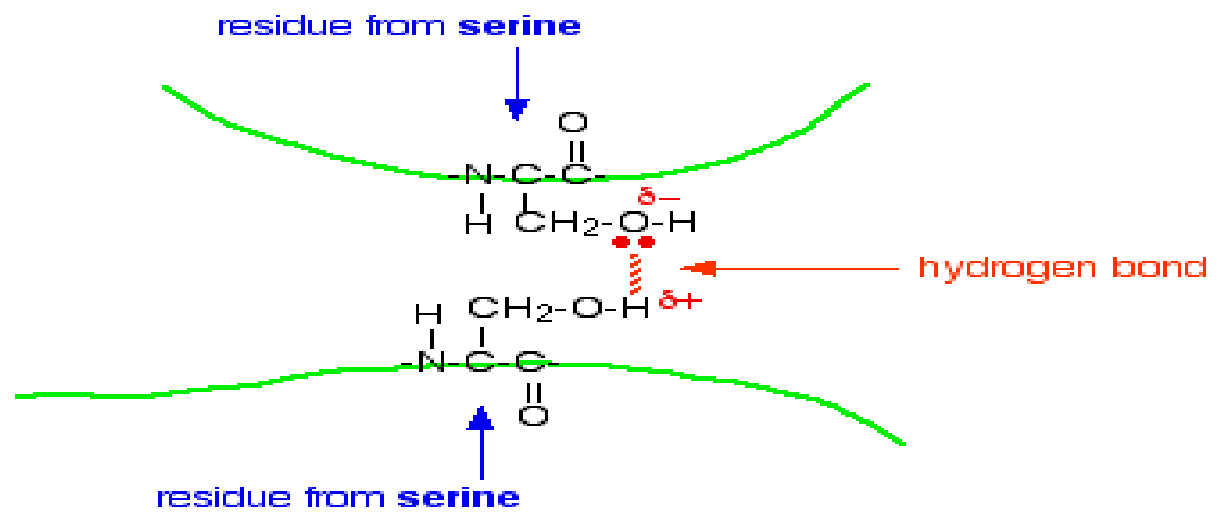


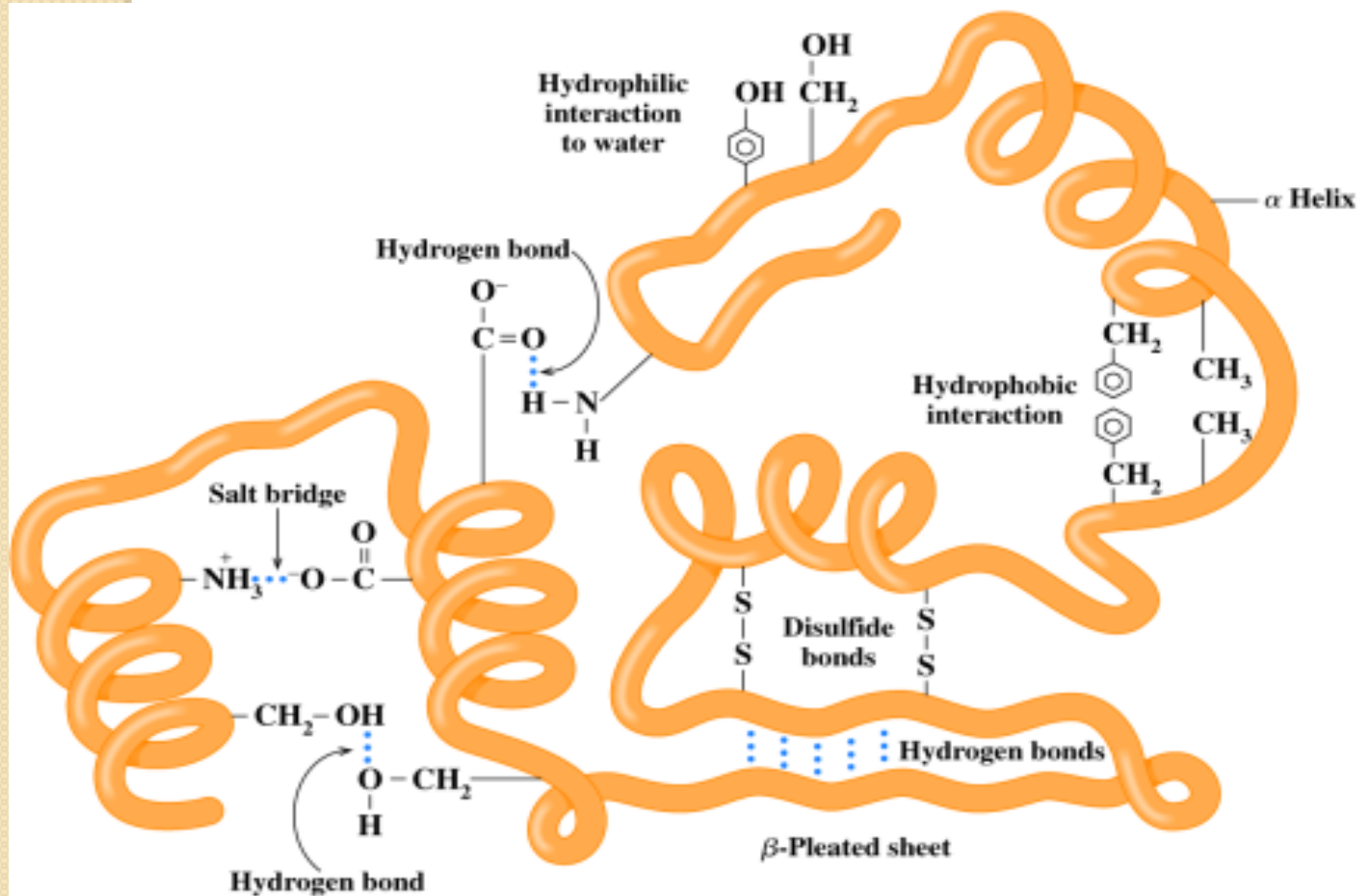
Sulphur bridges

FORMATION OF CYSTINE FROM TWO MOLECULES OF CYSTEINE AMINO ACID

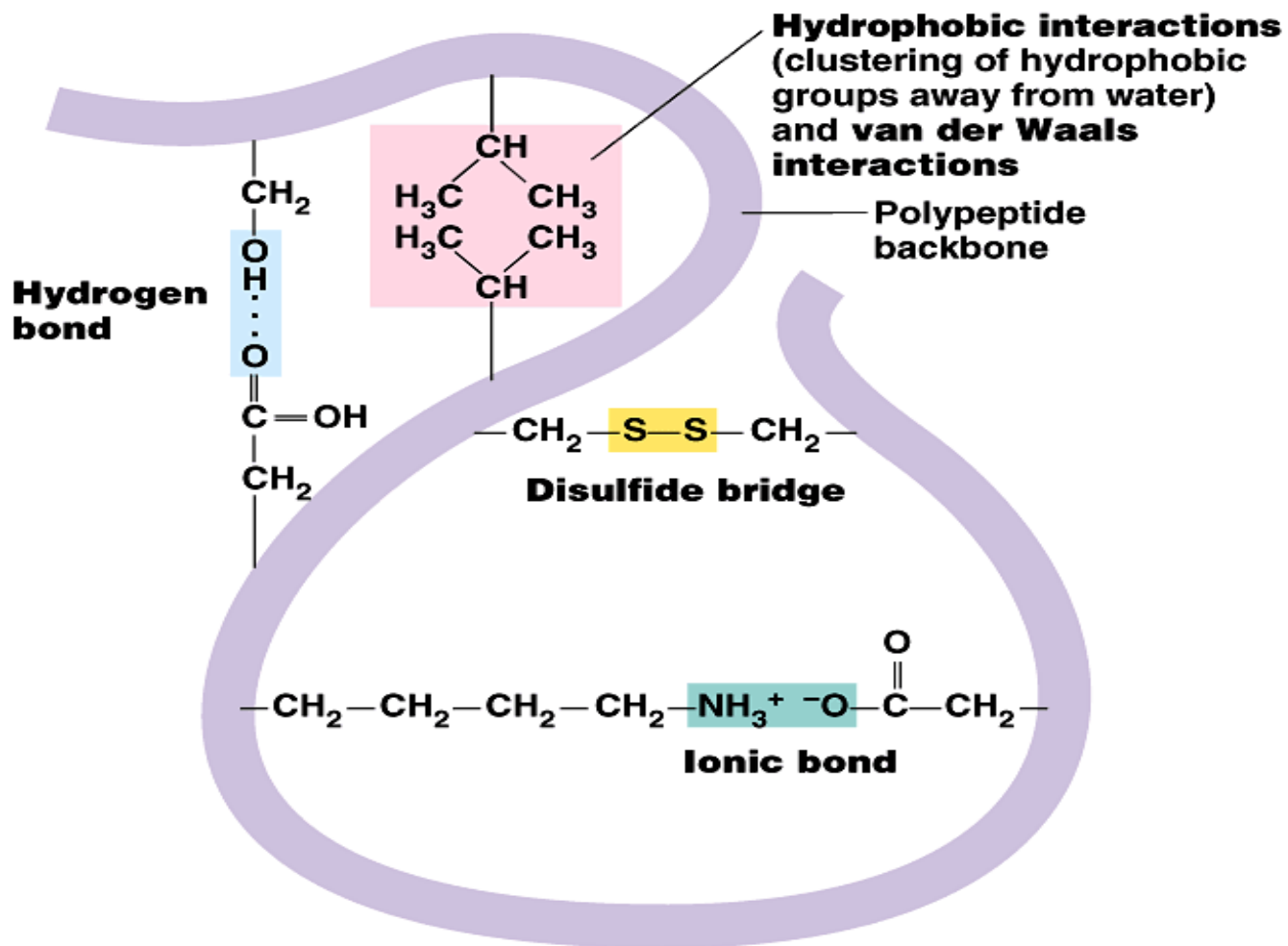


Hydrogen bonds



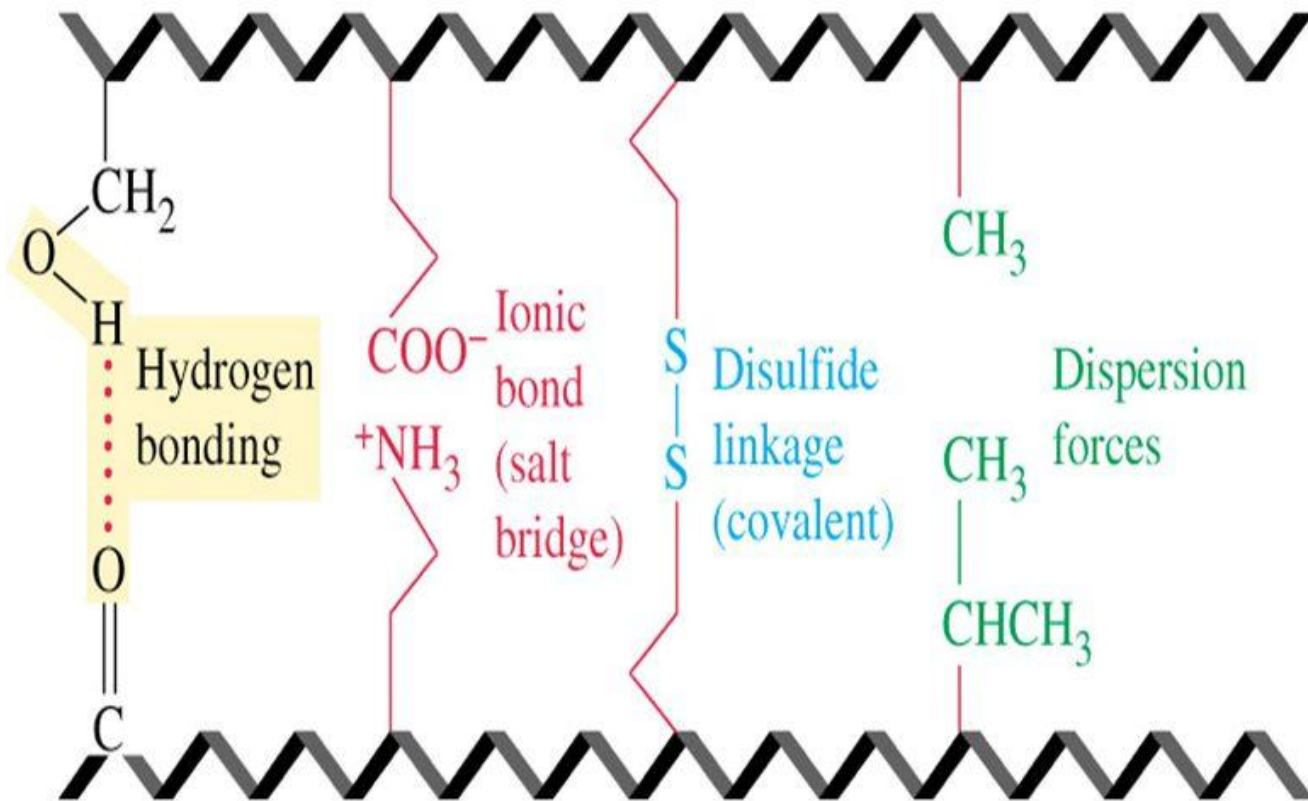


Interactions in tertiary structure of protein



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INTERMOLECULAR FORCES IN PROTEIN STRUCTURE



The 4 types of interactions that determine tertiary structure of proteins are shown. Though varying in strength, each set of interactions is significant in the formation of intrachain bonds that fixes the structure of the overall polymer.

اقسام البروتين في البناء الثالث

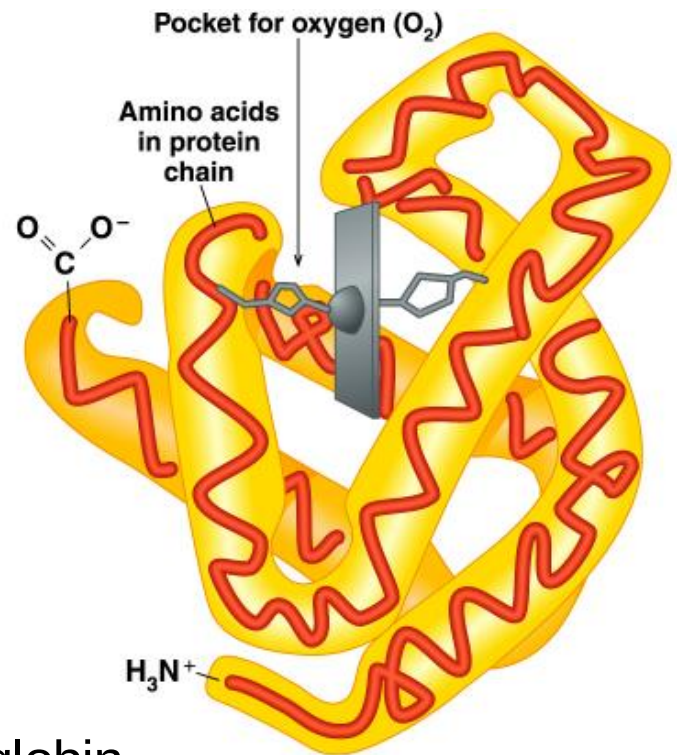
1-Fibrous proteins ليفي

(الشعر- الصوف)

2-Globular proteins كروي

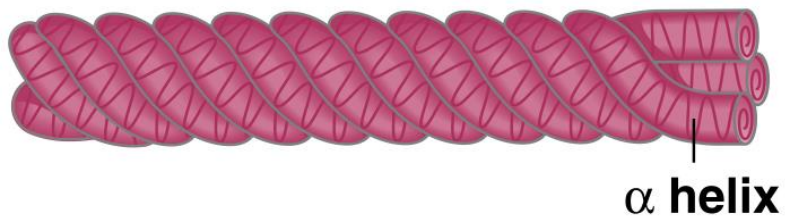
most enzymes are globular proteins

Globular Proteins



Myoglobin

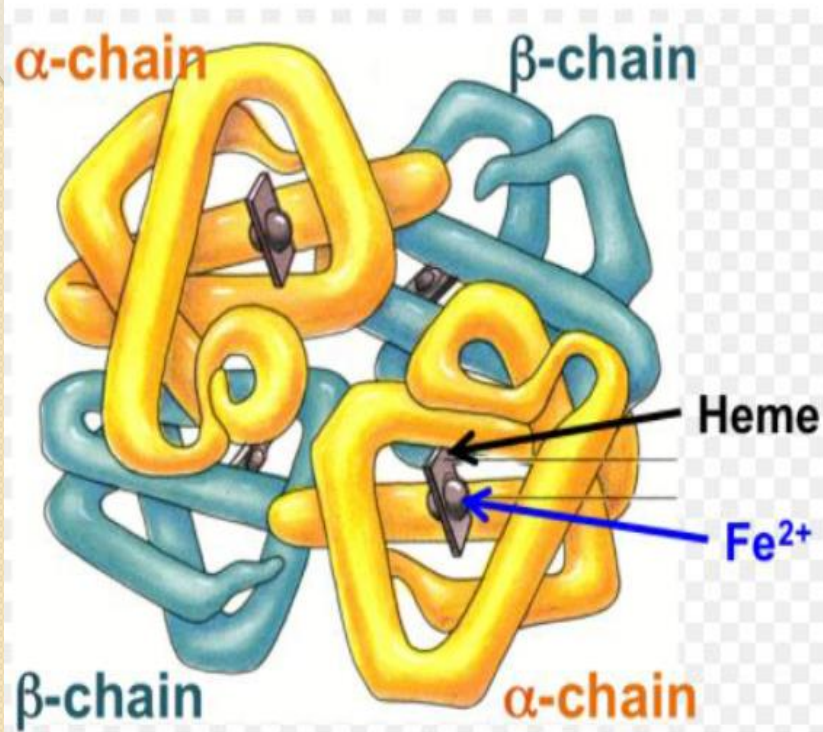
Fibrous Proteins (ليفى)



Alpha keratin

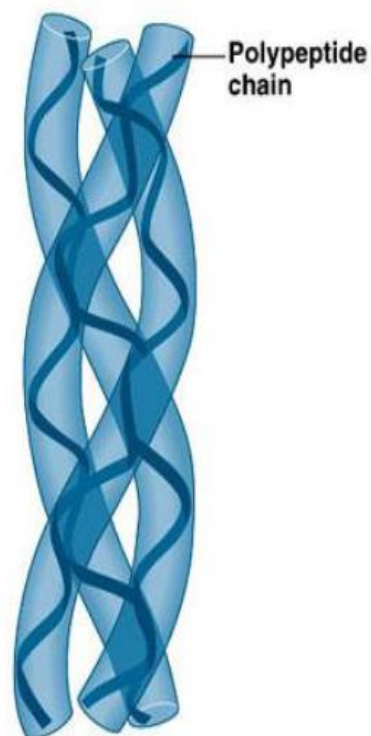
Timberlake, General, Organic, and Biological Chemistry. Copyright © Pearson Education Inc., publishing as Benjamin Cummings

البناء الرابع للبروتين



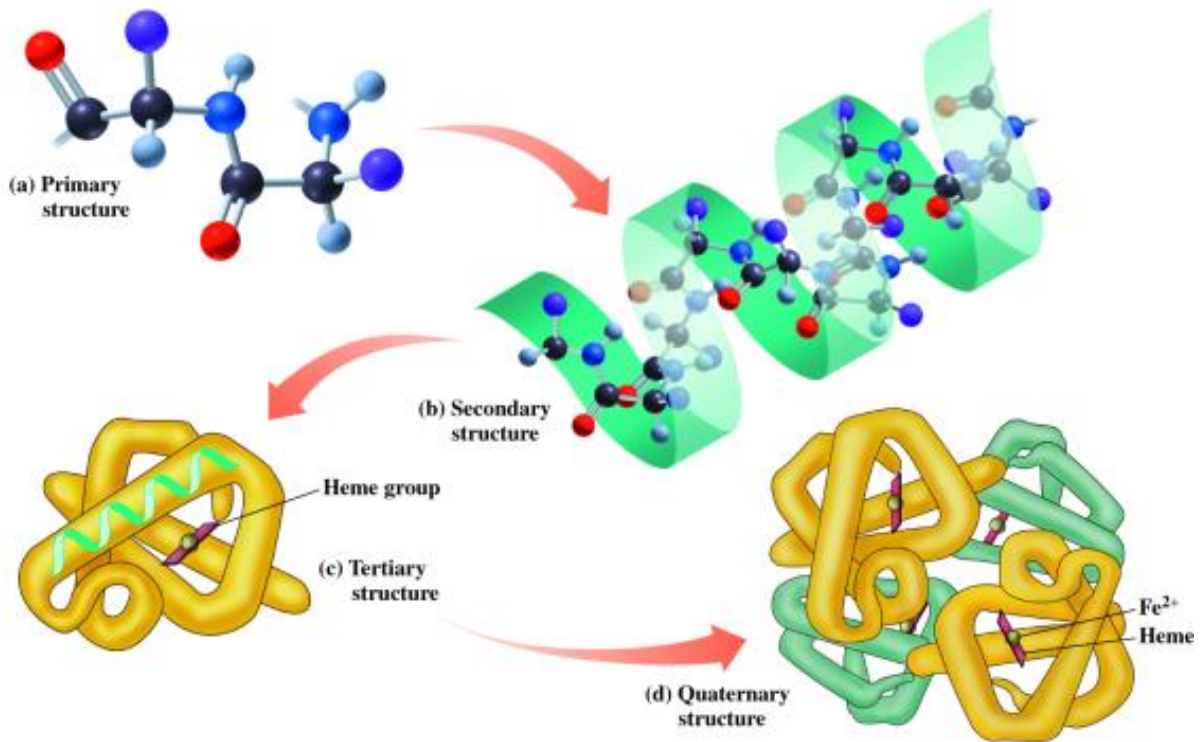
Hemoglobin

البناء الرابع للبروتين



collagen

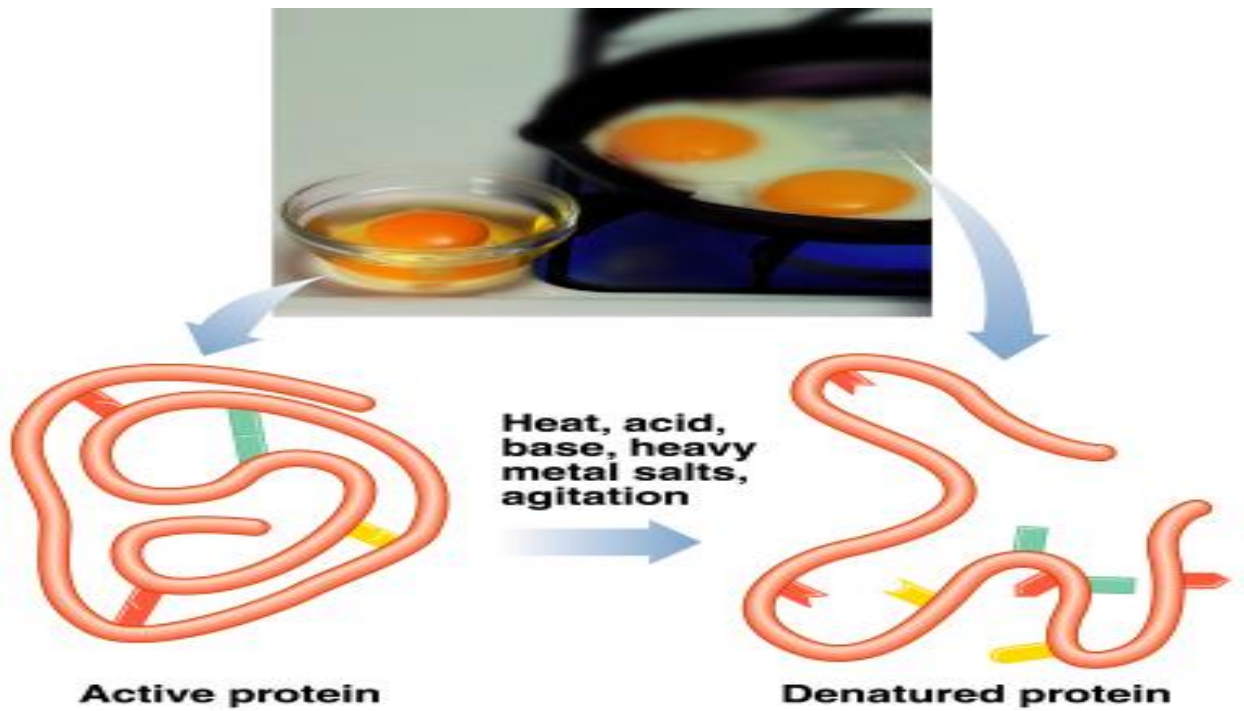
Summary of Protein Structure

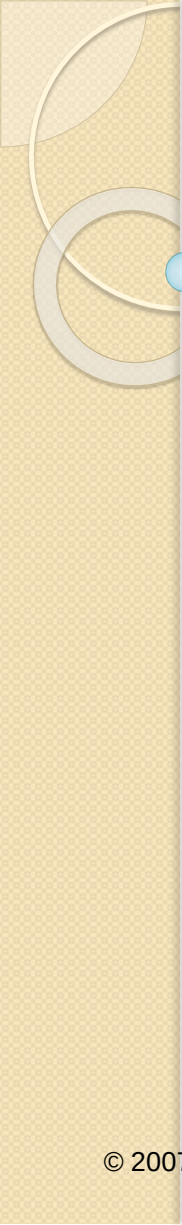


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Denaturation of Proteins

تخثر البروتين





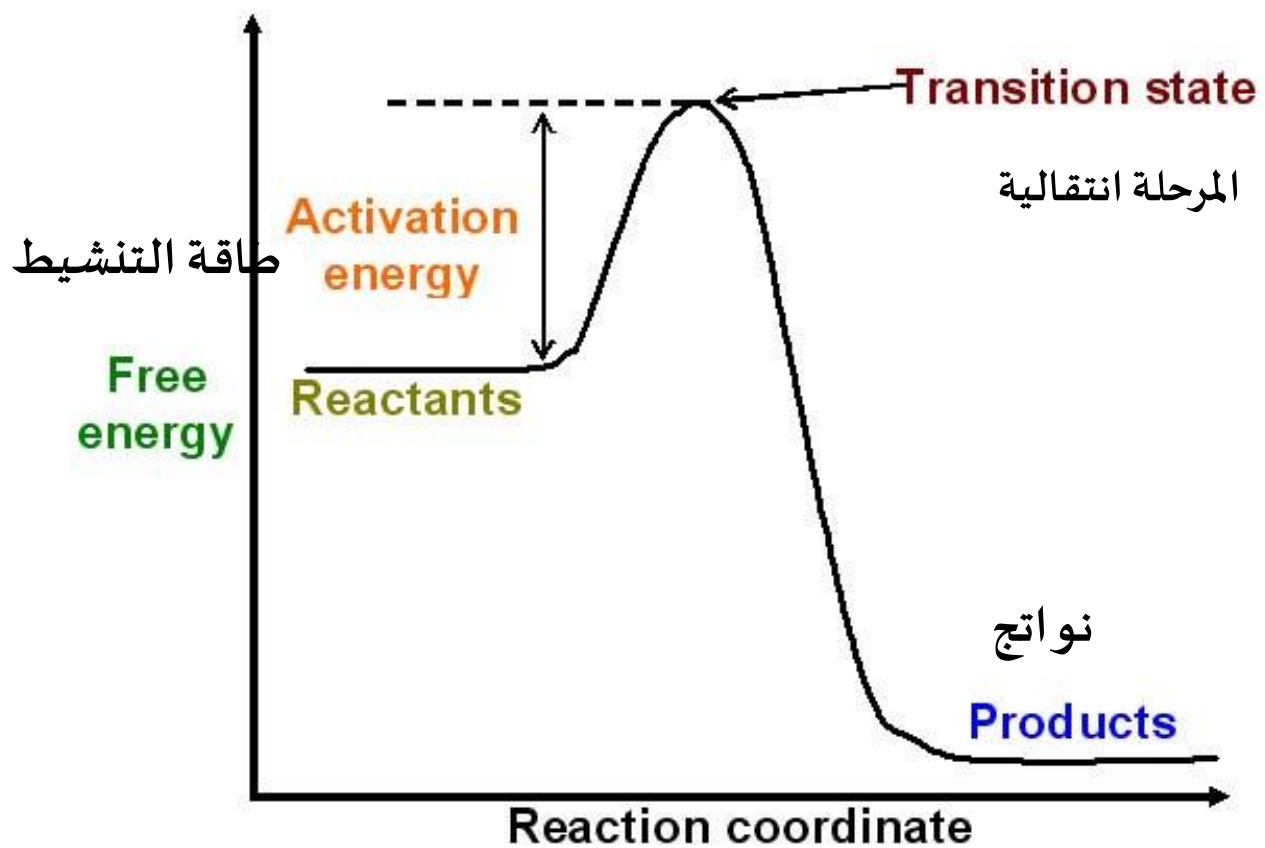
ENZYMES

الانزيمات

التفاعلات الكيميائية و طاقة التنشيط

THE ACTIVATION ENERGY transition state. (المرحلة انتقالية) •

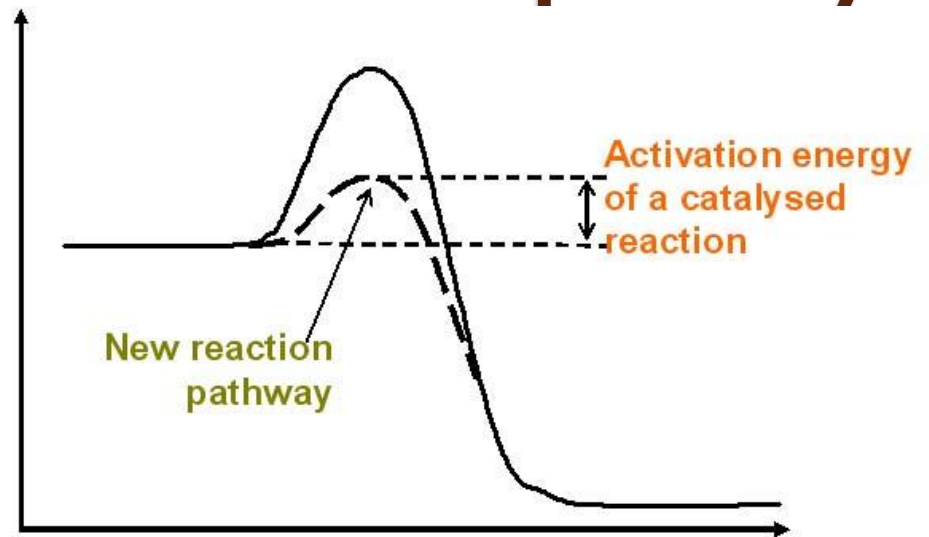
مسار التفاعل الكيميائي



كيف تسرع الانزيمات التفاعلات الكيميائية

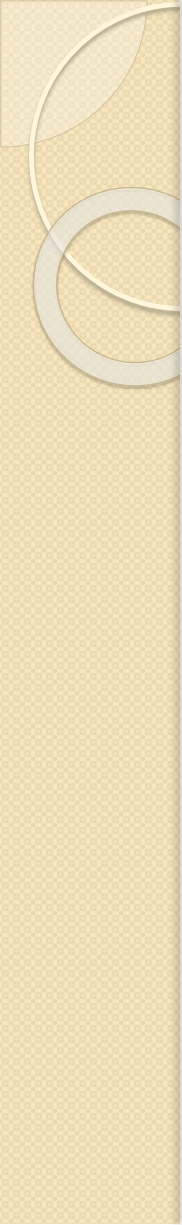
- They create **a new reaction pathway** “a short cut”

An enzyme controlled pathway



- Enzyme controlled reactions proceed 10⁸ to 10¹¹ times faster than corresponding non-enzymatic reactions.
- Catalase enzyme decrease activation energy¹⁴ from 18 to 6.4 kcal, urease decrease it from 24.5 to 8.7 kcal

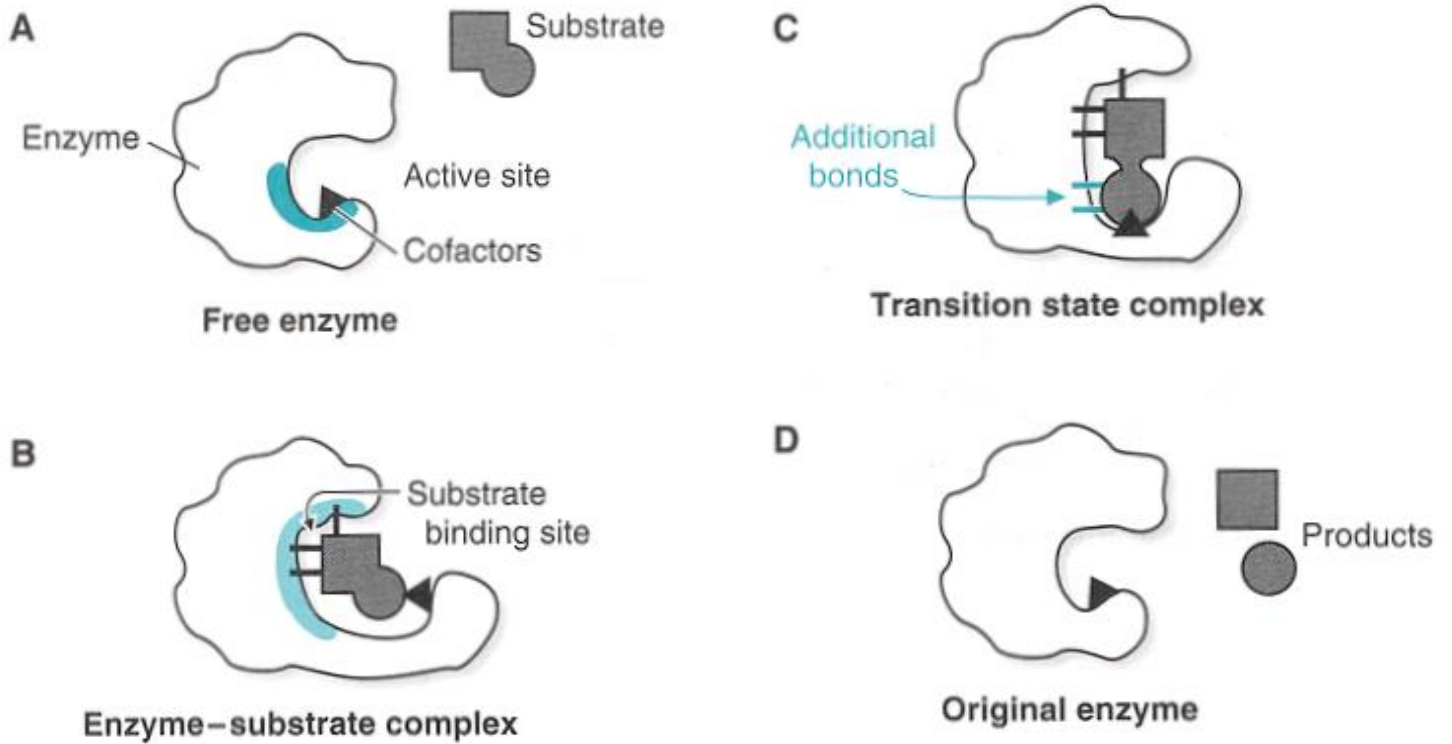
Prof.faten Abou-elella



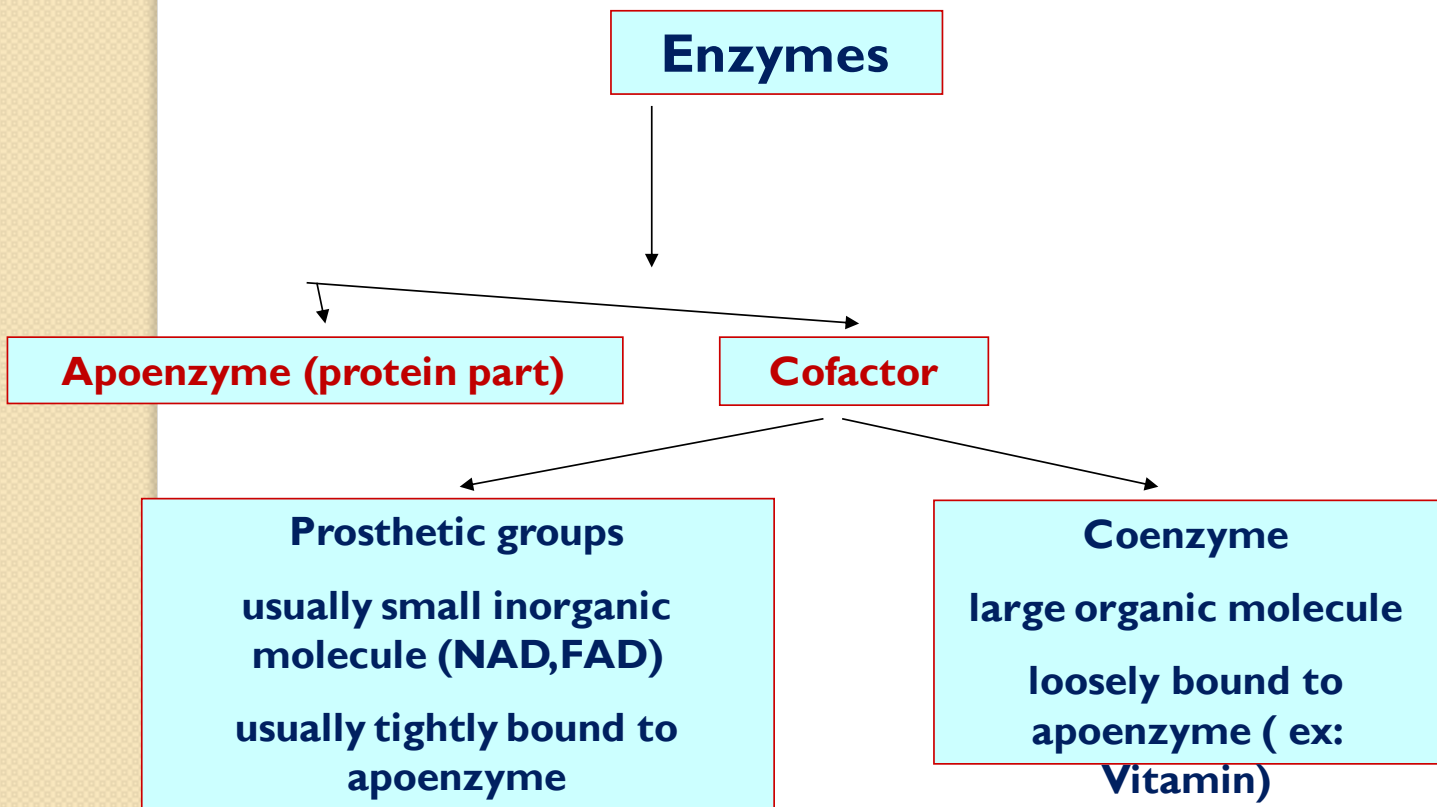
مرکز نشاط The active site

الانزيم

ملخص عمل الانزيم



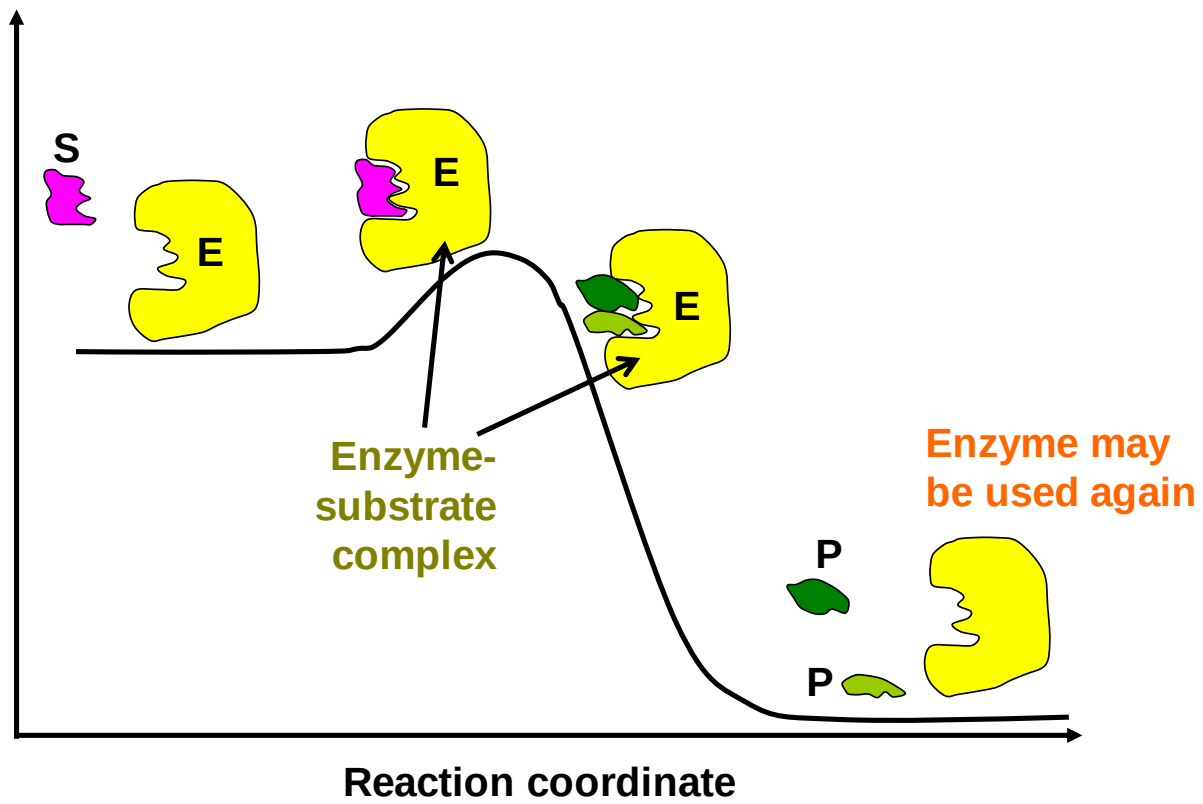
تركيب الانزيم



1-The Lock and Key Hypothesis

2-The Induced Fit Hypothesis

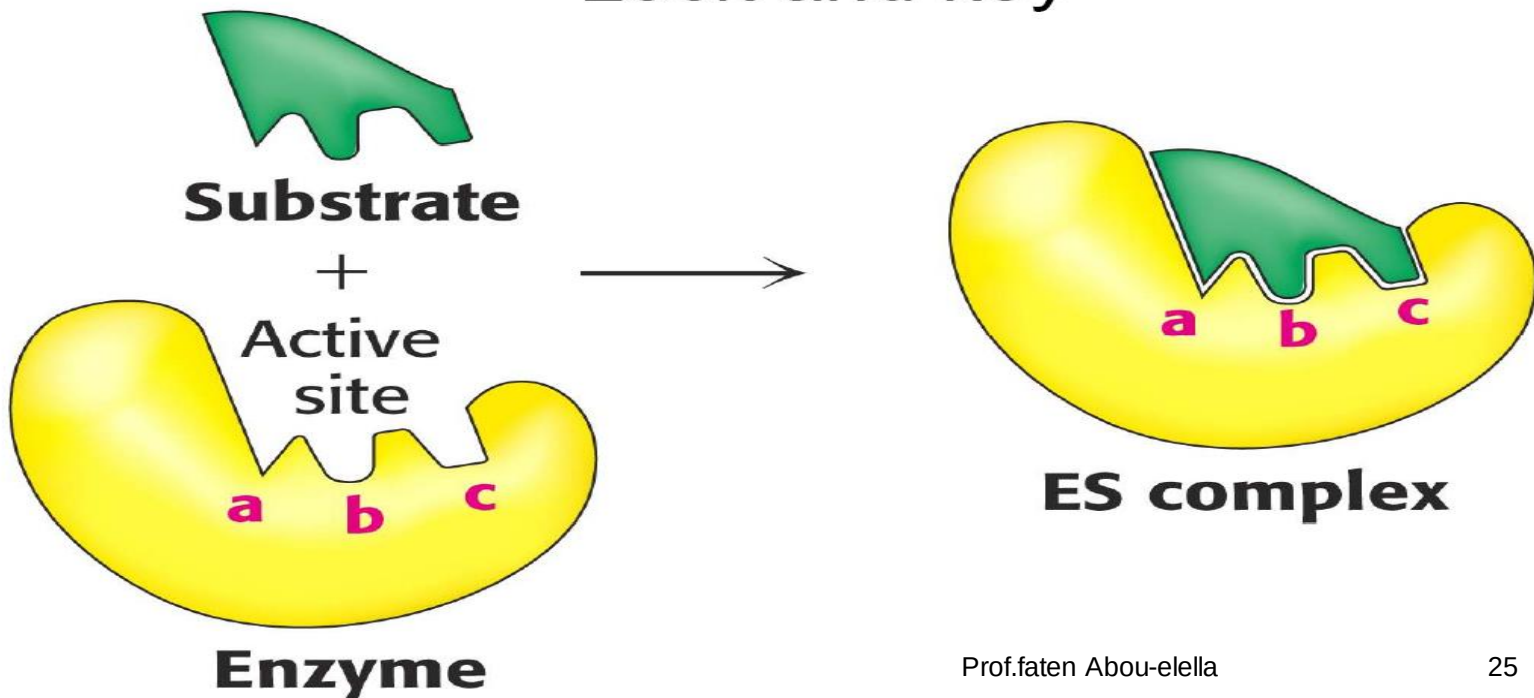
نظرية القفل والمفتاح



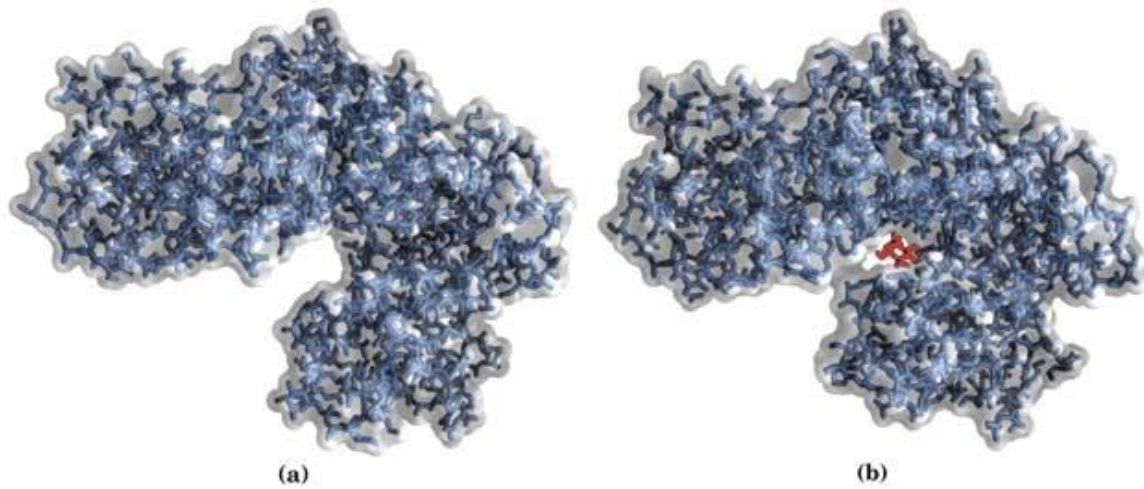
Fischer theory (lock and key model)

The enzyme active site (**lock**) is able to accept only a specific type of substrate (**key**)

Lock and key



The Induced Fit Hypothesis طريقة الارتباط بالحفز



Hexokinase (a) without (b) with glucose substrate

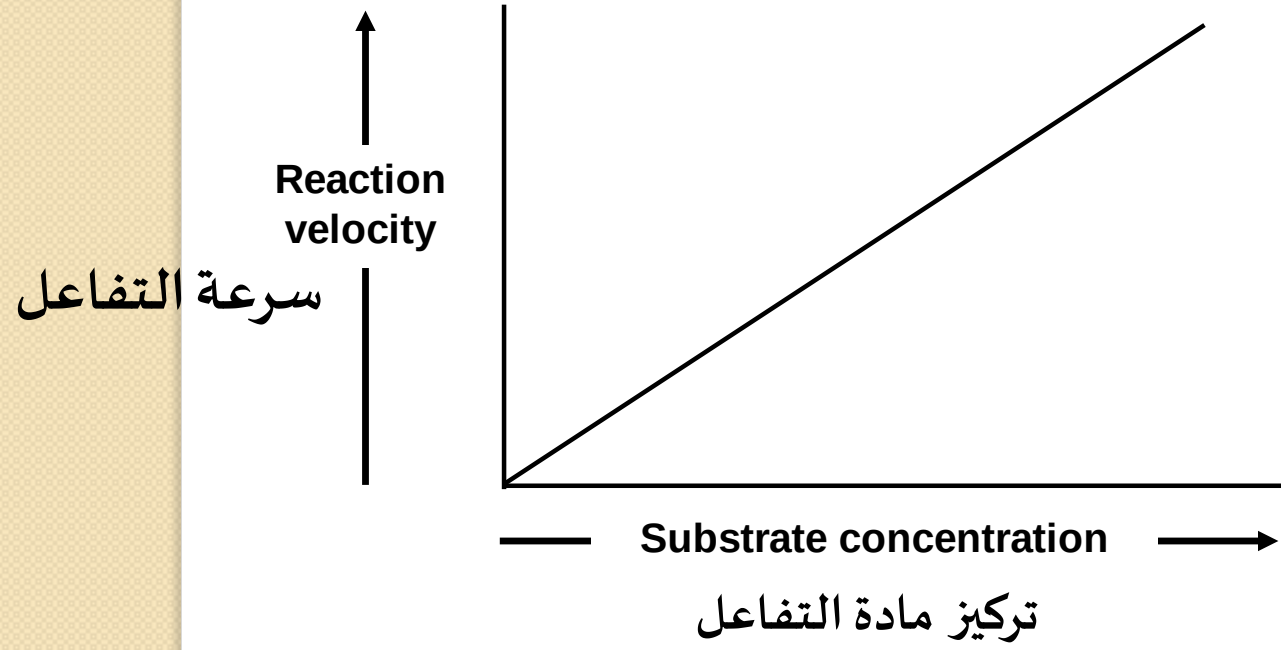
http://www.biochem.arizona.edu/classes/bioc462/462a/NOTES/ENZYMES/enzyme_mechanism.html

This explains the enzymes that can react with a range of substrates of similar types •

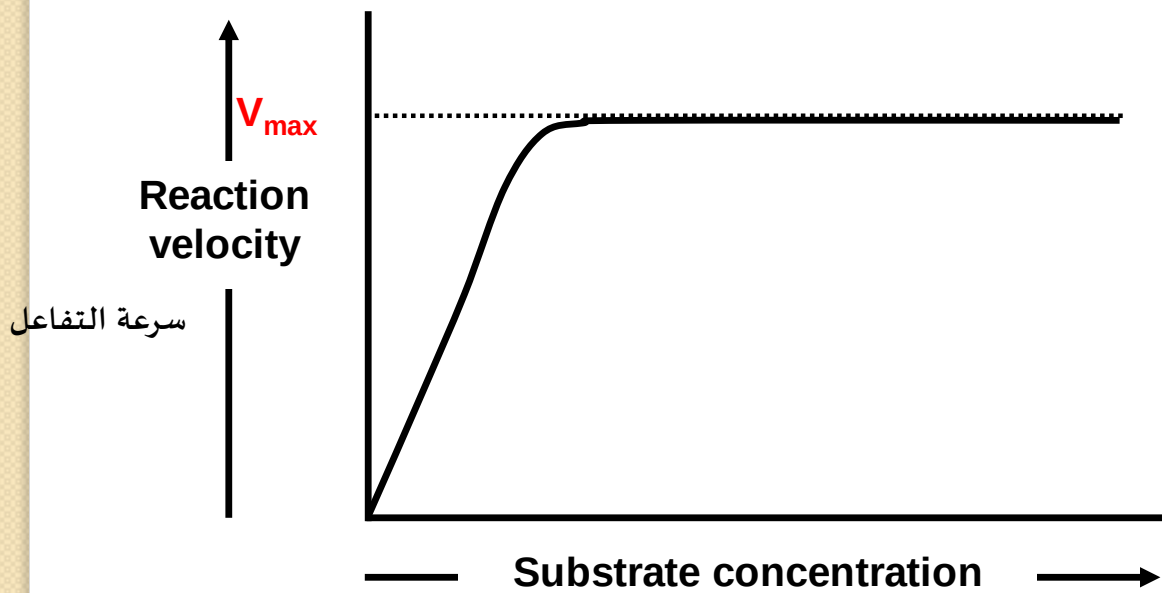
العوامل المؤثرة علي النشاط الانزيمي

- تركيز مادة التفاعل Substrate concentration
- تركيز الانزيم Enzyme concentration
- درجة pH
- درجة الحرارة Temperature
- المثبطات Inhibitors

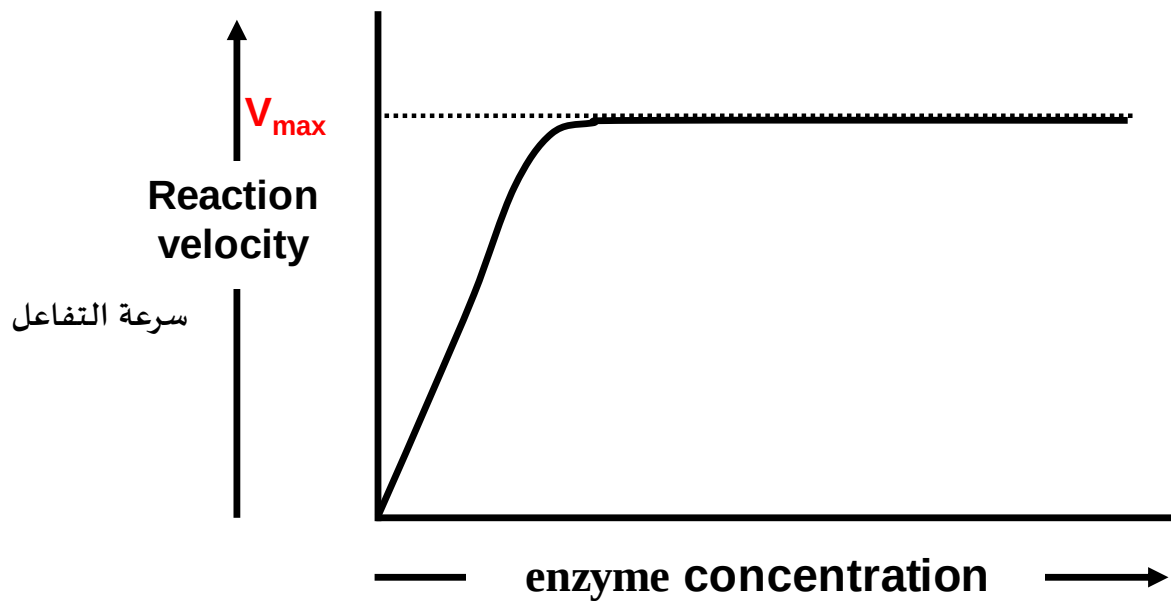
تأثير تركيز مادة التفاعل في تفاعل غير انزيمي



تأثير تركيز مادة التفاعل في تفاعل - انزيمي

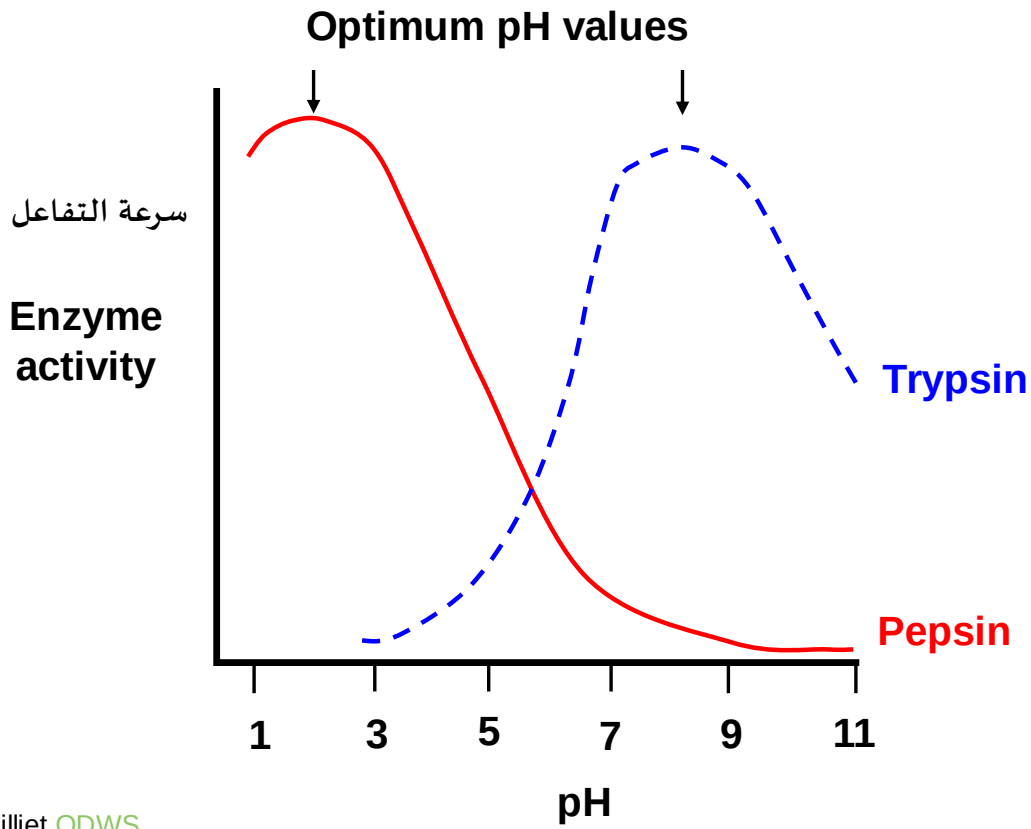


تأثير تركيز الانزيم

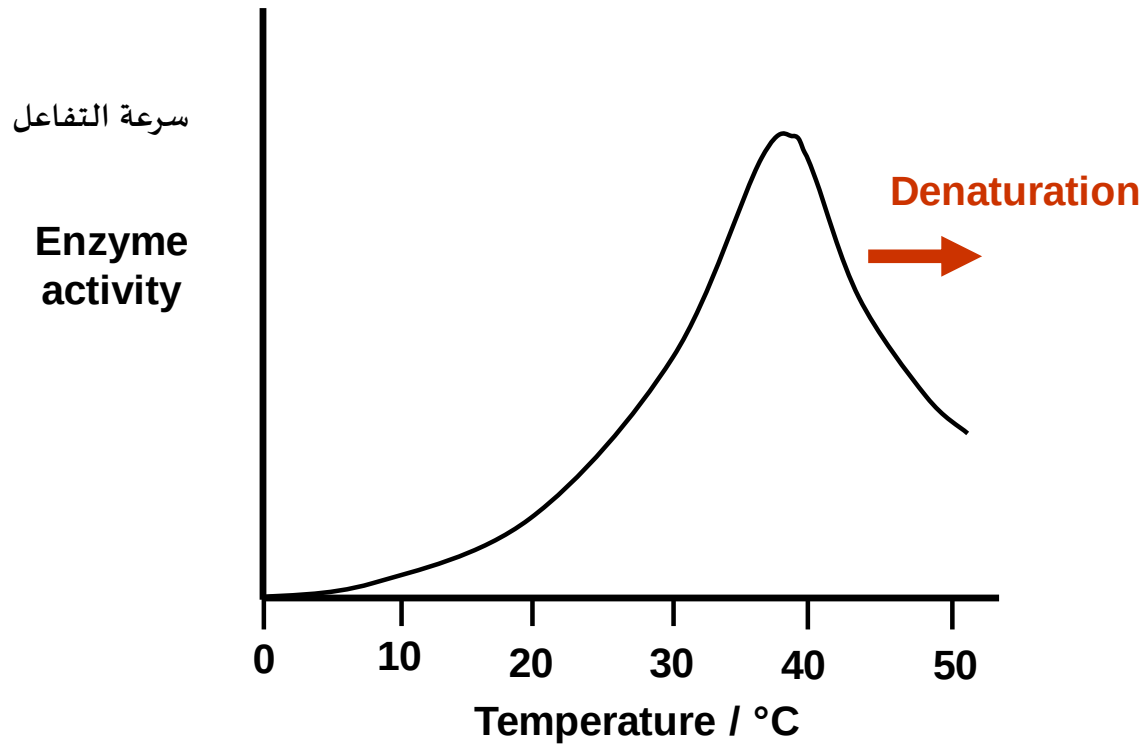


Faster reaction but it reaches a saturation point when all the enzyme molecules are occupied. •

تأثير درجة الحموضة على نشاط الانزيم

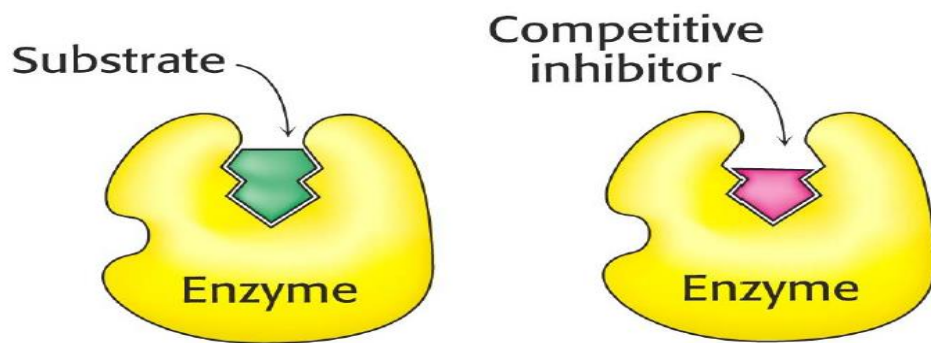


تأثير درجة الحرارة على الانزيم

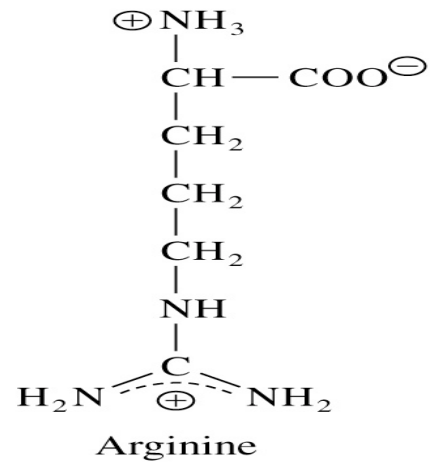


المثبطات Inhibitors

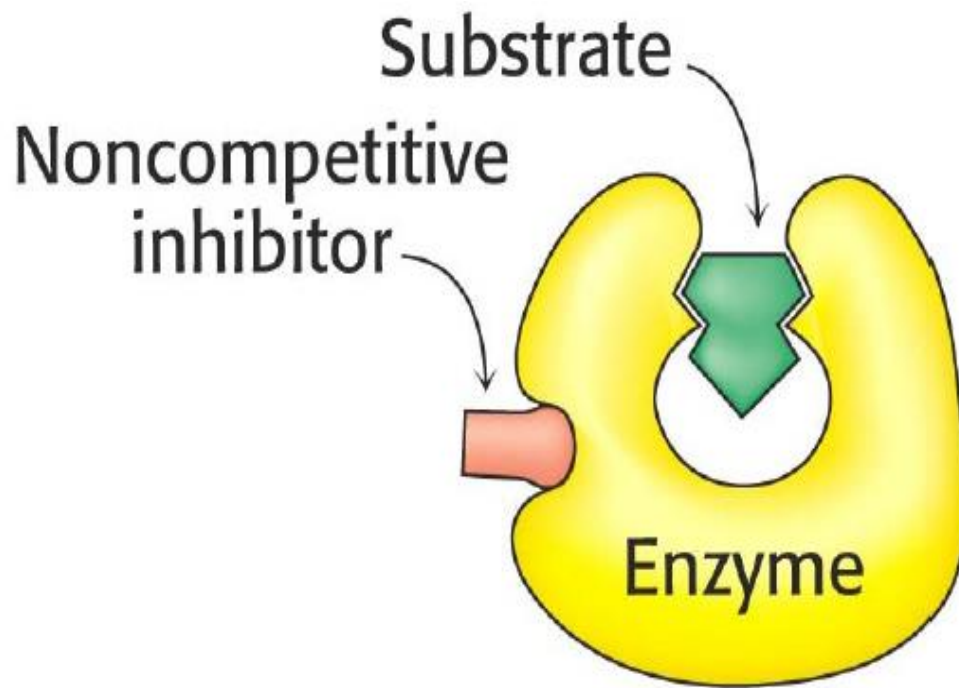
المثبطات التنافسية



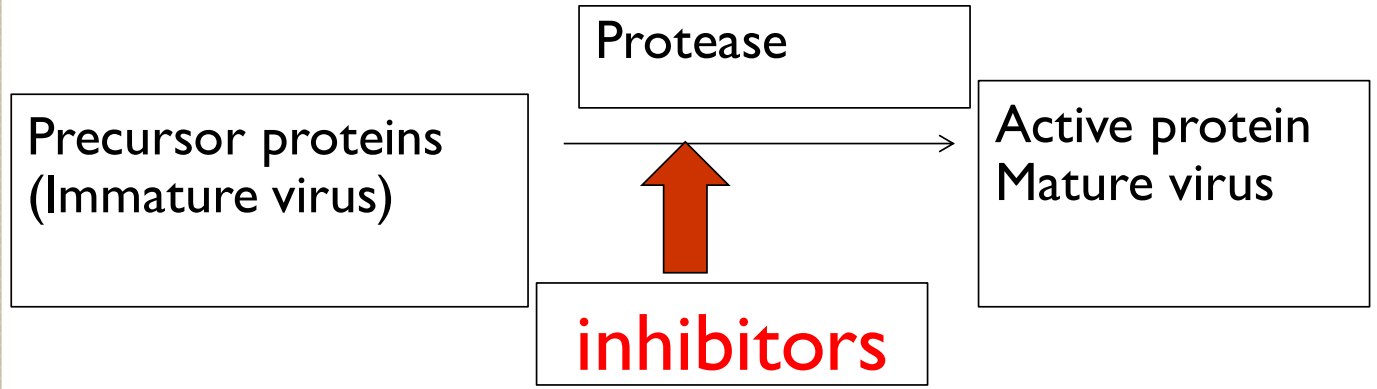
Benzamidine competes with arginine for binding to trypsin



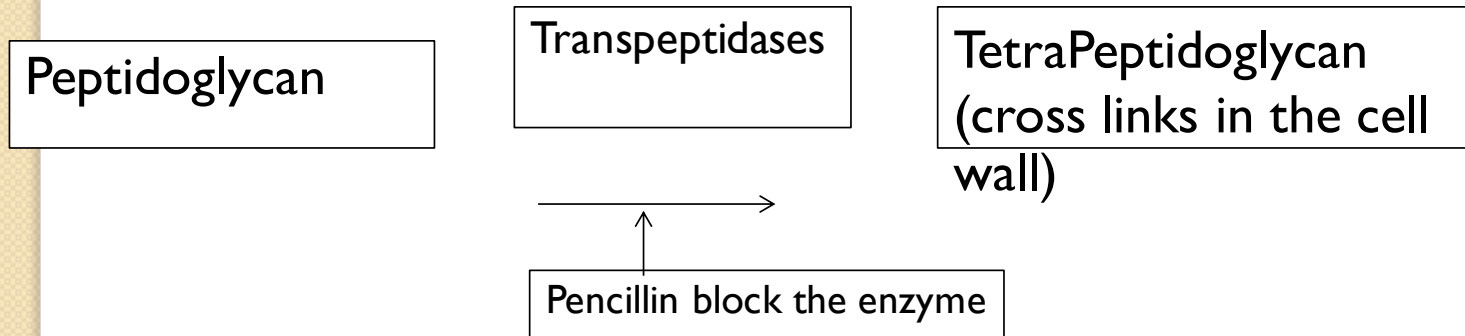
المثبطات الغير التنافسية



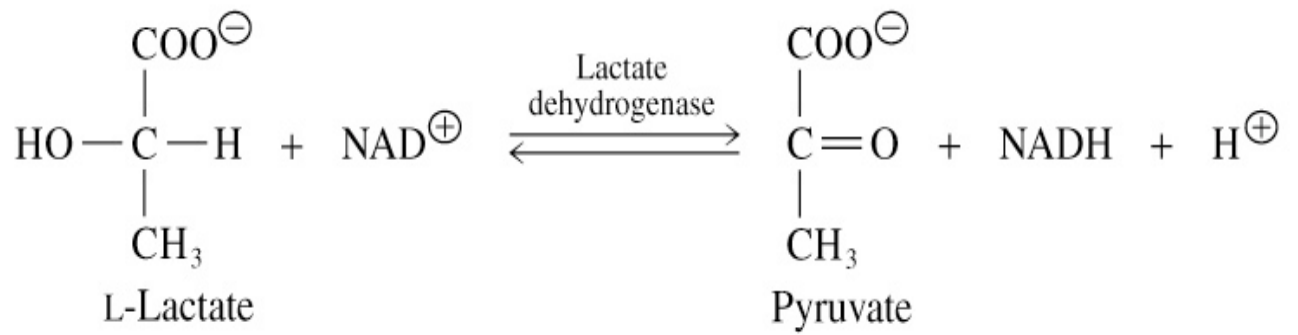
استخدام المثبطات في المجال الطبي لمنع تكاثر الفيروسات



استخدام المثبطات في المجال الطبي لمنع تكاثر البكتيريا مثال البنسلين يثبط انزيمات هامة
الاكتمال جدر الخلايا البكتيرية

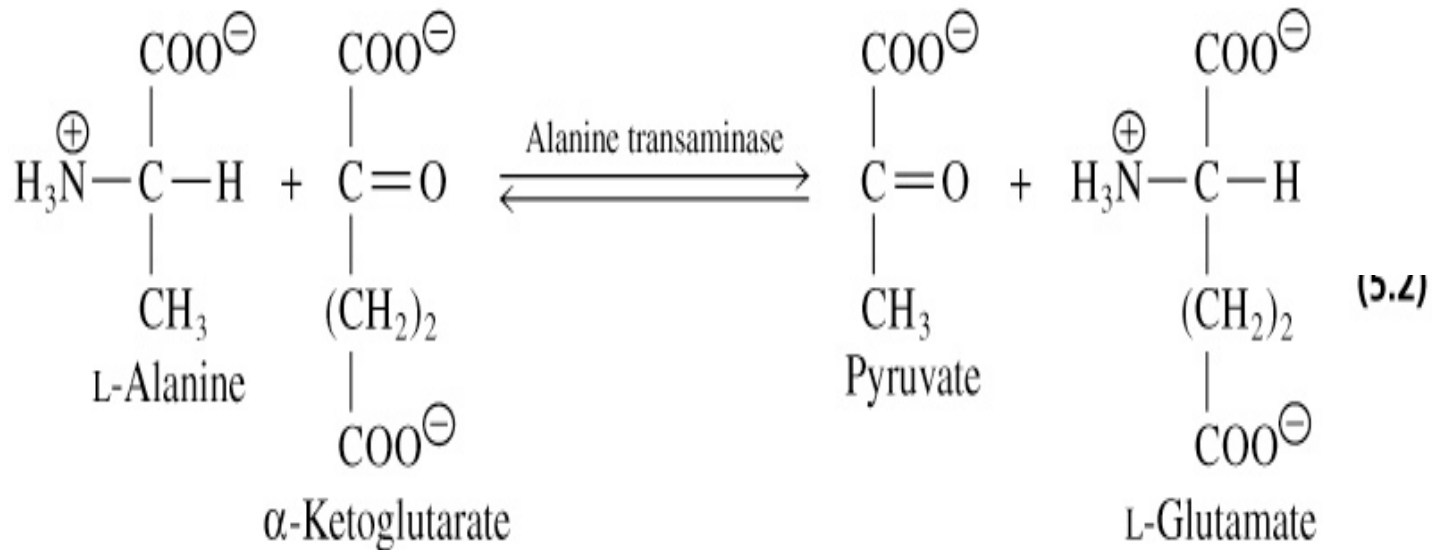


I. Oxidoreductases انزيمات الاكسدة والاختزال

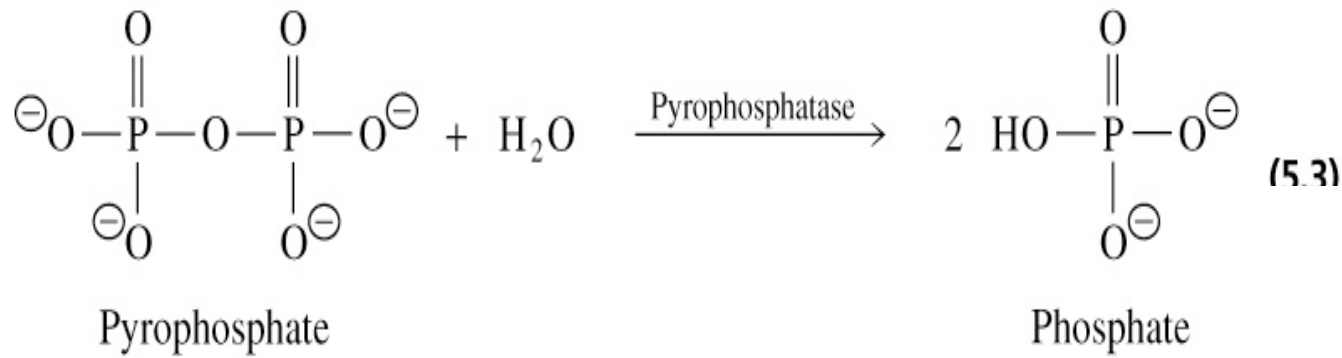


2. Transferases انزيمات النقل

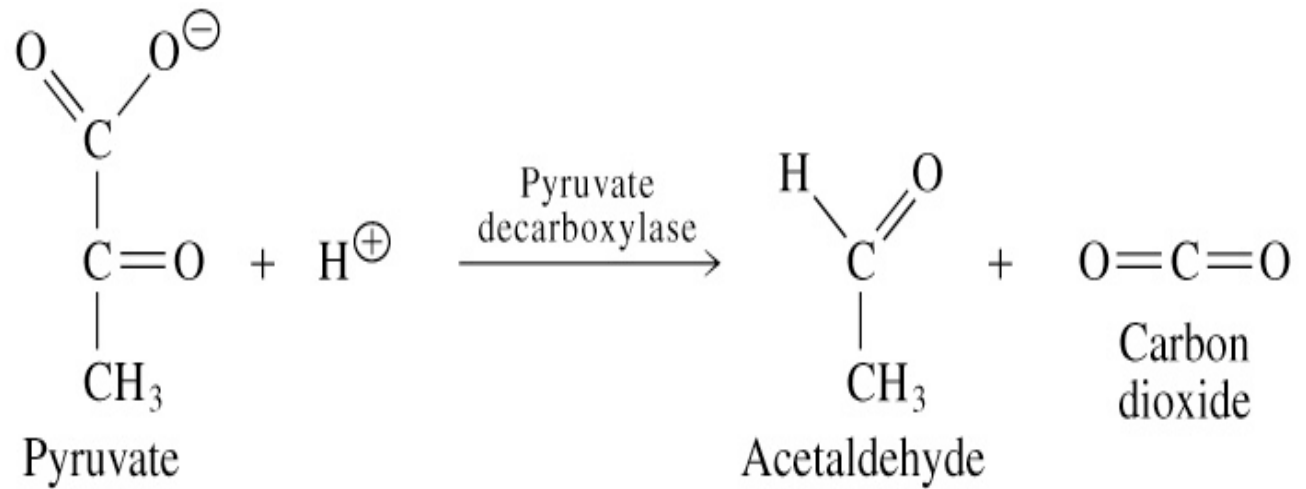
- Catalyze **group transfer** reactions



3. Hydrolases انزيمات التحليل المائي

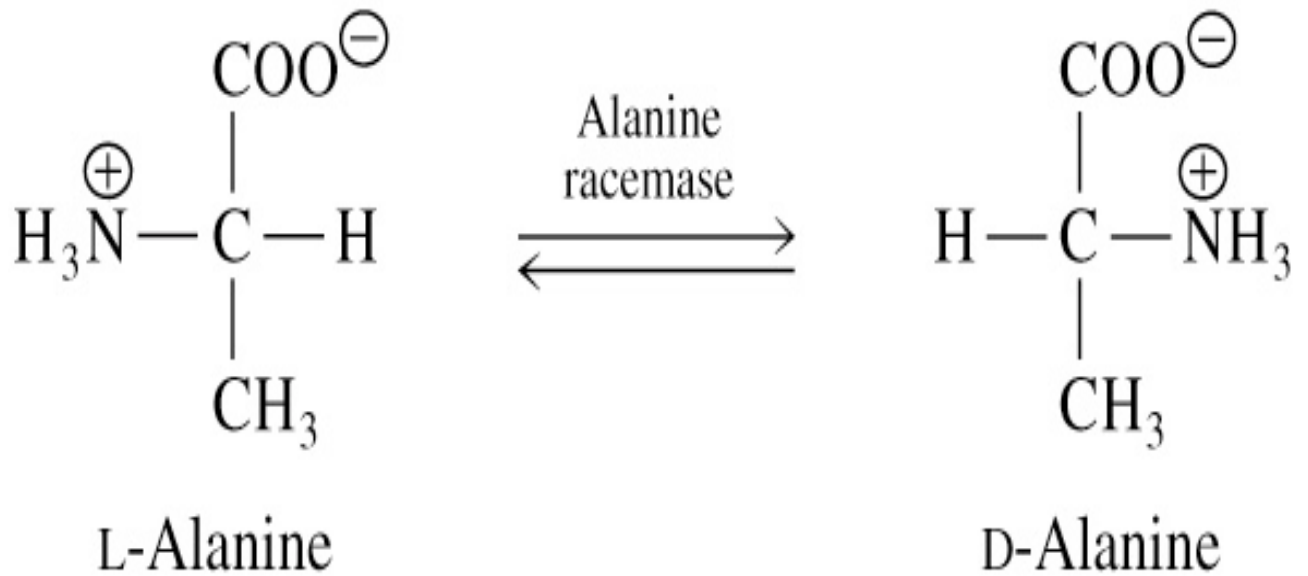


4. **Lyases** انزيمات التحليل



5. Isomerase انزيمات التشابه

- Catalyze isomerization reactions



6. Ligases انزيمات الربط

- Catalyze **ligation**, or joining of two substrates
- **Require chemical energy** (e.g. ATP)

