

# ENZYMES

## 1. Discuss these questions

- b) Who do you take after? Your mother or your father?
- c) Which features have you inherited, from your mother and which from your father ?
- d) If you have a brother or a sister, do you resemble each other ?
- e) Why do you think it is so ?
- f) What are enzymes? Can you describe how they work?
- g) Do you know any uses of enzymes?

## 2. Watch the video (0-4.45) and note down all possible uses of enzymes that are mentioned.

<http://www.youtube.com/watch?v=E90D4BmaVJM>

## Reading: Scientists Spy Enzyme That Makes Us Unique

### 2. Pronounce correctly

enzyme  
height  
bacteriophage  
agent

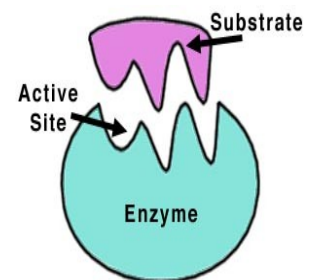
virus  
crucial  
sever  
junction

sequence  
major  
fundamental  
nuclease

### 3. Make sure you understand the following expressions

inherit  
unravel  
offspring  
be at the heart  
rush

split DNA strands  
derive from  
be about to do st  
join at random points  
yeast



#### 4. Answer the questions

- a) What have the researchers mapped ?
- b) Which enzyme is responsible for splitting DNA strands ?
- c) What method did the researchers use to discover the enzyme's structure ?
- d) What organism did they discover it in ?
- e) Why is the discovery a major breakthrough in research ?
- f) Describe the process in humans.
- g) How will the research continue?

<b>Scientists Spy Enzyme That Makes Us Unique</b>	
<i>ScienceDaily</i> (Oct. 17, 2007) — Have you ever wondered why you inherited your mother's smile but not your father's height? Researchers at the Universities of Leeds and Dundee are one step closer to unravelling how nature combines both maternal and paternal DNA to create genetically unique offspring.	1
In a world first, Leeds researchers Professor Simon Phillips, Dr Stephen Carr and Dr Jonathan Hadden, together with Professor David Lilley at Dundee, have mapped the 3 dimensional structure of an enzyme responsible for splitting DNA strands – a process at the heart of human individuality.	2
The discovery of the T7 endonuclease 1 enzyme's structure was made by using x-ray crystallography techniques. The enzyme is derived from a bacteriophage – a naturally occurring virus-like agent that attacks bacteria – but the molecular processes are expected to be similar in other organisms, including humans.	3
“Whilst the enzyme was known to play a central role, its [physical structure, which is crucial <sup>1</sup> to understanding the splitting process], has never been seen before. We've now got a 3D picture of it at work, and seen it at the point at which it is about to cut through the DNA strands. This is a major breakthrough in investigating the fundamental mechanisms at work behind the formation of a person's DNA and how viruses replicate their DNA in the body,” says Professor Phillips.	4
[In humans, this process starts <sup>2</sup> at conception ] when maternal and paternal DNA strands join together at random points in their sequence. Enzymes such as T7 endonuclease 1 are then responsible for severing the strands at this junction, thus creating a third, unique DNA sequence for the offspring.	5
However, Professor Phillips says it will be some time before this process can be observed in humans. “It's too important a discovery to rush. Our next step is to examine the process in a more complex system than bacteriophage, such as yeast,” he says.	6
[The work] is the result of a long collaboration between the research groups at Leeds and Dundee and [has been funded by the <sup>3</sup> <u>Wellcome Trust</u> ] and the Biotechnology and Biological Sciences Research Council (BBSRC) and Cancer Research UK.	7
<a href="http://www.sciencedaily.com/releases/2007/10/071017131857.htm">http://www.sciencedaily.com/releases/2007/10/071017131857.htm</a>	

## 5. Write questions about the underlined information.

- 1.
- 2.
- 3.

## 6. Fill in the gaps with the right prepositions.

Adapted from Wikipedia

Enzymes are proteins, which themselves are long chains ..... amino acids. Each enzyme is specific ..... the substrate ..... which it acts. The substrate is the substance that is present ..... the beginning ..... the chemical reaction. The substance which is made ..... the enzyme is called the product. .... example, the digestive enzyme amylase, which is found ..... saliva, acts ..... the substrate to make glucose.

Each enzyme has a particular temperature range and pH ..... which it works best. If an enzyme is subjected ..... extremes .... pH or excessive temperatures, irreversible changes can occur ..... the 3-dimensional structure ..... the enzyme which can also affect the active site. This leads .... the denaturation .... the enzyme.

## SLOVESNÉ ČASY (TENSES)

**PRESENT SIMPLE – čas přítomný prostý** (*I go, he goes*)

- mluvíme o tom, co se děje či platí opakovaně, či co je obecně platné, popř. co je trvalá situace.; nejčastěji používaný čas chem. literaturě

- typické výrazy: *usually, often, every week*

I usually go away at weekends. / The Earth goes around the sun. / Where do your parents live?

Obvykle jezdím v sobotu a v neděli pryč. / Země se otáčí kolem slunce. / Kde bydlí tví rodiče?

**PRESENT CONTINUOUS – čas přítomný průběhový** (*I am reading, you are reading, he is reading*)

- užití v případech, že děj probíhá právě teď, popř. k vyjádření širší přítomnosti a dočasné situace

- typické výrazy: *right now, at the moment, today, this week*

I am reading a book at the moment. / Is Susan working this week? – No, she isn't, she is on holiday.

Zrovna čtu knihu. / Dělá Zuzana tento týden? – Ne, nedělá, je na dovolené.

**PRESENT PERFECT SIMPLE – čas předpřítomný prostý** (*I have done, he has done*)

- vyjadřuje děj minulý, který však souvisí s přítomností, a to buď svými následky, nebo trváním; ovlivňuje či zahrnuje přítomnost

- typické výrazy: *just, already, yet, never, ever, recently, so far*

Somebody has broken the window. / He has just left. / Have you ever been to France?

Někdo rozbil okno. / Právě odešel. / Byl jsi někdy ve Francii?

**PRESENT PERFECT CONTINUOUS – čas předpřítomný průběhový** (*I have been running, he has been running*)

- užíváme pro činnost, která začala v minulosti a stále trvá, či která právě nebo před nedávnem skončila

- důraz na průběh činnosti (Jak dlouho? trvání od - do); typické výrazy: *since yesterday, for 5 years*

You're out of breath. Have you been running? / It has been raining for two hours.

Sotva popadáš dech. Běžel jsi? / Prší už dvě hodiny.

**PAST SIMPLE – čas minulý prostý** (*I jumped, I went*)

- vyjadřuje jednorázový prostý děj skončený v minulosti.

- typické výrazy: *yesterday, last week*

Yesterday I went to the cinema. / When I was young, I had a cat.

Včera jsem šel do kina. / Když jsem byl mladý, měl jsem kočku.

**PAST CONTINUOUS – čas minulý průběhový** (*I was reading, you were reading*)

- vyjadřuje děj, který probíhal v přesně určené minulé době, popř. v situaci, kdy se jeden minulý děj stal v rámci jiného minulého děje

- typické výrazy: *at 10 o'clock last night, this time yesterday*

At 10 o'clock last night I was watching TV. / When I came home, Jane was reading a book.  
Včera večer v 10 hodin jsem se díval na televizi. / Když jsem přišel domů, Jane zrovna četla knihu.

### **FUTURE SIMPLE – čas budoucí prostý (*I will go*)**

- vyjádření prostého děje děje budoucího, např. když se o činnosti rozhodneme v momentě mluvení;  
k vyjádření budoucnosti slouží i jiné prostředky (*I'm going to*, čas přítomný ap.)

- typické výrazy: *tomorrow, next week*

What would you like to drink? – I'll have an orange juice, please.

Co si dáte k pití? Dám si pomerančový džus.

### **Exercises**

#### **1. Use the right tense:**

- a) I ..... (know) Professor Brown since 1989. We ..... (meet) at a conference in New York.
- b) What you ..... (do) now? I ..... (look) for a textbook. I ..... (look) for it since yesterday. – You probably ..... (leave) it at school.
- c) Peter ..... (be) my best friend. I ..... (get to know) him well during my time at university. We ..... (be) friends ever since.
- d) She ..... (work) at the Institute of Biology. She ..... (start) to work there in 1985. She ..... (work) there for over ten years.
- f) You ever ..... (be) to English speaking countries? No, I ..... (not be). But next year I ..... (go) to Canada.
- g) When I ..... (enrol) at this university the courses were full and so I ..... (find) accommodation at my aunt's.
- h) He ..... (do) well in all his exams up to now.
- i) While I ..... (study) hard yesterday, Fred ..... (watch) TV.
- j) I'm sure he ..... (win) the scholarship next year.
- k) We ..... (see) Phil as he ..... (come) out of the examination room a while ago.
- l) She ..... (obtain) her Master's Degree at Masaryk University in 2009.
- m) Last night Richard ..... (tell) me about his plan. He ..... (fly) from London to Washington on business tomorrow.
- n) At 10 o'clock last night I ..... (study) for my biochemistry exam.

#### **2. Put the verbs in the correct form**

Interest in undiscovered human-like creatures continues to be widespread. Everyone (1) ..... (hear) of the Yeti, but since the last century there (2) ..... (be) reports of the existence in Australia of another, less famous creature – the Yahoo. In 1912, a Sydney newspaper (3) ..... (print) an account by Charles Harper of a strange, large animal he observed by the light of his campfire. „Its body, legs and arms (4) ..... (cover) with long, red-brownish hair, but what struck me most (5) ..... (be) its shape, which was human in some ways. Yet, the body was enormous, the arms (6) ..... (be) extremely long and muscular.

What could Harper (10) ..... (see) ? Such a creature (11) ..... (mention) in south-eastern Australia in the 1800, but no specimen (12) ..... (obtain) for scientific purposes so far.

**Based on:** Charlotte Doubravová et al. Angličtina pro posuchače VŠCHT. Praha 1999