

UNEXPECTED GENETIC HEROES

1. Uwagi ogólne

Zestaw materiałów opatrzony wspólnym tytułem *Unexpected Genetic Heroes* jest adresowany do studentów uzupełniających studiów magisterskich lub jednolitych studiów magisterskich. Przedstawione ćwiczenia mogą być wykorzystane przede wszystkim do pracy z grupami studentów biologii, biochemii, biofizyki i biotechnologii ze względu na tematykę.

2. Poziom zaawansowania: B2+ (z pomocą nauczyciela) oraz C1, C1+

3. Czas trwania opisanych ćwiczeń

Ćwiczenia zaprezentowane w tym artykule są przeznaczone na 2 jednostki lekcyjne (180 minut). Czas trwania został ustalony na podstawie doświadczenia wynikającego z pracy nad poniższymi ćwiczeniami w grupach na poziomie B2+ i (słabsze) C1.

4. Cele dydaktyczne

W swoim założeniu artykuł ma rozwijać podstawowe umiejętności językowe, takie jak mówienie, słuchanie, czytanie oraz pisanie.

5. Uwagi i sugestie

W zbiorze przewidziane są ćwiczenia na interakcję student–nauczyciel, student–student oraz na pracę indywidualną. Ćwiczenia w zależności od poziomu grupy, stopnia zaangażowania studentów w zajęcia i kierunku mogą być odpowiednio

zmodyfikowane. Zadania tu zamieszczone możemy omawiać na zajęciach lub część przedstawionych ćwiczeń zadać jako pracę domową, jeżeli nie chcemy poświęcać na nie zbyt dużo czasu na zajęciach. Wybór należy do nauczyciela. Materiały obejmują pytania, informacje, artykuły i zadania dotyczące badań nad chorobami genetycznymi i metod ich leczenia.

W wypadku słabszych grup B2+ całość może zająć nawet 180 minut (cykl 2 zajęć); wtedy można podzielić materiał na 2 części (do zadania 9 włącznie), a na kolejnych zajęciach wykonać zadania 10–14 (przygotowanie do miniprezentacji może być dość czasochłonne). Można również część zadań na słownictwo przeznaczyć na pracę domową.

Lekcja (jej II część) może być przydatna w przygotowaniu studentów do robienia prezentacji.

Rozpoczynamy od dyskusji na temat tego, czym są tytułowe „Genetic Heroes”, a następnie przechodzimy do ćwiczenia na słownictwo, które ma przygotować studentów do zadań na rozumienie ze słuchu (uzupełnianie luk, odpowiadanie na pytania otwarte etc. do TEDx talk Stephena Frienda). Jedno z zadań testuje umiejętności słowotwórcze studentów, dzięki niemu mogą również nauczyć się nowego słownictwa. Kolejne zadania dotyczą aplikacji pomagających osobom cierpiącym na zaburzenia typu choroba Parkinsona (zadanie na rozumienie ze słuchu), natomiast ostatnie prezentacji na temat aplikacji, jaką studenci sami chcieliby stworzyć, aby pomóc ludziom cierpiącym na różne schorzenia.

UNEXPECTED GENETIC HEROES

1. **Read the definitions below and then discuss briefly in pairs – What do you think a “genetic hero” might be?**

Genetics – the study of heredity and the variation of inherited characteristics.

A genetic disorder – a genetic problem caused by one or more abnormalities in the genome, especially a condition that is present from birth (congenital). Most genetic disorders are quite rare and affect one person in every several thousand or millions.

2. **You are about to watch a TEDx talk by Stephen Friend. To boost your comprehension of the video, match the definitions to the words/phrases below. Make sure you know how to pronounce the words. There is one definition already given.**

to change an opinion central/very important to drive/push forward vulnerability to start doing something having a great force/effect to show

retinoblastoma – a rare form of cancer that rapidly develops from the immature cells of the retina, the light-detecting tissue of the eye. It is the most common malignant cancer of the eye in children

to propel –

fundamental –

seismic –

susceptibility –

to go on to do something –

.....

to budge –

.....

to exhibit (e.g., symptoms) –

.....

3. Watch the TEDx talk by Stephen Friend “The hunt for unexpected genetic heroes” (0–3:16) and answer the questions.

You can find the video here: <https://www.youtube.com/watch?v=Yagdvqn2YMU>.

a) How did meeting the father and the son alter Friend’s life?

.....

b) What has happened since that fateful meeting 30 years ago?

.....

c) What is the paradox regarding the development of medication?

.....

d) What are the two reasons for this situation?

.....

e) What may have been the mistake in the angle of the research?

.....

f) What or who are the researchers looking for?

.....

4. In pairs, try to name as many diseases as you can which still cannot be successfully treated. You can use a dictionary if necessary.

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5. Watch another part of the talk (3:16–5:11) and complete the gaps with up to 3 words. Try to do this task in one attempt, if you can.

If you're going to do a study like that, you can imagine you'd like to look at lots and lots of people. We'd have to go and have a pretty wide study and we realized that, actually, one way to think of this is, let us look at adults who are over 40 years of age, and let's make sure that we look at those who were healthy as kids. They 1) individuals in their families who had had a childhood disease, but not necessarily. And let's go and then 2) those to find those who are carrying genes for childhood diseases. Now, some of you, I can see you putting your hands up going, "Uh, a little 3) hat's your evidence that this could be 4) ? I want to give you two examples. The first comes from San Francisco. It comes from the 1980s and the 1990s, and you may know the story where there were individuals who had very high levels of the virus HIV. They 5) to get AIDS. But there was a very small set of individuals who also had very high levels of HIV. They didn't get AIDS. And 6) clinicians tracked that down, and what they found was they were carrying mutations. Notice, they were carrying mutations from birth that were protective, that were protecting them from going on to get AIDS. You may also know that, actually, a line of therapy has been 7) based on that fact. The second example, more recent, is elegant work done by Helen Hobbs, who said, "I'm going to look at individuals who have very high 8) levels, and I'm going to try to find those people with high 8) levels who don't go on to get heart disease." And again, what she found was some of those individuals had mutations that were protective from birth that kept them, even though they had high lipid levels, and you can see this is an interesting way of thinking about how you could develop 9) therapies.

6. Before you watch the third part of the talk, try to form words from the ones in capital letters to complete the transcript. Then listen to the talk (5:12–6:04) to see how you did:

The project that we're working on is called "The 1) RESILIENT Project: A Search for Unexpected Heroes," because what we are interested in doing is saying, can we find those rare individuals who might have these hidden protective factors? And, in some ways, think of it as a 2) ring, a sort of resilience 2) CODE ring that we're going to try to build. We've realized that we should do this in a 3) way, so we've SYSTEM said, let's take every single childhood inherited disease. Let's take them all, and let's pull them back a little bit by those that are known to have severe symptoms, where the parents, the child, those around them would know that they'd gotten sick, and let's go 4) and then frame them

again by those parts HEAD of the genes where we know that there is a particular 5) ALTER that is known to be highly 6) to cause that disease. PENETRATE

7. Before you watch the final part of the talk, try to match the vocabulary below to the provided definitions.

- remote.....
- a plummeting
- outliers
- feasibility
- to launch
- constraints
- to start or set in motion –
- limitations –
- the state of being easily and – conveniently done; practicality –
-
- a sudden great decrease; a dramatic drop in something –
- (statistics) data points in a set of results that are very much bigger or smaller than the next nearest data point –
- to take action when there is a need or opportunity for it –
- distant –

8. Watch the final part of the talk (6:04–7:53) and answer the questions:

- a) What is the reason for not doing research locally?
.....
- b) What are the two reasons for the possibility to create such an extensive data collection? (Friend’s research is to be done on 1mln people).
.....
- c) What’s interesting about the reaction of the scientific community?
.....
- d) What happened 6 months ago?
.....

9. If and when this and similar research makes sufficient advancement and medication can be produced, which disease would you like to see eradicated first and why? Express your opinion in 100–120 words.

c) What symptoms does the app measure?

.....

d) What option do those taking *dopaminergic medications have?

.....

12. Work in groups of three/pairs and try to design your own biotechnological app – what would it measure? What functions would it have? Who would be the target group, etc.? Make notes and prepare to make a 3–5-minute presentation about your app in front of your classmates, who will play the role of potential investors in its development.

When you do your presentation, remember to greet your audience and introduce yourselves. Use language functions to organise your speech:

(First of all, second of all, moreover, In our opinion, To my mind, Last, but not least, etc.)

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* dopaminergic – releasing or involving dopamine as a neurotransmitter

KEY

1.

A genetic hero is a gene which stops an individual from developing a disease, even though he/she also carries the potential risk factor in their genes.

2.

to propel – **to drive/push forward**

susceptibility – **vulnerability**

seismic – **having a great force/effect**

to go on to do something – **start doing something**

to budge – **to change an opinion**

fundamental – **central/very important**

to exhibit (e.g., symptoms) – **to show**

3.

a) It made him create a team which discovered the first cancer susceptibility gene.

b) We have learnt a lot about the reasons underlying existing diseases and now you can find out if you're at risk of developing a given disease.

c) Despite having the knowledge about the underlying causes of many diseases, we haven't been able to develop medication against them.

d) It's still the early stages. Also, it's very hard to develop drugs which restore function.

e) We've been doing research through studying those who get sick and not those who don't.

f) People who, in theory, could develop a disease but they somehow don't, which means that they have genes which prevent it from happening.

4.

Suggested answers: E.g., many allergic diseases, asthma, arthritis, coeliac disease, depression, diabetes, epilepsy, many genetic diseases, obesity, Parkinson's disease, osteoporosis, schizophrenia and many more.

5.

1) MIGHT HAVE HAD

2) SCREEN

3) ODD

4) FEASIBLE

- 5) WENT ON
- 6) ASTUTE
- 7) COMING ALONG
- 8) LIPID
- 8) LIPID (the word is repeated, hence number 8 is used twice)
- 9) PREVENTIVE

6.

- 1) RESILIENCE
- 2) DECODER (the word is repeated, hence number 2 is used twice)
- 2) DECODER
- 3) SYSTEMATIC
- 4) AHEAD
- 5) ALTERATION
- 6) PENETRANT

7.

to start or set in motion – **to launch**

limitations – **constraints**

the state of being easily and conveniently done; practicality – **feasibility**

a sudden great decrease; a dramatic drop in something – **a plummeting**

(statistics) data points in a set of results that are very much bigger or smaller than the next nearest data point – **outliers**

distant – **remote**

8.

- a) There might be a genetic context or environmental factor that protect people and they could be detected when looking at a greater number of samples.
- b) This type of data analysis has become cheaper and some amazing tools have been created.
- c) They were willing to participate in the project without even asking about being given credit.
- d) A screening decoder key ring was identified.

9.

The exercise can also be treated as an opportunity for discussion instead of writing.

10.

Suggested answer: There are already some devices you can use to e.g., measure your blood pressure, your heart rate, etc.

11.

- a) The sufferers of PD and their loved ones can contribute to the research into the disease.
- b) You don't have to participate every day, but you're still making a difference.
- c) Dexterity, vocal tremor and gait.
- d) There's a visual report option.

12.

The short presentations – the students need to be given enough time to prepare. They divide the presentations into parts and each member of the group has his/her own.