# Etapa 2 - PPGECB 2024.2

Prova escrita de conhecimentos em língua inglesa.
LEIA ATENTAMENTE AS INSTRUÇÕES
1. A prova terá 2 horas de duração.
2. Leia atentamente o texto em inglês e responda a todas as perguntas em PORTUGUÊS ou ESPANHOL.
3. Digite o número de seu documento de identificação para prosseguir com a prova.
BOA PROVA!

* Indica uma pergunta obrigatória

1. Email *

2. Preencha atentamente seu CPF ou Passaporte. Essa é sua única identificação da prova. *

3. Nível pretendido *

*Marcar apenas uma oval.*

- ◯ Mestrado
- ◯ Doutorado
- ◯ Proficiência em lingua inglesa

Baseado no texto "**Plastic pollution: three numbers that support a crackdown"** Adaptado de: Nicola Jones (https://www.nature.com/articles/d41586-024-01117-1)" responda as seis questões seguintes.

Negotiators from around the world are gathering in Ottawa this week to try to hash out the text for a new international treaty on plastic pollution. The delegates are short on time: the treaty process, which started in 2022, is due to be finalized this December. But they are not short on science, thanks to a surge of new data and models from researchers aiming to inform the talks. Observers hope the treaty will cover all aspects of plastic production and disposal; it could, for example, limit how much plastic is produced or set up financial mechanisms to aid waste management. But the treaty process has been hindered by disagreement, with some member states arguing against tough measures such as caps on the production of virgin plastic. It is unclear whether and when a treaty will be agreed.In the run-up to the final negotiations, researchers have been publishing more reports, data sets and models about plastics than ever before. Researchers have also organized groups, such as the Scientists' Coalition for an Effective Plastics Treaty, to advance the profile of scientific evidence at the meetings. The treaty was originally conceived as a mechanism to end plastic pollution, which is sometimes taken to mean driving the amount of 'mismanaged waste' to zero by 2040. Mismanaged waste is plastic that isn't recycled or disposed of in a well-managed landfill or incinerator, but rather ends up loose in the environment or burned in an open pit.Annual production of plastics has grown exponentially, from about 2 million tonnes in 1950 to 460 million tonnes in 2019 (current levels are on track to triple by 2060). Mismanaged waste is hard to measure, given the vast number of sources, but it is estimated that about 74 million tonnes are currently produced each year. Modelling suggests that by 2050 this figure will reach 122 million tonnes per year, under business-as-usual projections. Unless policies change, the peak of mismanaged plastic waste "is nowhere yet in sight".Researchers have modelled how policies that could be included in the treaty would affect waste. Their work shows that getting close to the 'zero waste' goal requires a mix of strong measures, including both downstream efforts (such as increasing recycling) and upstream ones (such as capping virgin-plastic production). The models also show that a cap on plastic production — a particularly contentious topic during the negotiations — is one of the most powerful levers for cutting pollution.A new report concludes that plastic production generated the equivalent of 2.24 gigatonnes of carbon dioxide in 2019, mainly from the energy-intensive process of extracting and refining the fossil fuels used to generate the petrochemicals that make up most virgin plastic2. The report projects that those emissions will triple to 6.78 gigatonnes by 2050 if plastic production grows by 4% each year — a figure similar to annual production growth since 2010. That means that, over the next 25 years, cumulative plastics production alone would gobble up more than a quarter of the total carbon that can be emitted if the Earth's temperature is to rise less than 1.5° C above pre-industrial levels, the preferred goal of the landmark Paris agreement on climate change.Besides, an individual plastic typically contains hundreds of chemicals — many of which are toxic and can leach out — that make the material more flexible, water repellent, flame retardant or resistant to ultraviolet light. Last month, researchers released a report listing 16,000 chemicals associated with plastics, of which they found at least to be 4,200 hazardous. The most comprehensive report on health effects from plastics thus far is 'The Minderoo-Monaco Report on Plastics and Human Health'3, which a global team of scientists published last year in *Annals of Global Health*. That report, which Spring worked on, estimates that in 2015 the health costs of disease and disability caused by plastic-associated chemicals were more than US$920 billion in the United States alone. New work is helping to find specific health links: a study published in February of some 250 people

undergoing surgery showed that nano- and microplastics in carotid-artery blockages were linked to increased risk of heart attacks, strokes and death4."A number of groups are saying you must, must, must focus on public health," says Spring.

4. 1. O que era esperado que fosse incluído no novo acordo sobre poluição por plásticos? *

5. 2. O que significa dizer que se pretende terminar a poluição plástica até 2040? *

6. 3. O que tem acontecido com a produção de plásticos ao longo do tempo? Quais as projeções para o futuro? *

7. 4. Segundo os pesquisadores, o que precisaria ser feito para atingir a meta de “zero lixo”? *

8. 5. Por que a produção de plástico, contribui com as emissões de gases estufa? *

9. 6. Que outros produtos vindos da indústria de plásticos são preocupantes? *

Baseado no texto **"Why is exercise good for you? Scientists are finding answers in our cells"** Adaptado de: Gemma Conroy (https://www.nature.com/articles/d41586-024-01200-7), responda as próximas quatro questões.

Whether it's running or lifting weights, it's no secret that exercise is good for your health. Research has found that briskly walking for 450 minutes each week is associated with living around 4.5 years longer than doing no leisure-time exercise1, and that engaging in regular physical activity can fortify the immune system and stave off chronic diseases, such as cancer, cardiovascular disease and type 2 diabetes. In the past decade, researchers have started to build a picture of the vast maze of cellular and molecular processes that are triggered throughout the body during — and even after — a workout. Some of these processes dial down inflammation, whereas others ramp up cellular repair and maintenance. Exercise also prompts cells to release signalling molecules that carry a frenzy of messages between organs and tissues: from muscle cells to the immune and cardiovascular systems, or from the liver to the brain.

Exercise is also attracting attention from funders. The US National Institutes of Health (NIH), for instance, has invested US$170 million into a six-year study of people and rats that aims to create a comprehensive map of the molecules behind the effects of exercise, and how they change during and after a workout. Building a sharper view of the molecular world of exercise could reveal therapeutic targets for drugs that mimic its effects — potentially offering the benefits of exercise in a pill. However, whether such drugs can simulate all the advantages of the real thing is controversial. The work could also offer clues about which types of physical activity can benefit people with chronic illnesses, In the future we imagine someone can prescribe exercise as now they can prescribe a medicine.

Exercise is a fundamental thread in the human evolutionary story. Although other primates evolved as fairly sedentary species, humans switched to a hunter-gatherer lifestyle that demanded walking long distances, carrying heavy loads of food and occasionally running from threats. Those with better athletic prowess were better equipped to live longer lives, which made exercise a core part of human physiology. The switch to a more active lifestyle led to changes in the human body: exercise burns up energy that would otherwise be stored as fat, which, in excess amounts, increases the risk of cardiovascular disease, type 2 diabetes and some cancers. The stress induced by running or pumping iron has the potential to damage cells, but it also kick-starts a cascade of cellular processes that work to reverse those effects. This can leave the body in better shape than it would be without exercise.

In 2020, a research took blood of 36 people aged between 40 and 75 years old before, during and at various time intervals after the volunteers ran on a treadmill. The team used multiomic profiling to measure more than 17,000 molecules, more than half of which showed significant changes after exercise. They also found that exercise triggered an elaborate 'choreography' of biological processes such as energy metabolism, oxidative stress and inflammation. Creating a catalogue of exercise molecules is an important first step in understanding their effects on the body. Other studies have probed how exercise affects cell types. A 2022 study in mice identified more than 200 types of protein that were expressed differently by 21 cell types in response to exercise. The researchers were expecting to find that cells in the liver, muscle and bone would be most sensitive to exercise, but to their surprise, they found that a much more widespread type of cell, one

that appears in many tissues and organs, showed the biggest changes in the proteins that it cranked out or turned down. The findings suggest that more cell types shift gears during a workout than was previously thought, although what these changes mean for the body is still an open question. The findings also showed that after exercise, the mice's liver cells squeezed out several types of carboxylesterase enzyme, which are known to ramp up metabolism. Even when they fed them a diet of fatty foods, the mice didn't gain weight.

Larger efforts are under way to build a detailed molecular snapshot of how exercise exerts its health-boosting effects across tissues and organs. Some researchers pinpointed thousands of molecular changes during exercicise, many of which could have a protective effect on health, such as dialling down inflammatory bowel disease and tissue injury. Other study found that exercise alters the expression of genes linked to diseases such as asthma, and could help to trigger similar adaptive responses. Researchers hope that the reams of molecular data will eventually help clinicians to develop tailored exercise prescriptions for people with chronic diseases. Farther down the track, such insights could be used to develop therapeutics that mimic some of the beneficial effects of exercise in people who are too ill to work out. That's not to say that we will have exercise in a pill, but there are certain aspects of exercise that could be druggable.

10. 7. Por que a indústria farmacêutica tem investido tanto em estudos de mapeamento molecular das atividades físicas? *

11. 8. De que forma a atividade física foi importante na história evolutiva da espécie humana? *

12. 9. Estudos recentes identificaram uma grande alteração bioquímica em células de ratos durante exercícios. O que mais surpreendeu os pesquisadores nesse estudo? *

13. 10. Que efeitos dos exercícios na saúde humana tem sido relatados recentemente? *