

令和7年度
東北医科薬科大学 大学院 医学研究科
医学専攻博士課程
一般・社会人入学試験（二次募集）
【語学（英語）】

注意事項

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問題 1

次の英文の内容に関して、(1) から (5) までの質問に対し 1 つ選択肢を選び、解答用紙の所定欄に解答しなさい。

The Environment Ministry has confirmed there has been no impact on people or the environment following treated water discharge from the Fukushima No. 1 nuclear power plant over the past 12 months, according to findings from the ministry's yearlong monitoring for radioactive materials in seawater near the plant and fish caught in the area. No abnormalities have been found so far, and on Friday the ministry reported it to a meeting of an expert panel chaired by Takehiko Fukushima, professor emeritus at the University of Tsukuba. Together with the ministry, seawater around the nuclear plant has been monitored by the Fisheries Agency, the Nuclear Regulation Authority, the Fukushima prefectural government and Tokyo Electric Power Company Holdings, Inc. They regularly collect seawater and fish samples, such as flatfish, and disclose the levels of radioactivity in those samples. The process of discharging treated water began in August 2023. The water contamination occurred after being used to cool melted fuel in the 2011 nuclear accident at the plant, with most radioactive materials removed from the water except for tritium. According to studies conducted by the ministry over the past year, the maximum tritium level was 5 becquerels per liter — much lower than 10,000 becquerels per liter, the maximum amount determined by the World Health Organization for safe drinking water. Other radioactive materials were below detectable levels, according to the ministry. TEPCO has released a total of about 62,600 tons of treated water into the ocean and aims to complete the process over the next 30 years. The ministry and others will continue monitoring the area going forward.

Regarding the treated water discharge, Russia and South Korea separately released findings from their own scientific surveys in late August, both concluding that there should be no concern. The Pacific Oceanological Institute, part of the Russian Academy of Sciences' Far Eastern Branch, released findings from their seawater examination conducted in the Far Eastern region, including the east of the Japanese archipelago, since 2022. According to the institute, the average tritium level was about 0.12 becquerels per liter, which is much lower than Russia's safety criteria of 7,700 becquerels per liter. The institute declared there would be no risk of eating seafood caught around Japan. However, it also pointed out that long-term, continuous monitoring would be necessary for as long as the discharge of treated water continues. In step with China, Russia has been restricting imports of Japanese fishery products since October. Russia says it will keep the restrictions in place until safety evaluations are performed. Tokyo will continue to request that Moscow lift the restrictions. Meanwhile, the administration of South Korean President Yoon Suk Yeol maintains there is no safety issue

provided there is scientific evidence. Seoul announced it conducted nearly 50,000 sample surveys in the waters around South Korea over the past year, concluding that there was no detection of tritium levels exceeding that of safety standards.

- (1) **What is the primary conclusion of the Environment Ministry's yearlong monitoring of seawater and fish near Fukushima?**
- A) The tritium levels in the water are dangerously high.
 - B) There has been no negative impact on humans or the ecosystem.
 - C) The radioactive levels in fish are increasing rapidly.
 - D) The contamination levels in seawater are unpredictable.
- (2) **How does the tritium level in treated water discharged by TEPCO compare to the World Health Organization's safe drinking water standard?**
- A) It is slightly higher than the WHO standard.
 - B) It meets the WHO standard exactly.
 - C) It is far below the WHO's maximum permissible level.
 - D) It exceeds the safe limit set by the WHO.
- (3) **Which of the following statements about tritium is correct?**
- A) Tritium is a stable isotope of hydrogen.
 - B) Tritium emits gamma radiation and is highly dangerous.
 - C) Tritium is a radioactive isotope of hydrogen that emits low-energy beta particles.
 - D) Tritium is used primarily for generating electricity in nuclear reactors.
- (4) **What is the stance of South Korea regarding the discharge of treated water from Fukushima?**
- A) South Korea has detected dangerous levels of tritium in its waters.
 - B) The South Korean government believes there is no risk if scientific data supports it.
 - C) South Korea has banned all seafood imports from Japan.
 - D) South Korea is demanding compensation from Japan for environmental damage.

(5) What does the unit "becquerel" (Bq) measure?

- A) The temperature of radioactive materials
- B) The energy produced by a nuclear reaction
- C) The rate of radioactive decay in a substance
- D) The weight of radioactive particles

問題 2

次の文章はノーベル生理学・医学生を受賞した Paul Nurse の WHAT IS LIFE?の一部である。これを読んで（１）から（６）の問いに対し、解答用紙の所定欄に解答しなさい。

Before the seventeenth century, nobody had any idea that these invisible cells even existed, let alone that they worked according to the same basic principles as all other more visible life forms. During the eighteenth century and into the beginning of the nineteenth century, microscopes and microscopic techniques improved, and very soon scientists were identifying cells from all manner of different creatures. Some began to speculate that all plants and animals were built from collections of those animalcules* that Leeuwenhoek had identified several generations before them. Then, after a long gestation, the cell theory was finally fully born. In 1839 the botanist Matthias Schleiden and zoologist Theodore Schwann, summarized work from themselves and many other researchers, and wrote ‘we have seen that all organisms are composed of essentially like parts, namely of cells’. Science had reached the illuminating conclusion that the cell is the fundamental structural unit of life. The implications of this insight deepened further when biologists realized that every cell is a life form in its own right**. This idea was captured by the pioneering pathologist Rudolf Virchow, when he wrote in 1858 ‘that every animal appears as a sum of vital units, each of which bears in itself the complete characteristics of life’.

What this means is that all cells are themselves alive. Biologists demonstrate this most vividly when they take cells from the multicellular bodies of animals or plants and keep them alive in glass or plastic vessels, often flat-bottomed vessels called Petri dishes. Some of these cell lines have been growing in laboratories around the world for decades on end. They let researchers study biological processes without needing to deal with the complexity of whole organisms. Cells are active; they can move and respond to the environment, and their contents are always in motion. Compared to a whole organism, like an animal or a plant, a cell may seem simple, but it is definitely alive.

There was, however, an important gap in cell theory, as originally formulated by Schleiden and Schwann. It did not describe how new cells came into being. That gap closed when biologists recognized that cells reproduce by dividing themselves from one cell into two, and concluded that cells are only ever made by the division of a pre-existing cell in two. Virchow popularized this idea with a Latin epigram: ‘Omnis cellula e cellula’, that is, all cells come from cells. This phrase also helped to counter the incorrect idea, still popular amongst some at the time, that life arises spontaneously from inert matter all the time – it does not.

*animalcule: アニマルクル≒微小生命体

**in its own right: それ自体で

- (1) 18 世紀後半から 19 世紀初めにかけて多くの異なった生物で細胞が同定された。
これはなぜか。
- (2) 1839 年に Matthias Schleiden と Theodore Schwann によって、彼らを含む多くの研究者の集大成として記載した仮説はなにか。
- (3) 下線部を日本語に訳しなさい。
- (4) 細胞が生きていることを端的に示した実験はなにか。
- (5) Schleiden と Schwann によって打ち立てられた元々の細胞説における重大な欠点はなにか？
- (6) 病理学者の Virchow は‘Omnis cellula e cellula’というラテン語の標語で元々の細胞説の欠点を補う知見を広めた。このことを説明しなさい。

