

令和5年度
医学部
一般選抜試験問題



金沢医科大学

令和5年度

医学部

一般（前期）第1次選抜

2日目

- 1 Read the passage below and then answer the questions about it. Choose the most appropriate answers based on what is stated or implied in the passage. Boxes () in the passage indicate missing information.

A couple of years ago, Kevin Holesh, an application (app) developer, decided that he wasn't spending enough time with his family. The cause of the problem was technology, and his smartphone was the biggest offender. Holesh wanted to know how much time he was spending on his phone each day, so he designed an app called Moment. Moment tracked Holesh's daily screen time, calculating how long he used his phone each day. I spent months trying to reach Holesh because he <1>lives by his word. On the Moment website, he writes that he may be slow to reply to email because he's trying to spend less time online. Eventually, after my third attempt, Holesh replied with a polite apology and agreed to talk. "The app stops tracking screen time when you're just listening to music or making phone calls," Holesh told me. "It starts up again when you're looking at your screen—sending emails or surfing the web, for example." Holesh was spending an hour and fifteen minutes a day <2>glued to his screen, which seemed like a lot. Some of his friends had similar concerns but also had no idea how much time they lost to their phones, so Holesh decided to share the app. "I asked people to guess what their daily usage was and they were almost always 50 percent too low."

I downloaded Moment several months ago. I guessed I was using my phone for an hour a day at the most, and picking it up perhaps ten times a day. I wasn't proud of those numbers, but they sounded about <3>right. After a month, Moment reported that I was using my phone for an average of three hours a day, and picking it up an average of forty times. I was shocked. I wasn't playing games or surfing the web for hours, but somehow I had managed to spend twenty hours a week staring at my phone.

I asked Holesh whether my numbers were typical. "Absolutely," he said. "We have thousands of users, and the average usage time is just under three hours. They pick up their phones an average of thirty-nine times a day." Holesh reminded me that these were the people who were concerned enough about their screen time to download a tracking app <4>in the first place. There are millions of smartphone users who are unaware or just don't care enough to track their usage—and there's a reasonable chance they're spending even more than three hours on their phones each day.

Perhaps there was just a small group of heavy users who spent all day, every day on their phones, pushing the average usage times higher. [①] However, Holesh shared the usage data of eight thousand Moment users to illustrate that wasn't the case at all. Around two-thirds of users spend between one and four hours on their phones each day—and many far longer. [②] This isn't a minority issue. If, as guidelines suggest, we should spend less than an hour on our phones each day, 88 percent of Holesh's users were overusing. [③] They were spending an average of a quarter of their waking lives on their phones—more time than any other daily activity, except sleeping. Each month almost one hundred hours was lost to checking email, texting, playing games, surfing the web, reading articles, checking bank balances, and so on. [④] On average they were also picking up their phones about three times an hour. [⑤] This sort of overuse is so widespread that researchers have created the term "nomophobia" to describe the fear (phobia) of being without mobile phone contact (an abbreviation of "no-mobile-phobia"). [⑥]

Using smartphones robs us of time, but even their mere presence is damaging. In a 2013 study, two psychologists invited pairs of strangers into a small room and asked them to engage in conversation. To help the process go smoothly, the psychologists suggested a topic: why not discuss an interesting event that happened to you over the past month? Some of the pairs talked while a smartphone sat idle nearby, while for others the phone was replaced by a paper notebook. Every pair bonded to some extent, but those who got to know each other in the presence of the smartphone struggled to connect. They described the relationships that formed as lower in quality, and their partners as showing less sympathy and trust. By their mere presence, phones cause users to lose focus, even when they aren't in active use. They pull our attention away from the tasks at hand because they remind us of the world beyond the immediate conversation. The only solution, the researchers wrote, is to remove <5>them completely.

However, smartphones aren't the only offenders. Bennett Foddy has played thousands of video games, but refuses to play World of Warcraft (WoW). Foddy is a brilliant thinker with of interests. He works as a video game developer and professor at New York University's Game Center. Foddy was born and lived in Australia, where he was the base guitarist in an Australian band called Cut Copy—which released several best-selling singles and won a string of Australian music awards—until he moved, first to Princeton University and then to Oxford University, to study philosophy. Foddy has enormous respect for WoW, but won't play it himself. "I take it as part of my job to play all the culturally significant games, but I don't play that one because I afford the loss of time. If I were to start playing it, I'm sure it would be hard to give up."

WoW may be one of the most addictive* behavioral experiences on the planet. It's a massively popular multiplayer online role-playing game, with millions of players from around the world who create avatars that move across landscapes, fight monsters, complete quests, and interact with other players. Almost half of all players consider themselves addicted.

*Vocabulary

addictive = habit-forming and difficult to stop (an adjective form of the verb "addict")

1. Choose ONE answer that is closest in meaning.

1	<1>lives by	① speaks	② believes	③ guides	④ keeps	⑤ depends
2	<2>glued to	① engaged with	② touched on	③ driven by	④ watched at	⑤ brought up
3	<3>right	① collect	② good	③ accurate	④ appropriate	⑤ meaningful
4	<4>in the first place		① at the original shop	② without doubt	③ at once	
			④ at no cost	⑤ to begin with		

2. The following sentence was taken from the passage. Which location indicated by [①]-[⑥] was it taken from?

[Over the average lifetime, that amounts to a shocking *eleven years*.]

3. What does <5>them refer to? Choose ONE answer.

① phones ② users ③ active use ④ attention ⑤ tasks ⑥ conversation ⑦ researchers

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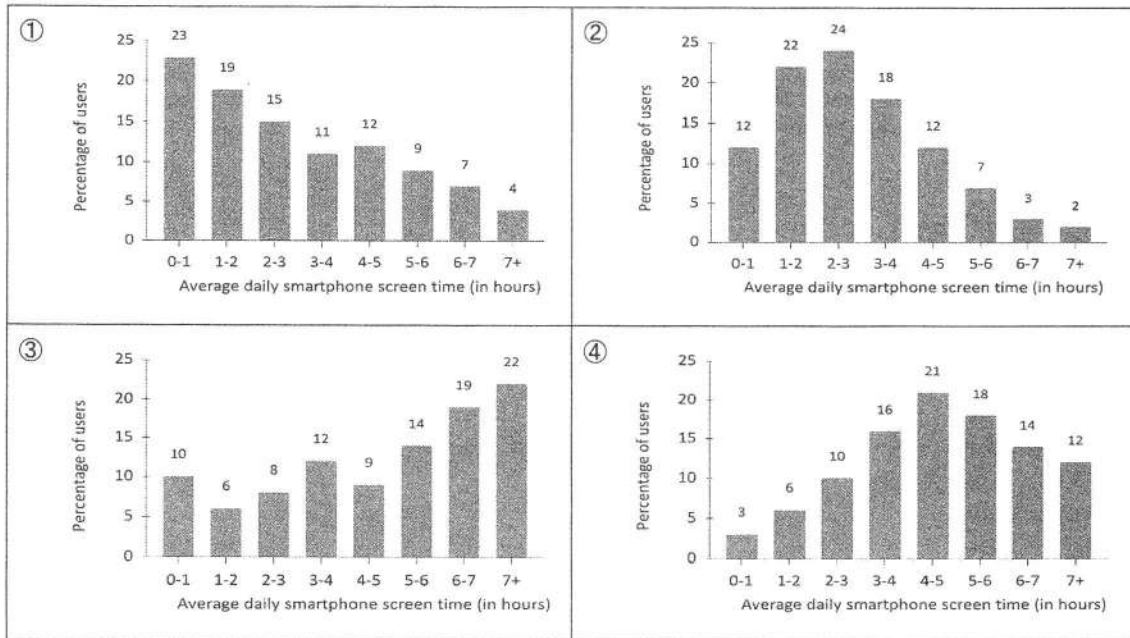
4. Choose the most appropriate answers.

- | | | | | | |
|----------------------------|-----------|---------|----------|-----------|----------|
| <input type="checkbox"/> 7 | ① various | ② both | ③ couple | ④ a whole | ⑤ dozens |
| <input type="checkbox"/> 8 | ① don't | ② won't | ③ can't | ④ haven't | ⑤ am not |

5. 9 According to paragraph 1, which TWO of the following are functions of the Moment app?

- ① It tells users to spend more time with their friends and family.
- ② It keeps a record of how long users look at their smartphone screens.
- ③ It controls the total amount of time users can use their smartphones.
- ④ It stops tracking screen time while users are talking on the phone.
- ⑤ It shows what websites users have visited while surfing the web.
- ⑥ It helps users understand how the smartphone tracking system works.

6. 10 According to paragraph 4, which ONE of the bar graphs (① - ④) represents average daily smartphone screen time according to data collected from Moment users?



7. 11 Which ONE of the following best describes the key finding from the 2013 study mentioned in paragraph 5?

- ① Paper notebooks help people connect with each other when having a conversation.
- ② Smartphone users often show less sympathy and trust to others.
- ③ Using a smartphone during a conversation causes users to lose focus.
- ④ The presence of a smartphone makes it difficult to concentrate on a conversation.
- ⑤ It is difficult to keep a conversation going when people can't use their phones.

2 Read the passage below and then answer the questions about it. Choose the most appropriate answers based on what is stated or implied in the passage. Boxes () in the passage indicate missing information.

All of the studies I have described in the past have dealt with one type of memory—that for facts, which we associate with textbooks or remembering someone's name. There are, however, many other types of memory within the brain, including skill memory. Take riding a bike, for example. As a child, your parents did not give you a textbook called *How to Ride a Bike*, ask you to study it, and then 12 you to immediately begin riding your bike with skilled confidence. Nobody can tell you how to ride a bike. Well, they can try, but it will do them—and more importantly you—no good. You can only learn how to ride a bike by doing rather than reading. Which is to say by practicing. The same is true for all motor skills, whether you are learning a musical instrument, an athletic sport, a surgical procedure, or how to fly a plane.

The term "muscle memory" is a misleading term. Muscles themselves have no such memory: a muscle that is not connected to a brain cannot perform any skilled actions, nor does a muscle store skilled routines. Muscle memory is, in fact, brain memory. Training and strengthening muscles can help you better 13 a skilled memory routine. However, the routine itself—the memory program—lies firmly and exclusively within the brain.

Years before I 14 the effects of sleep on fact-based, textbook-like learning, I examined motor skill memory. Two experiences shaped my decision to perform these studies. The first was given to me as a young student at the Queen's Medical Center—a large teaching hospital in Nottingham, England. Here, I performed research on the topic of movement disorders, specifically spinal cord* injury. I was trying to discover ways of reconnecting spinal cords that had been cut, with the ultimate goal of reuniting the brain with the body. Sadly, my research was a failure, but during that time, I learned about patients with varied forms of motor disorders, including stroke*. What struck me about so many of these patients was a consistent, step-by-step recovery of their motor function after the stroke, be it in their legs, arms, fingers, or speech. Rarely was the recovery complete, but day by day, month by month, they all showed some improvement.

The second transformative experience happened some years later while I was in graduate school. It was 2000, and the scientific community had declared that the next ten years would be "The Decade of the Brain," forecasting (accurately,

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as it [15]) what would be a period of remarkable progress within the sciences concerning the brain. I had been asked to give a public lecture on the topic of sleep at an event. At the time, we still knew <4>relatively little about the effects of sleep on memory, though I made brief mention of the findings that were available.

<5>After my lecture was finished, a distinguished-looking gentleman with a kind smile, dressed in a nice suit jacket with a subtle yellow-green color that I still vividly recall to this day, approached me. It was a brief conversation, but one of the most scientifically important of my life. He thanked me for the presentation, and told me that he was a pianist. He said he was fascinated by my description of sleep as an active brain state, one in which we may review and even strengthen those things we have previously learned. Then came a comment that would trigger a major focus of my research for years to come. "As a pianist," he said, "I have an experience that seems far too frequent to be chance. I will be practicing a particular piece, even late into the evening, and I cannot seem to master it. Often, I make the same mistake at the same place in a particular movement. I go to bed frustrated, but when I wake up the next morning and sit back down at the piano, I can just play, perfectly."

"I can just play." The words repeated in my mind as I tried to compose a response. I told the gentleman that it was a <6>fascinating idea, and it was certainly possible that sleep assisted musicianship and led to error-free performance, but that I knew of no scientific evidence to support the claim. He smiled and thanked me again for my lecture, and walked toward the reception hall. I, on the other hand, remained in the main hall, realizing that this gentleman had just told me something that <7>violated the most repeated and trusted teaching advice: practice makes perfect. Not so, it seemed. Rather, perhaps it was practice, with sleep, that makes perfect.

After three years of <8>subsequent research, I published a paper with a similar title, and in the studies that followed, gathered evidence that ultimately confirmed the pianist's idea about sleep. The findings also shed light on how the brain, after injury or damage by a stroke, gradually regains some ability to guide skill movements day by day—or should I say, night by night.

* Vocabulary

spinal cord = 脊髄
stroke = 脳卒中

1. Choose the most appropriate answers.

12	① expect	② expects	③ expected	④ expecting	⑤ to expect
13	① obey	② carry	③ discharge	④ behave	⑤ execute
14	① released	② explored	③ satisfied	④ alarmed	⑤ acquired
15	① put out	② took place	③ turned out	④ played a role	⑤ showed up

2. Identify the most stressed vowel for each word. Then choose ONE word for each that has the same vowel pronunciation.

16	<1>procedure
17	<2>ultimate

① sheet ② hit ③ bed ④ hat ⑤ cup ⑥ who ⑦ cook ⑧ shop ⑨ die ⑩ bay ⑪ cold ⑫ sure

3. [18] What does <3>it refer to? Choose ONE answer.

① goal ② brain ③ body ④ research ⑤ patient
⑥ varied form ⑦ motor disorder ⑧ stroke ⑨ step-by-step ⑩ recovery

4. Which is the most stressed syllable in the following word?

19	<4>relatively	rel-a-tive-ly
		① ② ③ ④

5. [20] For <5>After my lecture..., find the MAIN VERB of the sentence.

① was finished ② distinguished-looking ③ dressed ④ suit
⑤ subtle ⑥ color ⑦ recall ⑧ approached

6. Choose ONE answer that is closest in meaning.

21	<6>fascinating	① peculiar	② silly	③ interesting	④ complicated	⑤ mysterious
22	<7>violated	① offended	② annoyed	③ declined	④ improved	⑤ disturbed
23	<8>subsequent	① low-quality	② succeeding	③ long-term	④ inconvenient	⑤ necessary

7. [24] In paragraph 5, why does the author mention that his conversation with the pianist was important? Choose ONE answer.

① The author and the pianist made presentations about the same topic.
② The pianist's comment influenced the author's future research.
③ The author was researching how a pianist learns to read music.
④ The pianist confirmed the author's beliefs about the importance of practice.
⑤ The pianist taught the author how to play perfectly without frustration.

8. [25] What is the main theme of this passage?

① Remembering is like riding a bike.
② Muscles remember skills.
③ Musical talent takes practice.
④ Sleep contributes to skill memory.
⑤ Brain research is a new science.

- 3 Read the passage below and then answer the questions about it. Choose the most appropriate answers based on what is stated or implied in the passage. Boxes () in the passage indicate missing information.

THE SURVIVAL SWITCH: WHY HUMANS BECOME FAT

I call the process whereby animals maintain a weight within a narrow range until a challenge to their survival activates various biological processes that let them put on additional fat the survival switch. While the process is turned on and off like a switch, it can also be adjusted high or low. This switch is not unique to animals. Just as we humans share with animals the signs of metabolic syndrome, we also share the causes of syndromes. The same biological processes occur in us, where <1>they have the same outcome: putting on fat.

Historically, humans, like animals in the wild, have tended to maintain their weight. For many of us, it was easy to keep our weight within a narrow range early in life, regardless of what we ate. 27 as I have gotten older, I know it has become easy for me to gain weight, but relatively hard to lose it. It is as if my body would prefer to be overweight. I do not think I am alone. All around the world, the majority of adults today are overweight.

THE CLASSICAL THEORY

Why are we gaining weight? The classical teaching, which dates back to the 1920s, is that we are becoming overweight and developing diabetes* because foods are now less expensive and easily available, and advances in transportation and other technologies have resulted in us exercising less and sitting more. The introduction of fast food, processed foods, and junk foods has made it easier to overeat, while elevators, escalators, trains, and automobiles have replaced the need to walk or bicycle. The internet, television, and smartphones have also made it easier and more enjoyable to stay home. The equation is simple physics: we are eating too much and exercising too little. When too much energy is produced (from food), and too little energy is used (via exercise and other metabolic activities), the energy that is left over is stored as fat.

Consistent with the so-called overnutrition hypothesis* is evidence that food portions have increased. Over the last century, the size of most soft drinks increased from 7 ounces to 10, 12, and even more. Restaurants keep increasing the size of meals, and all-you-can-eat buffets are common. Studies also show that the average number of daily calories people are eating has increased over the last decades. One analysis by the Food and Agricultural Organization of the United Nations reported that there was a more than 24 percent increase in total caloric intake between 1961 and 2013 (from about 2,900 calories a day to 3,600). People are also less active. Obesity* is directly related to the amount of time people spend watching television or are on the internet. Today the average person spends about 10 or 11 hours on their cellphone or computer each day but only about 17 minutes exercising. No wonder we are getting fat.

There is a major problem with the overnutrition hypothesis, however. That problem is not its conclusion—that we are gaining weight because we are eating more 28 expending less energy—but rather that it blames this phenomenon solely on bad habits. Our culture does encourage us to eat more and not be active, and it is a contributing reason for this serious health issue. However, the root of the problem is biological.

THE NEW THEORY

One reason people are eating more today is that many of us, and especially those of us who are overweight, tend to be hungrier than usual because we do not get a sensation of being full after we have eaten. Normally, we get a sensation of satisfaction or fullness after a meal because a hormone called leptin tells a region in the brain called the hypothalamus* to signal us to stop eating. Leptin is produced by fat cells, and levels vary in relation to insulin levels and BMI (Body Mass Index). However, people who are overweight respond poorly to the leptin signal, something called leptin resistance, and so remain hungry longer. (This also explains why restaurants give us larger plates of food now than they did a few decades ago—not because they want us to feel we're getting a better deal, but because they know we will leave hungry if they don't.)

Another reason is that people who are overweight also do not burn fat as well as those without excess fat. Since they burn less fat, fatty tissue tends to increase. Meanwhile, when you burn less fat, you convert less stored energy to readily usable energy. Your cells sense when usable energy levels are low, and interpret this as a low-energy state despite the total energy in the cells, including that from fat, being normal or high. There is some evidence that this can cause fatigue, and also hunger. This compounds the effects of leptin resistance, causing you to eat even more food, until your energy levels finally rise high enough that your hunger is satisfied. However, the cost is having eaten more food and made more fat.

This is the same biology that is observed in animals preparing to sleep through the winter. In fact, the biology of animals that are putting on fat has remarkable similarities 29 of the majority of humans who are struggling with their weight. This suggests that the underlying reason for human obesity is that we have turned on the same survival switch used by animals in nature. If we could understand how we turned on this switch, we would figure out the cause of obesity—and, perhaps, how to cure it.

The evidence is overwhelming. The primary reason we are becoming fat is not our culture. It is our biology. Our culture is responding to our biology. Somehow, we have activated nature's survival switch without knowing it. This is why we can lose weight temporarily through dieting and exercise, but have trouble keeping <2>it off.

With the survival switch activated, it is as if we are continuously preparing for winter with no end in sight; unlike animals in the wild that turn this switch off when they sleep through the winter, our switch appears permanently <3>jammed in the "on" position. So long as this switch is on, we will continue to fight a losing battle against obesity and its related diseases. The survival switch has become a fat switch.

Yet, our detective work is <4>paying off. It's given us significant insight already into the biological process that is making us fat. Next, we need to figure out what precisely <5>sets off this switch and how it works.

* Vocabulary

diabetes = 糖尿病

overnutrition hypothesis = 過栄養仮説

obesity = the state of being very overweight, in a way that is not healthy

hypothalamus = 視床下部

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1. [26] What does <1>they refer to? Choose ONE answer.
① animals ② humans ③ signs ④ causes ⑤ syndromes ⑥ processes
2. Choose the most appropriate answers.
[27] ① As soon ② As long ③ That is, ④ Therefore, ⑤ However,
[28] ① during ② while ③ before ④ than ⑤ instead of
[29] ① in which ② to which ③ in that ④ to that ⑤ of that
3. [30] What does <2>it refer to? Choose ONE answer.
① evidence ② reason ③ becoming fat ④ culture ⑤ biology
⑥ survival switch ⑦ weight ⑧ dieting ⑨ exercise ⑩ trouble
4. Choose ONE answer that is closest in meaning.
[31] <3>jammed ① pulled ② painted ③ pressed ④ hurt ⑤ stuck
[32] <4>paying off ① being rewarded ② costing a lot ③ producing
[33] <5>sets off ④ coming to an end ⑤ being done
① turns on ② turns out ③ cuts out ④ cuts down ⑤ cuts back
5. [34] - [38] Based on the information in THE CLASSICAL THEORY section, fill in the blanks and complete the outline of the classical theory on why humans become fat.

OUTLINE: Classical theory on why humans become fat

We are eating too much and [34] too little.

I) Foods are less expensive and more [35].

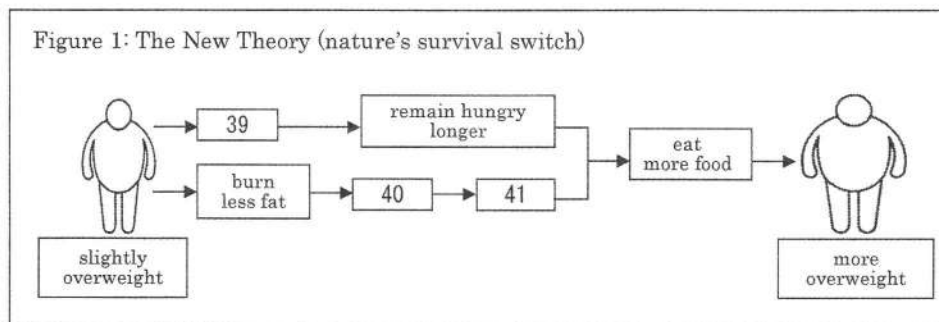
- Fast foods and processed foods make eating easier and buffet restaurants are common.

II) Transportation and technology result in less physical movement.

- Elevators, escalators, trains, and automobiles have [36] walking or cycling.
- People only spend [37] minutes exercising a day.
- The internet, TV, and smartphones provide lots of entertainment within the home.
- People spend up to [38] hours a day on their cellphones or computers.

- ① ten ② spent ③ replaced ④ eleven ⑤ portions ⑥ running
⑦ available ⑧ delicious ⑨ twelve ⑩ using ⑪ seventeen ⑫ exercising

6. [39] - [41] Based on the information in THE NEW THEORY section, use the following phrases to complete Figure 1.



- ① more food provided in restaurants
② poor response to the leptin signal
③ feel tired or hungry more often
④ gain weight due to cultural reasons
⑤ get a sensation of satisfaction after eating
⑥ become less able to turn stored fat into usable energy

出典

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- [3] Nature Wants Us to Be Fat: The Surprising Science Behind Why We Gain Weight and How We Can Prevent and Reverse It by MD, Richard J. Johnson, BenBella Books, 2022.