

設問 I

次の英文は、集団からの孤立が生物の行動や遺伝子に与える影響について、アリを用いた実験が記述された新聞記事です。

本文を読んで、問1～問4に答えなさい。なお、本文中に「*番号」を付けてある語については、本文のあとの「注」に日本語説明があるので、参考にしなさい。

解答は、すべて解答用紙に記入しなさい。

Ant study offers path to reducing stress, loneliness in animals

Researchers in Japan discovered that ants placed in isolation die younger due to an accumulation of *¹reactive oxygen, a finding that may lead to ways to reduce stress levels in animals and help make them more resistant to loneliness.

“Our findings indicate that even insects have more reactive oxygen through isolation and that (1) the system is common among a range of living creatures,” said Akiko Koto, a researcher of behavioral ecology who was part of the team.

Ants under normal conditions live in colonies.

Koto, a chief researcher at *²the National Institute of Advanced Industrial Science and Technology (AIST), formed a team from AIST to look at the behavioral pattern of ants by placing them separately in containers.

With two-dimensional barcodes applied to the back of each ant, the observation results were compared with those for a group of 10 ants that stayed in the same container together.

Most grouped ants returned to their nest within an hour, with only a few remaining outside to keep watch, standard behavior for the species.

Ants living in isolation roamed near walls longer. At times, they headed for their nests but did not stay long, underlining their “abnormal” condition.

On top of that, 50 percent of the ants kept in isolation died within 25 or so days. Nearly 80 percent of their grouped counterparts were still alive 50 days later when the experiment ended.

The team members tried to pinpoint the mechanism behind the abnormality *³detected in isolated ants and their shorter lifespan.

(2) They also extracted RNA from both categories of ants for *⁴genetic analysis 24 hours after the start of the experiment.

The outcome showed that ants in isolation had more genes working to produce reactive oxygen.

Reactive oxygen can be found in the human body as well. Excessive accumulation of the substance is said to cause cell damage that triggers various health problems.

An especially dramatic rise in reactive oxygen in isolated ants was identified in an organ that corresponds to the liver of humans.

(3) *⁵Melatonin, a hormone used to eliminate reactive oxygen, was *⁶administered to the ants living in isolation, which succeeded in inhibiting their unusual behavior. Their *⁷half-fatality period was extended from 25 days to 50 days.

Koto referred to past research that suggested rats separated from their group display a higher amount of reactive oxygen, although the phenomenon's mechanism is unclear.

“We will try to *⁸elucidate how social relationships can impact living creatures' health conditions by referring to ants as a model,” Koto said.

The team's findings were published in the scientific journal *Nature Communications* at (<https://www.nature.com/articles/s41467-023-41140-w>).

Ant study offers path to reducing stress, loneliness in animals
(The Asahi Shimbun, November 8, 2023)

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注

*¹ reactive oxygen 活性酸素

*² the National Institute of Advanced Industrial Science and Technology 産業技術総合研究所

*³ detected 検出された

*⁴ genetic analysis 遺伝子解析

*⁵ melatonin メラトニン(ホルモンの一種)

*⁶ administered 投与された

*⁷ half-fatality period 半数致死期間(実験対象のアリの半数が死に至る期間)

*⁸ elucidate 解明する

問1 本文中の下線(1) the system is common among a range of living creatures について、the system とは何かを明らかにしながら、日本語で書きなさい。

問2 本文中の下線(2) They also extracted RNA from both categories of ants for *4genetic analysis 24 hours after the start of the experiment. について、遺伝子解析の結果わかったことはどのようなことか、both categories とは何かを明らかにしながら、日本語で書きなさい。

問3 次の文章が本文の内容と合っている場合は○、合っていない場合は×を書きなさい。

- ① 観察されたアリには2次元バーコードが背中に貼り付けられていた。
- ② 孤立群のアリは、グループ群のアリよりも、巣の外にいる時間が長かった。
- ③ 孤立群のアリの約80%は、50日以上生きていた。
- ④ 孤立群のアリの活性酸素の劇的な上昇は、ヒトの肺に相当する器官で確認された。
- ⑤ 活性酸素の過度の蓄積は、さまざまな健康問題を引き起こす。

問4 本文中の下線(3) Melatonin--a hormone used to eliminate reactive oxygen--was administered to the ants living in isolation, which succeeded in inhibiting their unusual behavior. Their half-fatality period was extended from 25 days to 50 days. を日本語で書きなさい。

設問Ⅱ

ユニセフ(UNICEF: United Nations Children's Fund、国際連合児童基金)のイノチェンティ研究所は、世界の子どもの well-being (幸福)に関する動向を最近5年間にわたって分析し、「Innocenti Report Card 19」として 2025 年 5 月に発表しました。この報告書では、mental health(精神的幸福度)、physical health(身体的健康)、social, emotional, digital and academic skills (社会的、情緒的、デジタル、アカデミックスキル)の 3 つの指標に分けて、child well-being in an unpredictable world (予測不可能な世界における子どもの幸福)を捉えています。

次の文章は、「Innocenti Report Card 19」に基づいて、日本の子どもの well-being がどのような状況にあるのかについて配信された英文記事です。イノチェンティ研究所が以前に報告した「Innocenti Report Card 16」との比較なども含めて記述されているので、内容をよく読み、問1～問5の問いに答えなさい。なお、本文中に「*」を付けてある語については、本文のあとの「注」に日本語説明があるので、参考にしなさい。

解答は、すべて解答用紙に記入しなさい。

Children in Japan continue to suffer poor mental health, with the country ranking 32nd among 43 developed and emerging nations due to high suicide rates and other factors, a UNICEF report released Wednesday showed. The country improved from 37th in 2020 when the ranking was last published, although this time the suicide rate among Japanese youth was the fourth highest among wealthy states surveyed, worsening from 12th. In contrast, Japan topped the list on physical health, unchanged from the previous corresponding report. The report by the United Nations Children's Fund analyzed members of the Organization for Economic Cooperation and Development and the European Union under the categories of mental well-being, physical health, and academic and social skills. Japan ranked 12th in academic and social skills, up from 27th, and 14th overall, up from 20th. The Netherlands topped the overall ranking, which excluded the United States and six other countries with insufficient mental health data.

“There is little awareness that children have mental problems in Japan, and government measures have been ineffective,” said Aya Abe, a professor at Tokyo Metropolitan University with expertise in poverty issues. As for physical health, she said, (1) *Obesity is at a low level, but there is the problem of underweight children.”

The report noted that the COVID-19 pandemic has significantly reduced children's academic performance and mental and physical health in developed countries. It called for each country to address issues impacting (2) the well-being of children who are growing up in a modern world with epidemics, conflicts and climate change.

Japanese kids' mental health ranks poorly among rich nations: UNICEF
(共同通信社 KYODO NEWS, May 14, 2025)

注

* obesity 肥満

問1 次の文の()内にふさわしい数字を入れなさい。

2025 年の Innocenti Report Card 19 によると、日本の子どもの精神的幸福度の順位は、(①)か国中の(②)位であった。

問2 次の文の()内にふさわしい数字を入れなさい。

2025 年の Innocenti Report Card 19 によると、日本の子どもの精神的幸福度の順位は、(①)年の報告で(②)位であったのに比べると上昇した。

問3 2025 年の Innocenti Report Card 19 による報告で、日本は Innocenti Report Card 16 と変わらず最上位であると評価された指標を日本語で答えなさい。

問4 Aya Abe 教授が Innocenti Report Card 19 に報告された日本人の子どもの分析について指摘した下線(1) “Obesity is at a low level, but there is the problem of underweight children.” はどのような意味であるかを日本語で表現しなさい。

問5 本文中の下線(2)the well-being of children who are growing up in a modern world with epidemics, conflicts and climate change では、子どもが育つ現代社会の特徴を3つ挙げている。この記述は、1919 年に 15 歳の子どもが New Zealand の新聞に送った手紙の “... with the war, the epidemic, and the weather, times are altogether troublesome.” という表現を活かしたものである。本文の英文に登場する3つの特徴である epidemics、conflicts、climate change を日本語に訳した上で、現代社会では具体的に何を指すのか、あなたの考えをそれぞれ 70 文字程度の日本語で分かりやすく述べなさい。

- ① epidemics について: 「訳」と「現代社会では何を指すのか」
- ② conflicts について: 「訳」と「現代社会では何を指すのか」
- ③ climate change について: 「訳」と「現代社会では何を指すのか」