

Niigata University Graduate School of Medical and Dental Sciences  
(*Doctoral Program*) (Med.Field)  
Admission in April 2025  
Special entrance examination for international students

**Notes**

◆ Please do not leave anything on the desk other than the admission ticket, writing implements, and dictionaries that are allowed to be brought in. Electronic dictionary and medical dictionary are not allowed to be used. Please turn off the power of the cellular phone and put away in your bag. Do not wear it on your body.

受験票、筆記用具、持込が許可されている辞書以外のものを机の上に置かないでください。なお、電子辞書及び医学辞書の使用は認めません。また、携帯電話等を持っている人は、電源を切ってからカバン等に入れ、身につけないでください。

◆ Please do not open the examination paper until the start of the examination is announced.

試験問題・解答用紙は、試験開始の合図があるまで開かないでください。

◆ The start of the examination is 10:00.

The end of the examination is 11:30.

試験開始時刻は、10時です。試験終了時刻は、11時30分です。

◆ There are 6 examination sheets. You can't remove staples used for stapling.

問題・解答用紙は、1～6ページの6枚です。なお、ホチキス止めは外さないでください。

◆ If you find any lack of question and answer sheets or printing failure, please offer after the test starts.

問題・解答用紙の不足、印刷不鮮明の箇所がありましたら、試験開始後に申し出てください。

◆ After the test starts, make sure to fill your examinee's number and name on all pages. Question and answer sheets will be collected after the examination.

問題・解答用紙は試験終了後にすべて回収しますので、試験開始後に問題・解答用紙のすべてのページに受験番号・氏名を必ず記入してください。

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受験番号 (No.) \_\_\_\_\_

氏名 (Name) \_\_\_\_\_

1. Read following text and answer the questions.

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受験番号 (No.) \_\_\_\_\_

氏名 (Name) \_\_\_\_\_

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(Modified from Nature 635, 523-524, 2024)

受験番号 (No.)

氏名 (Name)

- 1) What is the main goal of the Human Cell Atlas (HCA) project?
- 2) How many human cells were recorded in the HCA data by 2024?
- 3) Which earlier project contributed to the foundation of the HCA? Write three examples.
- 4) Why is the HCA described as a "Wikipedia for cells"? Choose the most accurate explanation.
  1. It is an open-access resource that allows contributions from non-scientific communities worldwide.
  2. It is collaboratively built by the scientific community, reflecting diverse regional priorities, and intended to remain open access.
  3. It is funded and managed by international organizations to ensure equal representation of all global regions.
  4. It organizes cell data hierarchically, similar to how Wikipedia structures its entries.
- 5) What is the key challenge for the HCA project to achieve its ultimate goals? Choose the best answer based on the text.
  1. Collecting and analyzing data from over 100 countries, including underrepresented regions.
  2. Mapping 62 million cells accurately while addressing regional and demographic variations.
  3. Securing long-term funding and commitment from both public and private organizations.
  4. Developing more powerful diagnostic tools based on genetic variant mapping.

受験番号 (No.) \_\_\_\_\_ 氏名 (Name) \_\_\_\_\_

2. Read following text and answer the questions.

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(Modified from Nature 635, 808-811, 2024)

受験番号 (No.)

氏名 (Name)

1) Explain one advantage of using AI in biological research, providing three examples.

2) List two concerns about using AI in biological research.

3) Which of the following is identified as a key limitation of current AI safety evaluations?

1. They fail to include ethical considerations in evaluating AI models.
2. They are narrowly focused on bioweapons and overlook interactions between AI systems.
3. They primarily depend on AI developers for funding and expertise.
4. They emphasize resource accessibility but neglect cybersecurity risks.
5. They are standardized across nations, leaving little room for flexibility.

4) What is crucial for building trust in AI for biological research?

1. Strict government regulations on AI research and development.
2. Establishing a single global authority to oversee AI usage in life sciences.
3. Collaborative workshops that focus on vaccine development alone.
4. Independent evaluations, automated safety tests, and international collaboration.
5. Avoiding the use of AI in sensitive areas like immune-evading virus research.

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3. Describe your research plan in the doctor course in English.