前期日程

科目 外国語(英語)

医 学 部 医 学 科

注 意

1. 開始の合図があるまで，この問題冊子を開いてはいけません。
2. 問題は１ページから７ページにわたっています。問題冊子に不備がある場合は，直ちにその旨を監督者に申し出てください。
3. 解答用紙は４枚で，問題冊子とは別になっています。解答は，すべて解答用紙の所定の欄に記入してください。指定された解答用紙以外に記入した場合は，評価(採点)の対象としません。
4. 受験番号は，４枚の解答用紙のそれぞれの上部の欄に記入してください。
5. 解答用紙は持ち帰ってはいけません。
6. 下書用紙には，下書き用のマス目が書いてありますので，活用してください。
7. 問題用紙と下書用紙(２枚)は持ち帰ってください。

1 次の文章を読み，問いに答えなさい。

When Jake Harvey visits the clinical center at the National Institutes of Health (NIH) in Bethesda, Maryland, he is usually dirty, itchy, and wheezing — (A) not the happiest state of affairs for a 14-year-old boy. But his doctors require that for 24 hours prior to each visit, he refrain from bathing, using the **inhaler*** that soothes his asthma, or applying the **ointment*** that softens his eczema. In order to study his illness, they need him to be as close to his natural state as possible.

(B) Jake's discomfort could lead to better treatments for the millions who have eczema — a disorder marked by dry red **rashes*** in the folds of the elbows, behind knees, and on the back of necks — as well as an array of other allergic reactions. By understanding eczema in a new way, as the product of a delicate interaction between the immune system and the legion of bacteria that live on the skin, one group of scientists hopes to better understand what triggers it and why the number of diagnosed eczema cases in developed countries has dramatically increased over the past few decades.

These researchers, led by Heidi Kong, a **dermatologist*** at the Center for Cancer Research at the National Cancer Institute, and Julie Segre, a geneticist at the NIH, are just one part of the five-year, $173 million Human Microbiome Project (HMP), an effort to characterize the thousands of species of microbes that live on or in us. So far, Jake has made half a dozen trips to Bethesda, 60 miles each way, to donate a few skin cells to the project.

As many as 30 percent of all children develop eczema, and no one knows what mix of genetic and environmental factors sets it off. The disease runs in families, yet Jake's twin sister, Becca, has perfect skin. For about 60 percent of children with the disease, it goes away by early adolescence. The others frequently deal with outbreaks for life.

In the Human Microbiome Project (HMP), researchers plan to characterize the vast numbers of bacteria, **fungi***, **protozoa*** and viruses in our body by sequencing their genes. That won't be easy. In the past, researchers had to grow each species outside the body before they could identify it, a process that required intense research to determine optimum growing conditions. Only the hardiest and most numerous bacterial species — for example, ***Staphylococcus aureus**** and ***Streptococcus pyogenes****, which can cause life-threatening infections — have been thoroughly studied in the laboratory. Now, advances in DNA sequencing — the very same that made it possible for the Human Genome Project to decode the 3 billion base pairs of our own genome quickly — have provided the technology to make a comprehensive Human Microbiome Project possible.

"What we want to understand first," says HMP coordinator Lita Proctor, "is what's considered the norm. What does a typical healthy human have?" HMP researchers are

building a reference database of the genetic fingerprints of about 3,000 different bacterial species. Scientists are also thoroughly characterizing the makeup of microbial communities found at half a dozen body sites — including the gut, the mouth, the skin, and the **groin*** — of 300 normal people. The next step is to compare those results with what researchers find in patients with specific medical conditions, such as eczema, **Crohn's disease***, and **ulcerative colitis***.

The skin samples from Jake and other children with eczema will help Segre and Kong determine whether changing profiles of **skin flora***, and their interaction with the human immune system, are involved in the rising rates of the disease. Some 34.1 million Americans suffer from asthma, and up to 50 million have seasonal allergies.

"In the last three decades, all of these allergic disorders — asthma, eczema, **hay fever*** — they've all tripled," Segre says. In that short a time frame, the cause can't be simply changes in our own genome. "So it must be something about the gene-environment interaction. And I now believe that that's regulated by the body's bacteria."
(C)

The skin is an ecosystem. Like any other ecosystem, it harbors permanent residents and also migrant species that flock to a few hot spots during certain seasons. Those fluctuations powerfully influence how the skin works. ***Staphylococcus epidermidis****, for example, may help educate the skin's immune system, training it to recognize particular molecules so that it can better respond to an attack by harmful species. *Staphylococcus epidermidis* produces proteins that prevent unwanted invaders from adhering to skin. So it makes sense that disrupting these complex microbial interactions could lead to skin problems.
(D)

With the eczema study, Segre says she hopes to find patterns in the microbiome that could predict the onset of an eczema **flare*** in a particular child or even help doctors choose a far more effective treatment; for some patients, **bleach baths*** might help, whereas for others, a round of **anti-inflammatory steroids*** might be the best choice.

If she finds certain microbial profiles that predict the onset of an eczema flare, for example, doctors could use that data as a guide for action. They might tell the patient to take a few extra bleach baths that week or to skip football practice. Researchers might even be able to create medicines to replace the bacterial species that patients lack during a flare, Segre says.

These potential applications are many years off, and Segre's initial studies probably won't have much effect on Jake's eczema. Still, the Harveys are happy to be moving the field forward. "It's probably going to be a while before Jake's helped," Debbie says. "But in the future, if someone else can avoid sitting up all night scratching their legs, that would be great."
(E)

(Virginia Hughes, 2011. *Popular Science*, truncated and slightly modified)

*注：inhaler　吸入器　　ointment　軟膏　　rash　発疹　　dermatologist　皮膚科医
fungi　菌類(fungus の複数形)　　protozoa 原生生物
Staphylococcus aureus　黄色ブドウ球菌　　Streptococcus pyogenes　化膿レンサ球菌
groin　鼠蹊部(股のつけ根部分)　　Crohn's disease　クローン病
ulcerative colitis　潰瘍性大腸炎　　skin flora　皮膚細菌叢(皮膚を棲息場所とする細菌群)
hay fever　花粉症　　Staphylococcus epidermidis　表皮ブドウ球菌
flare　炎症で赤くなった周辺部　　bleach bath　漂白剤風呂
anti-inflammatory steroid　ステロイド性抗炎症剤

(1)　下線部(A)のように作者が述べているのはなぜですか。以下の(a)~(e)の選択肢からその理由として最もふさわしいものを一つ選び，記号を解答欄に書きなさい。

(a)　さまざまな治療法を試みているが，喘息や湿疹が一向に回復しないから。
(b)　喘息や湿疹に対して苦しんでいる状態のままでいることが，求められているから。
(c)　同じ治療法を繰り返しているために，喘息や湿疹が慢性状態になっているから。
(d)　喘息や湿疹を抑えるための治療法が思春期の男子にはふさわしくないものだったから。
(e)　喘息や湿疹の治療のため，人工的な製品や道具を使わずに生活しなければいけないから。

(2)　次の日本文は，下線部(B)のように言えるのはなぜか，その要点をまとめ直したものです。この文が正しい内容の文になるよう，空欄を指定の字数の日本語で埋めなさい。

実は，そうした discomfort を我慢することで，Jake は，できるだけ [(a)(2字)] に近い状態で，貴重な彼の [(b)(10字程度)] しているからである。

(3)　この文章で述べられている HMP というプロジェクトでは，具体的にどのような内容が計画されていますか。140 字程度の日本語で説明しなさい。但し，句読点も 1 字に数えます。

(4)　下線部(C)のようにこの研究者が考える根拠を，順序に従って簡潔な日本語で箇条書きにして答えなさい。さらにその結論として，下線部(C)を that の内容を明示しつつ日本語に訳しなさい。

(5) 下線部(D)はどのようなことを念頭において述べられたものですか。次の英文がその答えとなるように，空欄①，②に最もふさわしい英語を下の選択肢からそれぞれ1つ選び，記号を解答欄に書きなさい。

The health of the skin is sustained by [①]. This perspective provides us with a better understanding of how [②] can cause disease.

(a) changes in the microbial species living on it
(b) microbes permanently inhabiting it
(c) integration of microbes into our immune system
(d) the unpolluted natural environment around us
(e) complex relationships between our body and microbes
(f) daily protection against harmful microbes
(g) the migrations of foreign microbes on our body
(h) interactions between microbial and human genomes
(i) immune mechanisms disrupting migrant microbes

(6) 下線部(E)について次の問いに答えなさい。

(a) 下線部(E)の具体例は何ですか。本文中に挙げられている具体例をすべて簡潔な日本語で箇条書きにして述べなさい。

(b) 下線部(E)が実現されるための前提条件を30字程度の日本語で答えなさい。

(7) 本文の記述と合っているものを，以下の(a)~(f)の選択肢から全て選び，記号を解答欄に書きなさい。

(a) In contrast with Jake, his sister Becca is among one of the 60% of children who suffered from eczema but recovered from it.
(b) The Human Microbiome Project is directed by Heidi Kong and Julie Segre.
(c) Except for some harmful species, scientists have hardly been able to characterize bacteria in and on the human body using DNA analysis.
(d) Jake's contribution has the potential to shed light on the mystery of why seasonal allergies have been increasing so rapidly.
(e) *Staphylococcus epidermidis* often intervenes in our immune system and makes our body dependent on this microbe.
(f) The Harveys are pleased that Jake is now getting better, thanks to developments from the Human Microbiome Project.

2 次の文章は薬剤師(Ms. Collins)と患者(Mr. Jenkins)の会話です。これを読み，次頁の問いに答えなさい。

Ms. Collins: Hello. My name is Frederica Collins. I'm a pharmacist. Are you Mr. Arthur Jenkins?

Mr. Jenkins: Yes, I am. Do you (A)[me / what / the / know / to / drugs / wants / doctor / take]?

Ms. Collins: Yes, I do. But could you tell me first how you're feeling?

Mr. Jenkins: Well, I have felt better, but (B)ここ3か月間，私には歩行が困難です。 My legs have been hurting. The doctor told me I have bad arteries. He says they're hard.

Ms. Collins: You have (C) is called peripheral artery disease. What that means is that you have fatty material inside your arteries. This material blocks the blood (D) flowing to your arteries. That's (E) your legs hurt when you walk. Your legs need more blood when they move, when you walk or go upstairs.

Mr. Jenkins: Yeah. My legs feel tight and heavy and my calf muscles feel tired. You know, the pain comes and (F).

Ms. Collins: You should start feeling much better once you begin your [G]. Your doctor has prescribed **Pletal***. It will help improve the oxygen and blood flow in your legs. (H)まもなくそんなに大きな痛みなくもっと長い距離を歩けるようになるはずです。 Here's what Pletal looks like. It comes in tablet form. As you can see, the name of the drug is imprinted on the tablet.

Mr. Jenkins: Yeah, I see. P-L-E-T-A-L. It is (I) almost like flower petal.

Ms. Collins: Yeah, you're right. Now you will need to take one tablet twice a day. And make (J) you take the tablet 30 minutes before breakfast and dinner, or 2 hours after breakfast or dinner.

Mr. Jenkins: How (K) will I start feeling better?

Ms. Collins: Well, you should see improvement in as soon as 2 to 4 weeks, or longer. It could take as long as 12 weeks (L) you feel the benefits of the medication.

Mr. Jenkins: That long, huh? I hope it's sooner rather than later.

Ms. Collins: I'll give you a patient information sheet for you to take home and refer to. And if you have any questions, you can call us, or your doctor.

Mr. Jenkins: OK. Thanks.

(Miriam Díaz-Gilbert (2009). *English for Pharmacy Writing and Oral Communication*, truncated and modified)

注：Pletal　プレタール(医薬品名)

(1)　下線部(A)の単語を並べ替えて文を完成させなさい。

(2)　下線部(B)と下線部(H)の文意を英語で表しなさい。

(3)　空欄(　C　)，(　D　)，(　E　)，(　F　)，(　I　)，(　J　)，(　K　)，(　L　)に最も適切な語を次から選び，その記号を解答欄に書きなさい。但し，同じ語を二回以上選ばないこと。

ア．because	イ．sure	ウ．of	エ．from	オ．fast
カ．what	キ．why	ク．which	ケ．sounds	コ．goes
サ．it	シ．before	ス．after	セ．spelled	ソ．long

(4)　空欄[　G　]に最も適切な単語を前頁の会話の中から抜き出し，その語を解答欄に書きなさい。

3 次の文章を読み，指示に従った英文を書きなさい。尚，注には英語に訳した本文中の日本語の語彙が提示してありますが，使用は任意です。必ず使用しなければならないということではありません。

ある町のスーパーマーケットで，レジの前に長い順番待ちの行列ができていた。おばあさんのうしろに小さい息子を連れた母親が立っていた。男の子はおばあさんの足に何度もショッピングカートをぶつけた。おばあさんはとうとう子供の母親に頼んだ。お子さんにやめるように言って下さい，痛いですから，ってね。ところがこの母親は無愛想にこう答えただけだった。「わたしは子供を反権威主義的*に教育しているんです。子供がやりたければ構わずやっていいことになっているの。」母親のうしろに並んでいた若い男が，それを聞いてカートから蜂蜜のビンを取り出し，それを開けて中身を母親の頭にぶちまけた。彼女が怒って振り向き，ののしると，彼はただこう答えた。「やってみたかっただけなんです！」

(ロルフ・W・ブレードニヒ(編)『ヨーロッパの現代伝説』(池田香代子ほか訳)2003年，若干修正し使用)

注：反権威主義的な　antiauthoritarian

(1) この物語は近年，ヨーロッパで採録された世間話の一つである。この話の内容を150語程度の英文で表現しなさい。なお，話の展開が十分に伝わる範囲であれば，要約をまじえても構いません。

(2) この文章を読んで自分が感じたこと，考えたことを80語程度のまとまりのある英文で表現しなさい。