

平成15年度大学院医学研究科（1回目）

医学・生物学一般試験（問題用紙1枚、解答用紙2枚）

以下の4問題から2問題を選択して解答しなさい。1問題につき1枚の解答用紙を使用すること。紙面不足の場合は裏面使用も可。

- 問題1. ヒトの遺伝子の中でもG蛋白共役型受容体（細胞膜7回貫通型の受容体）は最も大きな遺伝子ファミリーを形成しているものの一つで、生体内の多様な機能に関わっています。また、これらの受容体を標的分子にした多くの薬剤が開発されています。このG蛋白共役型受容体遺伝子ファミリーに属する受容体を一つ挙げ、その生体内での機能について述べなさい。
- 問題2. 21世紀の日本における高齢化社会では痴呆老人が300万人を超えるとされ、その介護に膨大な経費と労力が必要とされている。このような状況の中で社会学的、医学的に痴呆老人をどのようにすべきか検討を加える必要がある。
- 設問1. 痴呆老人をケアするにはどのようにしたらよいか、社会学的立場からあなたの考えを述べなさい。
- 設問2. 痴呆老人の45%を占める血管性痴呆と35%を占めるアルツハイマー型痴呆患者の医療をどのようにしたらよいか、医学的立場に立ってあなたの考えを述べなさい。
- 問題3. 設問1. がんの臨床および基礎研究の中での再生医学の果たす役割を述べなさい。
- 設問2. がん領域におけるトランスレーショナルリサーチとは具体的にはどういう研究を指すのか説明しなさい。
- 問題4. 今日、世界がかかえる地球環境問題、生態系問題、保健・医療問題にはどんなものがあるでしょう。
- 設問1. 5つ以上を挙げなさい。
- 設問2. そのうちの一つについて、原因、現状と動向、対策などを簡潔に論じなさい。

外国語試験問題・解答用紙 (日本人)

問1. 次の文章を読んで以下の設問に答えなさい。

Smoking loads the body () (a) trillions of free radicals.

Each puff of cigarette smoke produces 10^{14} free radicals – that's 100,000,000,000,000 – which is why half of all smokers die before their time (b). It's been calculated that each cigarette reduces the life expectancy of a smoker by 10 minutes, because of the damage caused by all those free radicals (c).

The link between smoking and premature death was first discovered by statisticians, but it is the free radical theory which explains why cigarettes are linked () (d) heart disease and cancer.

The increased free radical load uses up the body's anti-oxidants, such as Vitamin C. Smokers (even passive smokers (e)) typically have subnormal Vitamin C levels in their blood – many of them could be said to be suffering () (f) borderline scurvy. Low levels of anti-oxidants cause damage to the lining of the arteries.

At the same time, the free radicals cause lipids (fats) in the blood to oxidise and turn rancid. These rancid lipids attack the damaged artery walls and start building atheromatous plaque (furring of the arteries). This helps to explain why smokers are so prone () (g) heart attacks.

Free radicals also damage the DNA in a smoker's body cells, leading to mutations (h) which may eventually give rise to cancer.

So what about the few smokers who defy the odds and live out a reasonably normal life span (i)? It is almost certainly because they have better anti-oxidant defences.

There may be a genetic factor: some individuals may be better at making anti-oxidant enzymes. Long-life smokers may eat a better diet, containing higher levels of anti-oxidant nutrients.

This suggests that if you cannot (yet) give up smoking, you should at least try to minimise the damage by supplementing () (j) a well-designed mix of the key anti-oxidants.

A threshold of 100mg of Vitamin C reduces the amount of DNA damage and should reduce the risk of cancer. Vitamin E, Co-enzyme Q10, anti-oxidant minerals and the flavonoids are equally important.

(From Paul Clayton, Health Defence, Accelerated Learning Systems Ltd, Aylesbury, 2001)

問

1. time (b) の同義語を文中から探し英語で答えなさい。

2. かつこ下線部にふさわしい語句を答えさい。

1) () (a) 2) () (d) 3) () (f) 4) () (g) 5) () (j)

3. タバコ煙のなかにはどのような free radicals (c) が含まれていますか。

4. passive smokers (e)とはどういう意味ですか。passive smoking と同義語を英語で答えなさい。

5. mutations (h) を発がんに関連づけて簡潔に説明しなさい。

6. So what about the few smokers who defy the odds and live out a reasonably normal life span (i)? に対する2つの回答を、文中から見出だし日本語で答えなさい。

7. 貴方ならこのコラムに何というタイトルをつけますか。

問2 以下の文章を読んで設問に答えなさい。

Sakichi Toyoda's birth in 1867 coincided with the dawn of Japan's modernization. As a young man, he set about improving the conventional method of cotton weaving, eventually succeeding with his invention of the G-type Automatic Loom, then the most advanced in (A). Sakichi's next goal was developing a car, a dream that was to be realized in 1930 when his son Kiichiro began the trial manufacture of cars. Kiichiro, using the proceeds from the sale of the automatic loom patent, spent the next five years developing his first vehicle. His efforts culminated in the completion of the first Type A engine in September 1934 and, finally, Toyota's first passenger car prototype, the A1, in May 1935.

Sakichi always maintained a sense of gratitude, not only toward members of this family or those who helped him, but also toward society as a whole. He believed that he owed his success to the world at large and that it was important to be of service to humankind by working in good faith, not purely for (B). One example of how he put this philosophy into practice was his donation of 1 million yen to the Imperial Institute of Invention and Innovation to promote the development of a storage battery.

Those working under Sakichi inherited his convictions and applied them even after his death as basic tenets for the management of every concern affiliated with Toyota. Risaburo and Kiichiro Toyoda later codified these principles, and on October 30, 1935, the fifth anniversary of Sakichi's death, they presented them in the form of the "Toyota Precepts":

☉ Toyota Precepts

- 1 Be contributive to the development and welfare of the country by working together, regardless of position, in faithfully fulfilling your duties.
- 2 Be at the vanguard of the times through endless creativity, inquisitiveness and pursuit of improvement.
- 3 Be practical and avoid frivolity.
- 4 Be kind and generous; strive to create a warm, homelike atmosphere.
- 5 Be reverent, and show gratitude for things great and small in thought and deed.

The fundamental spirit of these precepts constitutes the basis on which the Toyota Group functions today. They ☉ have been handed down to the present generation and still serve as guidelines for the Group's policies and activities, as well as for all management and staff.

(from "TOYOTA: A history of the first 50 years" by Toyota Motor corporation, 1968)

設問1 (A)の部分に入る単語として最も適切なものを○印で示しなさい。

- () Japan
- () Europe
- () the world

設問2 (B)の部分に入る語句として最も適切なものを○印で示しなさい。

- () the gain of the fame
- () monetary gain
- () obtaining the freedom

設問3 豊田佐吉の精神と言われている「豊田綱領 (Toyoda Precepts)」(C)のうち、基礎医学や臨床医学に応用出来ると考えるのはどれか、ひとつを選んで例を挙げて簡潔に説明しなさい。

設問4 下線 (D) を日本語に訳しなさい。

Problem 1. Read the following sentences and answer the questions below either in English or Japanese.

Smoking loads the body () (a) trillions of free radicals.

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There may be a genetic factor: some individuals may be better at making anti-oxidant enzymes. Long-life smokers may eat a better diet, containing higher levels of anti-oxidant nutrients.

This suggests that if you cannot (yet) give up smoking, you should at least try to minimise the damage by supplementing () (j) a well-designed mix of the key anti-oxidants.

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(From Paul Clayton, Health Defence, Accelerated Learning Systems Ltd, Aylesbury, 2001)

Questions

- Note the synonym for time (b) mentioned in the article.
- Note appropriate word(s) for the bracket underlined.
1) () (a) 2) () (d) 3) () (f) 4) () (g) 5) () (j)
- Briefly note free radicals (c) contained in tobacco smoke.
- What are passive smokers (e)? Note a synonym for passive smoking.
- Briefly note mutations (h) in conjunction with carcinogenesis.
- So what about the few smokers who defy the odds and live out a reasonably normal life span (i)? Note two plausible reasons mentioned in the article.
- Give a title to this article.

2 Read the following sentences and answer the questions below in English or Japanese.

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(C) Toyoda Precepts:

- 1 Be contributive to the development and welfare of the country by working together, regardless of position, in faithfully fulfilling your duties.
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(from "TOYOTA: A history of the first 50 years" by Toyota Motor corporation, 1988)

Question 1 Please mark to the word you think the best in (A) ?

- () Japan
- () Europe
- () the world

Question 2 Please mark to the term you think the best in (B) ?

- () the gain of the fame
- () monetary gain
- () obtaining the freedom

Question 3 Pick up one precept from "Toyoda Precepts (C)", the spirit of Sakichi Toyoda, in which you believe the precept is also valuable in basic and clinical medicine, and explain briefly with an example.

Question 4 What does the underlined part (D) mean ?

問1. 次の文章を読んで以下の設問に答えなさい。

「猿は人間に毛が三筋たらぬといへど」と浄瑠璃の語りにある。人とサルの違いを俗に「毛が三本」などと言うが、科学の目で見ても、ごくわずかな差であるらしい。

遺伝情報を記録している二千万個の化学物質（a）を人間とチンパンジーで比べてみたら、1.23%の違いしかなかったそうだ。理化学研究所などの共同チームによる研究のせいか（b）である。

（ ）（c）。そうした人間特有の知性の根源が、このわずかな違いに秘められている。「毛ほどの」差にじゅうよう（d）な意味があるのは分かる。それは分かるのだが、うーん、1.23%ねえ…。

底の浅いたくらみを「（ ）」（e）、欲情が抑えられないことを「意馬心猿」と言う。しばしば悪い例えの引き合いに出されるサルである。「あなたがた人間も大差はないのに」と、どこからかチンパンジーのつぶやく声が聞こえなくもない

狂牛病（f）、不況、不審船、アフガン…。えつねん（g）した宿題に気を引き締めて向かわねばならない人間サマを、いくらでもけんきょ（h）にしりょ（i）深くしてくれそうな数字ではあろうか。

どれも、のんびり解いては間に合わない超難問ばかりだ。電卓をたたいてみると、今年もきょう五日で、一年という時間の1.37%が終わる。「わずかのように見えて、実は重要」なものが、ここにも一つ。

（編集手帳 [読売新聞 平成14年1月5日朝刊]より）

問

1. 化学物質（a）とは何のことでしょうか。

2. 次の下線部のひらがなを漢字で答えなさい。

- 1) せい か (b) () 2) じゅうよう (d) () 3) えつねん (g) ()
4) けんきょ (h) () 5) しりょ (i) ()

3. 底の浅いたくらみを「（ ）」（e）にふさわしい語句を答えなさい。

4. （ ）（c）。そうした人間特有の知性とはどんなものか 30文字以内で述べなさい。

5. 狂牛病（f）について簡潔に述べなさい。

6. 狂牛病（f）、不況、不審船、アフガン…以外に、今日の日本がかかえる問題にはどのようなものがあると思いますか。一つ挙げ、その内容を簡潔に説明しなさい。

7. 貴方ならこのコラムにどのようなタイトルをつけますか。

8. このコラムを100文字以内で要約しなさい。

問2 次の文章は平成14年8月23日付けの中日新聞（夕刊）の「紙つぶて」欄に掲載されたコラムである。これを読んで、以下の設問に答えなさい。

（ A ）のことを書く。大学二年の夏、友人数名と、出雲市近郊の立久恵（たちくえ）峠に登った時、スズメバチの集団に襲われた。一瞬痛いと思い、数分歩いたのだろうか。全身に発疹が出始め、突然目の前が暗くなった。あとは何も覚えていなかった。

たまたま近くの旅館の方がその場を通られた。うろたえる友人達に、「私の旅館にお医者さんが来ておいで。早く運びなさい」と促された。旅館では、出雲市の外科医、勝部早苗先生が囲碁をうっておられた。山奥のこと救急薬品はない。そこで先生は友人達に、「池の水を手足にかけ続ける」とせかされた。私が気付いた時、旅館の縁側に寝かされ、失禁していた（食事中恐縮です）。

後に勝部先生から伺ったことだが、以前「蜂中毒」の青年の命を救えなかった苦い経験をお持ちだった。「蜂中毒」では、手足などの末梢の血管が拡張し、その結果血液が心臓に戻りにくくなり、死に至ることがある。それなのに、その青年に強心剤を用いたため、かえって血液が心臓に戻りにくくしたことを先生は悔やんでおられた。だから、私には末梢の血管を収縮させようと、池の水をかけたのだという。過去に苦い経験から、機転のきいた冷静な判断を私に活かして頂いたのだ。

三年後、先生は愛息を病気で失う不幸にみまわれた。一方で私が医学生の御令嬢を教える運び合わせもあった。人生には大切な出会いがしばしばある。私は、この感謝の気持ちを社会に返さねば、と常々思っている。今夏、勝部先生からの暑中見舞いに、「ふたたびは帰らず深き蜂の穴」（青畝）とあった。喜寿を前に、ますますお元気でいてほしい。（名古屋市立大学病院長 郡健二郎）

