生命科学専攻　英語

英語　第　1　問

以下の文章を日本語に訳せ。

If, as many scientists believe, life can readily emerge under the right environmental conditions, it is possible that life arose on Earth more than once. Scientists have begun searching deserts, lakes and caverns for evidence of "alien" life-forms—organisms that would differ fundamentally from all known living creatures because they arose independently. Even if alternative life does not exist now, it might have flourished in the distant past before dying out for some reason. In that case, scientists might still be able to find markers of their extinct biology in the geologic record. If alternative life had a distinctively different metabolism, it might have altered rocks or created mineral deposits in a way that cannot be explained by the activities of known organisms. A more exciting but also more speculative possibility is that alternative life-forms have survived and are still present in the environment, constituting a kind of shadow biosphere.

cavern（洞窟）、　flourish（繁栄する）、　extinct（絶滅した）、　deposit（堆積物）、biosphere（生物圏）

生命科学専攻　英語

英語　第　2　問

以下の文章を読み、下記の問１ － 問３に答えよ。

An international team of researchers says it has completed a genetic map for an unusual-looking animal: the platypus. For years, scientists have been interested in the platypus because it appears to be a mix of several different animals. The platypus has hair covering its body. But it also has a bill surrounding its mouth and webbed feet like a duck. The researchers sought to understand how this strange creature developed by studying its genome, or full set of chromosomes. The new, genetic map shows that the platypus has genes also found in both birds and reptiles.

The platypus is native to eastern Australia. The platypus is not endangered; however, people rarely see them. This is because the animals spend much of their time in underground passages along small rivers. Although the platypus is considered a mammal, it is actually one of two animals known as monotremes. Both the platypus and the echidna are believed to have resulted from other mammals. （ a ） more than one hundred sixty million years ago. The platypus is so unusual that when it was first sent to scientists in Europe in the nineteen century, they thought the animal was a joke.

For the new study, the researchers examined genetic material from a female platypus they call Glennie. She lives in southeastern Australia. A goal of the study was to find which platypus qualities came from ancient reptiles, and which resulted separately in the development of monotremes. The researchers found that（ b ）in other mammals. For example, it includes genes linked to production of eggs. These genes are shared only with reptiles and fish. The platypus also has genetic material for poisonous venom production similar to that of snakes. The venom is found in back legs of male platypuses. The animal uses it to attack its enemies or other males.

The platypus also carries mammalian genes for milk production. The animal does not have nipples, like most mammals, to feed its young. Instead, the platypus feeds milk to its young through skin on its abdomen. Among the surprises the research team discovered was genetic material responsible for sensitive odor receptors. Scientists had already known of the platypus' ability to identify electric fields of other animals underwater. （ c ） The study also found that the platypus genome is two-thirds the size of the human genome. Eighty-two percent of the animal's genes are shared with mammals.

platypus（カモノハシ）、endangered（絶滅の危機に瀕した）、monotreme（単孔類）、echidna（ハリモグラ）、venom（毒液）、abdomen（腹部）、odor（におい）

平成２１年度　大学院・生命理学研究科博士前期課程　入学試験

生命科学専攻　英語

英語　第　2　問つづき

問１　最初の段落を 80 字程度（60 字から 100 字）の日本語で要約せよ。

問２　下の単語を並べ替えて（　a　）、（　b　）内の文を完成させよ。

(a) believe, separation, that, place, traditional, Scientists, from, this, took, mammals

(b) includes, found, platypus, genes, genome, which, some, the, not, are

問３　(c) の部分に入るように、以下の文章を英訳せよ。

カモノハシは、水中で進路を見つけたり、交配のために連絡したり、狩りをするために、匂いを嗅ぐ能力を使うと、研究者らは信じている。

下書きスペース

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生命科学専攻　英語

英語　第　3　問

以下の文章を読み、問１ － 問５に答えよ。

Until fairly recently, many prominent biologists believed that living systems are qualitatively different from non-living ones, containing within them a “vital spirit” that enables them to perform activities that cannot be carried on outside the living organism. This concept is known as vitalism and its proponents are vitalists.

In the seventeenth century, the vitalists were opposed by a group known as the mechanists. The French philosopher Rene Descartes (1596-1650) was a leading proponent of this point of view. The mechanists set about showing that the body worked essentially like a machine: the arms and legs move like levers, the heart like a pump, the lungs like a bellows. Although these simple mechanical models provided much insight into the functioning of the animal body, by the nineteenth century, the debate about the distinctiveness of living systems had moved beyond them. The argument became centered on whether or not the chemistry of living organisms was governed by the same principles as the chemistry performed in the laboratory. The vitalists claimed that the chemical operations performed by living tissues could not be carried out experimentally in the laboratory, categorizing reactions as either “chemical” or “vital”. Their new opponents, known as reductionist (since they believed that the complex operations of living systems could be reduced to simpler and more readily understandable ones), achieved a partial victory when the German chemist, Friedrich Wöhler (1800-1882) converted an “inorganic” substance (ammonium cyanate) into a familiar organic substance (urea). On the other hand, the claims of the vitalists were supported by the fact that, as chemical knowledge improved, many new compounds were found in living tissues that were never seen in the non-living, or inorganic, world.

In the late 1800s, the leading viatlist was Louis Pasteur, who claimed that the changes that took place when fruit juice was transformed to wine were “vital” and could be carried out only by living cells - the cells of yeasts. In spite of many advances in chemistry, this phase of the controversy lasted until almost the turn of the century. However, in 1898, the German chemists Eduard and Hans Büchner showed that a substance extracted from yeasts cells could produce fermentation outside the living cell. (This substance was given the name enzyme, from zyme, the Greek word meaning “yeast” or ferment). A “vital” reaction was demonstrated to be a chemical one, and the subject was eventually laid to rest. Today, it is generally accepted that living systems “obey the rules” of chemistry and physics, and modern biologists no longer believe in a “vital principle”.

vitalism (生気論), vitalist (生気論者), mechanist (機械論者), proponent (支持者), bellow (ふいご), reductionist (還元論者)

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生命科学専攻　英語

英語　第　3　問つづき

問1　無生物界には存在しない化合物が生物に存在することが明らかとなった。これは生気論・機械論の論争にどのような影響を与えたか。

問2　Pasteur は 1800 年代において生気論の指導者的立場にあった。彼の生気論の考え方はどのような実験によって疑問を持たれたか。

問3　生気論および機械論とはそれぞれどのような考え方か。

問4　還元論者はどのような主張をしていたか。また還元論者がある程度の勝利を得た実験はどのような実験か。

問5　酵素の語源は何か

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生命科学専攻　英語

英語　第　4　問

下記の英文を和訳せよ。

The medicinal properties of salicylic acid, mainly for fever relief, have been known since ancient times, and it was used as an anti-inflammatory drug. Hippocrates wrote in the 5th century BC about a bitter powder extracted from willow bark that could ease aches and pains and reduce fevers. Native Americans used an infusion of the bark for fever and other medicinal purposes for centuries. The medicinal part of the plant is the inner bark and was used as a pain reliever for a variety of ailments. A vicar noted in 1763 that the bark of the willow was effective in reducing a fever. Salicin was isolated in crystalline form from willow in 1828 by a French pharmacist. And an Italian chemist was able to convert the substance into a sugar and a second component, which on oxidation becomes salicylic acid. Salicylic acid is probably best known as a compound that is chemically similar but not identical to the component of aspirin. In fact, salicylic acid is a metabolite of aspirin. Salicylic acid is a phenol ubiquitous in plants generating a significant impact on plant growth and development. Salicylic acid is recognized as an endogenous signal, mediating in plant defense against pathogens.

salicylic acid（サリチル酸），anti-inflammatory drug（抗炎症薬），ailments（病気），Hippocrates（ヒポクラテス），vicar（司教），salicin（サリシン）