2010 年 秋田大学医学部医学科(前期)

以下の「病原菌の発見」についての文章を読み、設問に答えよ。

Throughout history, people have created explanations for disease. Many diseases have been seen as being spiritual in origin – a punishment for a person's sins or as the capricious behavior of gods or spirits. From ancient times, the most commonly held biological theory was that illness was attributable to some sort of imbalance of body humors (hypothetical fluids that were described by their effects, but not identified chemically). Hence, for thousands of years the treatment of disease consisted of appealing to supernatural powers through offerings, sacrifice, and prayer, or of trying to adjust the body humors by inducing vomiting, bleeding, or purging*. However, the introduction of germ theory in the nineteenth century radically changed the explanation of what causes diseases, as well as the nature of their treatment.

As early as the sixteenth century, there was speculation that diseases had natural causes and that the agents of disease were external to the body, and therefore that medical science should consist of identifying those agents and finding chemicals to counteract them. But (l) [be / of/ some / that / might / no one / suspected / invisible organisms / the disease-causing agents], since such organisms had not yet been discovered, or even imagined. The improvement of microscope lenses and design in the seventeenth century led to discovery of a vast new world of microscopically small plants and animals, among them bacteria and yeasts. The discovery of those microorganisms, however, did not suggest what effects they might have on humans and other organisms.

The name most closely associated with the germ theory of disease is that of Louis Pasteur* , a French chemist. The connection between microorganisms and disease is not immediately apparent – especially since (as we know now) most microorganisms do not cause disease and many are beneficial to us. Pasteur came to the discovery of the role of microorganisms through his studies of what causes milk and wine to spoil. He proved that spoilage and fermentation* occur when microorganisms enter them from the air, multiplying rapidly and producing waste products. He showed that (2) [if/ it / of/ out / food / kept / spoil / were / would not / microorganisms] or if they were destroyed by heat.

Turning to the study of animal diseases to find practical cures, Pasteur again showed that microorganisms were involved. In the process, (3)he found that infection by disease organisms – germs – caused the body to build up an immunity against subsequent infection by the same organisms, and that it was possible to produce vaccines that would induce the body to build immunity to a disease without actually causing the disease itself. Pasteur did not actually demonstrate rigorously that a particular disease was caused by a particular, identifiable germi that work was soon accomplished, however, by other scientists.

The consequences of the acceptance of the germ theory of disease were enormous for both science and society. Biologists turned to the identification and investigation of microorganisms, discovering thousands of different bacteria and viruses and gaining a deeper understanding of the interactions between organisms. The practical result was a gradual change in human health practices – the safe handling of food and water,' pasteurization* of milk; and the use of sanitation measures, quarantine*, immunization, and antiseptic* surgical procedures – as well as the virtual elimination of some diseases. Today, the modern technology of high-power imaging and biotechnology make it possible to investigate how microorganisms cause disease, how the immune system combats them, and even how they can be manipulated genetically.

出典: AAAS Project 2061, Science for AllAmericans (1990).

purging* : to cause the body to release all waste products

Louis Pasteur* ・″ a French chemist (1822- 1895)
fermentation* : a process of allowing bacteria to grow in something as it ages, such as wine, cheese, or *natto*
pasteurization* : heating something to a certain point and then cooling it quickly in order to kill bacteria – often done with milk
quarantine* : putting someone or something into isolation – removing them or it from contact with others
antiseptic* : clean; sterile; an absence of bacteria or germs

問 1　第 1 段落の内容によると、人々は病の原因をどのようなものと考え、どのような治療をおこなっていたか、宗教的側面と生物学的側面から日本語で表にまとめよ。ただし、「生物学的側面」からの「原因」は、すでに答えが与えられている。

	宗教的側面	生物学的側面
原因		体液の不均衡によるもの
治療法		

問 2　下線部(1)と(2)の[　　]内の語を並び替え、前後の内容とあう英文を完成させよ。

問 3　下線部(3)を日本語に訳せ。

問 4　下記 a～d の記述が、本文の内容にあっていれば T を、あっていなければ F を記入せよ。
a　今では病気の原因を宗教的なものに求める人は誰もいない。
b　顕微鏡開発の恩恵により、17 世紀には、微生物が人間やその他の生物にどのような効果をもたらすかが、すでに明らかになっていた。
c　大半の微生物は病気を引き起こさず、我々にとって有益なものも多いため、微生物と病気との関連は、すぐにはみえてこない。
d　パストゥールは、特定の病気が特定の同定可能な病原菌によって引き起こされることを、厳密に実証した。

問 5　最終段落の内容を 120 字程度の日本語でまとめよ。句読点も 1 字と数えること。