[医学部学士編入対策問題例]

〔III〕次の英文を読んで、ここで述べられている inflammation(文全体で)について、400字程度でまとめなさい。［＊印のついた語句は注を参照にしなさい。］

What does an injured toe or a splinter* in a finger have to do with your risk of developing Alzheimer's disease, suffering a heart attack or dying from colon cancer*? More than you might think. As scientists look deeper into the fundamental causes of those and other illnesses, they are starting to see links to an age-old immunological defense mechanism called inflammation --- the same biological process that turns the tissue around a splinter red and causes swelling in an injured toe. If they are right --- and the evidence is starting to look pretty good --- it could radically change doctors' concept of what makes us sick. It could also prove a great source of profit to drug companies looking for new ways to keep us well.

Most of the time, inflammation is a lifesaver that enables our bodies to defend themselves against various disease-causing bacteria and viruses.

The instant any of these potentially deadly microbes* slips into the body, inflammation directs a defensive attack that destroys both invader and any tissue it may have infected. Then just as quickly, the process slows down and healing begins.

Every once in a while, however, the whole feverish production doesn't shut down on schedule. Sometimes the problem results from an individual's genes; other times something like smoking or high blood pressure keeps the process going. In any event, inflammation becomes chronic rather than temporary. When that occurs, the body turns on itself --- like a child who can't resist picking a scab*--- with after-effects that seem to cause a wide variety of diseases.

Suddenly, inflammation has become one of the hottest areas of medical research. Hardly a week goes by without the publication of yet another study uncovering a new way that chronic inflammation does harm to the body. It destabilizes* cholesterol deposits in the coronary arteries*, leading to heart attacks and potentially even strokes. It chews up nerve cells in the brains of Alzheimer's victims. It may even foster the spread of abnormal cells and encourage their transformation into cancer. In other words, chronic inflammation may be the engine that drives many of the most feared illnesses of middle and old age.

This concept is so interesting because it suggests a new and possibly much simpler way of warding off disease. Instead of different treatments for, say, heart disease, Alzheimer's and colon cancer, there might be a single, inflammation-reducing remedy that would prevent all three.

Chronic inflammation also fascinates scientists because it indicates that our bodies may have, from an evolutionary perspective, become victims of their own success. "We evolved as a species because of our ability to fight off microbial invaders," says Dr. Peter Libby. "The strategies our bodies used for survival were important in a time when we didn't have processing plants to purify our water, when we didn't have a system to dispose of human

waste."

But now that we are living longer, those same inflammatory strategies are more likely to slip beyond our control. Making matters worse, it appears that many characteristics of a modern lifestyle-such as a diet high in sugars and fats, accompanied by little or no exercise --- also make it easier for the body to become inflamed. At least that's the theory. For now, most of the evidence is as yet uncertain. But that hasn't
stopped doctors from testing the anti-inflammatory drugs that are already on pharmacy shelves to see if they have any broader benefits.

[注]
splinter とげ、裂片
colon cancer 結腸癌
immunological 免疫(学)の
microbe 微生物、病原菌
scab (傷の)かさぶた
destabilize 不安定にする
coronary artery 冠状動脈

〔Ⅳ〕以下の英文で下線部 the work とは、1)どのような推論について2)具体的にどのようなことがなされたかを、1)と2)の両方で400字程度でまとめなさい。

Researchers have tried to create a pandemic H5N1 influenza strain --- and failed.

Simply mixing genes from an H5N1 bird-flu strain with those from an H3N2 human strain did not result in a strain that was readily transmissible, at least among ferrets. The scientists who conducted the work, at the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, say it suggests that the H5N1 virus will require a complex series of genetic changes to evolve into a pandemic strain.

"These data do not mean that H5N1 cannot convert to become transmissible from person to person," says Julie Gerberding, director of the CDC. "We are not out of the woods on pandemic preparedness yet."

Others agree, pointing out that there are many ways a pandemic strain could evolve. For instance, strains other than those used in the experiments could get together. "They need to look at other viruses, because both human and avian flu continue to evolve," says Frederick Hayden, a flu specialist at the University of Virginia, Charlottesville, who is currently working with the World Health Organization.

Since 1997, millions of domestic and wild birds have died owing to the H5N1 strain of flu. It has infected at least 232 people and killed 134 of them. Scientists are worried that H5N1 will learn to pass easily between humans and kill millions more. In 1957 and 1968, pandemic strains of flu seem to have emerged when bird and human flu viruses exchanged genes, allowing the bird-flu virus to be easily transmitted between people.

To test whether H5N1 might do this, the CDC scientists used a technique called reverse genetics to snip genes out of H3N2 and H5N1 viruses and recombine them into hybrid bird-human viruses. They infected ferrets with the hybrids and tested whether the animals got sick and transferred the viruses to other ferrets.

Ferrets infected with hybrid viruses did not get as sick as those infected with the original H5N1 virus. In addition, the ferrets did not pass the hybrid virus easily to others. And even if they did pass on the virus, the other ferrets did not become fatally ill.

The findings seem to indicate that the recombined viruses were less deadly than the original H5N1 strain and unlikely to transfer to other animals, the scientists say. They hope to repeat the experiments to test the pandemic potential of other viruses --- including those taken from patients after 1997, the year that the H5N1 strain they used was isolated.

"We believe this model is a good tool to assess the potential of H5N1 viruses to cause a pandemic in the future," says Jacqueline Katz of the CDC, who led the work.

Many questions remain unanswered, however. The ferret model may not perfectly replicate human disease, say scientists not involved in the experiments. Nor does the study address whether H5N1 could evolve into a pandemic strain by accumulating mutations if it passed through many people. It also did not test hybrids with human flu viruses other than H3N2.

"The attention being paid to pandemic preparedness is certainly appropriate, and the results shouldn't dissuade people from continuing to progress in that area," says Hayden.
(*Nature* 3 August 2006)