問1、英文を読んで下の設問に答えなさい。

Living in tree-filled neighborhoods may reduce risk of heart disease

Researchers at the University of Louisville designed a clinical trial that followed hundreds of people living in six low-to middle-income neighborhoods in South Louisville, Kentucky. "We are trying to see if we can decrease the rates of heart disease in a community," said Aruni Bhatnagar, a professor of medicine at the university, who led the project. The researchers used blood and other samples to better understand how the participants' heart risks changed before and after the team planted thousands of mature trees near their homes. Results from the Green Heart Louisville Project's HEAL Study showed that people living in neighborhoods with twice as many trees had lower levels of a blood marker associated with heart disease, diabetes and some types of cancer, compared with those who lived in neighborhoods with fewer trees.

Most previous studies showing the effects of nature on mental and physical health are observational and can't answer whether people who live in green communities are healthier because they're wealthier and have access to better health care. The HEAL study was set up with a control group and an intervention, which means introducing a measurable condition that some of the participants are exposed to during the study but not before.

Bhatnagar and his team recruited about 750 people living in a 6.4-kilometer area of South Louisville on either side of a highway. The residents were 25 to 75 years old. Nearly 80% were white, and 60% identified as female. Half reported average household incomes of $50,000. The researchers collected blood, urine, nail and hair samples, as well as health data, from each person before they began their intervention. Then, from 2019 to 2022, they planted nearly 8,500 evergreen trees, 630 deciduous trees — the type that lose leaves in the fall — and 45 different types of shrubs in some parts of the study area, leaving others untouched. Last year and this year, they took new samples from residents living in both areas. People living in the intervention areas had 13% lower levels of high-sensitivity C-reactive protein, a blood marker associated with heart disease, including stroke and heart attack. The drop was similar to starting a regular exercise routine.

"There is no sort of ultimate proof of the effect of the trees," Bhatnagar said. "But this is the strongest evidence of any study that's ever been done on trees and their relationship to health."

As part of the study, the project planted trees only in the parts of South Louisville that had the worst air quality. The team took air quality samples before the project, and it is still analyzing how the new tree cover has affected pollution. It's a complex undertaking, because air quality changes based on the weather — a windy day might increase or decrease air pollution in certain areas, depending on the direction of the wind, and air pollution is worse on hotter days.

How trees can improve physical health

Previous studies have shown that spending time in green spaces boosts mental health. This new study showed the connection between living among more trees and physical health. There are several possible theories why this is the case. Trees provide shade and cool the areas where they're planted, helping lower the urban heat effect that disproportionately affects low-income neighborhoods. Hot weather worsens heart disease and can cause heatstroke in people without pre-existing conditions. Trees also reduce noise, which is linked to higher rates of cardiovascular disease, according to Peter James, a researcher at the University of California, who was not involved in the study. "They provide areas for people to relax, exercise, and probably more importantly, socialize," said Joan Casey, an associate professor at the University of Washington. One of the city's major highways runs through the study area. Trees' ability to filter air pollution and shelter neighborhoods from constantly breathing in harmful particles could be a primary way the tree-planting intervention appeared to lower blood marker levels in people living in the greened areas.

If the intervention neighborhoods continue to show positive results, the team involved in the study plans to plant trees in the control group neighborhoods in another three or four years. It also plans to determine whether tree cover improves sleep or children's immune systems by encouraging outside play.

Growing evidence shows the importance of ensuring green spaces are equally distributed around cities, which is currently not the case. Casey said it's important that city planners be careful not to create "green gentrification" when they create more access to green spaces in cities — that is, when spaces such as water fronts are improved and housing prices increase as a result, making it unaffordable for current residents to continue living there once a green space is completed. "The take-home message here is that nature is not an amenity; green spaces are not only for the wealthy. They are essential for us all as human beings," James said.

[Kaitlin Sullivan and Anne Thompson, Living in tree-filled neighborhoods may reduce nsk of heart disease, study shows. NBC News, August 27, 2024より抜粋,一部改変]

1. So far, how has the HEAL Study research team examined the effect of urban trees and plants on people's health? Circle the best answer.
A) They compared middle class neighborhoods with poorer neighborhoods.
B) They compared neighborhoods that previously had different noise levels.
C) They compared neighborhoods with different kinds of trees and plants.
D) They compared recently greened neighbo血oods and those without new trees.

2. According to the article, which of the following is NOT true about the study area? Circle the best answer.
A) It was a city in Kentucky.
B) It was a high-income area.
C) More than half of the residents were female.
D) None of the residents were older than 75.

3. Which of the following best describes the HEAL study research team's future research plan on greening neighborhoods? Circle the best answer.
A) Determine the effects of trees on sleep quality
B) Examine how highways can be distributed in green areas
C) Investigate whether green spaces improve housing prices
D) Observe if exercise improves children's mental health

4. HEALプロジェクトにおいて,すでに明らかになっている主な成果を,本文に即して日本語で説明しなさい。

5．木々に囲まれて暮らすことが身体の健康に良い影響を与える，と述べられている。本文に即して，その理由について日本語で説明しなさい。