

Practicing Preventive Medicine with a Customized Medical Checkup Program

Center for Personalized Medicine for Healthy Aging

In May 2016, the Center for Personalized Medicine for Healthy Aging started operation on the 16th floor of the Medical Hospital as the first health checkup center at Tokyo Medical and Dental University. Unlike ordinary comprehensive medical checkup facilities, the Center practices advanced preventive medicine based on individual genomic information. In this Special Feature, we focus on the role and mission of the Center at a time when societal needs for preventive medical care and advanced medical care are increasing.



Photo by Aflo

Everyone wants to live a healthy, long life. In fact, however, as the super-aging of society progresses, the numbers of people suffering from lifestyle diseases, cancer, and dementia are increasing, and Japan's medical costs continue to rise.

In those circumstances, preventive medical care is mentioned as an important national issue and a societal imperative. Whereas in conventional medicine, treatment is provided after a person becomes ill, the idea behind preventive medicine is to provide medical intervention to avoid illness. Expectations are high that preventive medicine will contribute to controlling constantly soaring medical costs.

In particular, since changes in lifestyle habits, such as eating and smoking behaviors, increase the preventive effect, group medical checkups, such as metabolic syndrome checkups, have been actively promoted and conducted.

The Tokyo Medical and Dental University Medical Hospital Center for Per-

sonalized Medicine for Healthy Aging has developed an advanced medical examination system and conducts medical checkups that can be utilized in preemptive medical care, which goes a step further than preventive medical care. The Center aspires to live up to its name by providing personalized services that help patients lead long, healthy lives.

Health Management Genomic Information for Estimating Disease Risk

The Center performs examinations for heart, lung, esophagus and stomach, colon, urinary organ, brain, and vision and hearing. PET-CT whole body screening for occult neoplasm or inflammation, and women's cancer screening. Sleep examinations, motor organ examinations, and dental checkups, examinations seldom performed at ordinary medical checkup facilities, are also available.

An even more important characteristic of the Center is that it offers a unique

program for providing genetic risks of common non-communicable diseases, such as cancer and lifestyle diseases. Through this program, developed jointly with TMDU's Bioresource Research Center, the Center for Personalized Medicine for Healthy Aging performs gene analysis and informs disease risk factors and possible preventive measures to each individual.

Approximately 30 diseases are covered, including 10 types of cancer, such



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A summary of items offered by the Center for identifying individuals' genetic risks

More than 60 items

Cancer risk (approx. 10 types)

Breast cancer (women only), lung cancer, esophageal cancer, stomach cancer, colorectal cancer, prostate cancer (men only), etc.

Lifestyle diseases and other disease risk (approx. 20 diseases)

Type 2 diabetes, high blood pressure, ischemic heart disease, arrhythmia, non-alcoholic fatty liver disease (NAFLD), Graves' disease, rheumatoid arthritis, etc.

Genetic patterns associated with laboratory test values

Blood pressure, blood glucose level (HbA1c), cholesterol level, etc.

Drug responsiveness

Prediction for warfarin resistance, carbamazepine side effects, etc.

Approx. 30 diseases

Analysis of approximately 60 items, consisting of about 30 risk items for common non-communicable diseases, 3 items related to drug responsiveness and 30 genetic patterns affecting laboratory test values such as cholesterol level. This program does not deal with hereditary diseases such as familial colon cancer.

as breast cancer, lung cancer, esophageal cancer, stomach cancer, and colon cancer, as well as type 2 diabetes, high blood pressure, non-alcoholic fatty liver disease (NAFLD), and rheumatoid arthritis. Genetic risk diagnosis is performed for more than 60 items, including genetic patterns associated with blood pressure, blood glucose level, cholesterol level, and other laboratory test values as well as drug responsiveness, such as prediction for warfarin resistance. As the color of the pea plant is determined by the pattern of genetic variation called the genotype, it is considered that risks of some common diseases can be estimated from genotypes. Based on this idea, the Center analyzes genotypes from the individual DNA sample and determines genetic risk for each disease of interest. Furthermore, the Center assists patients in preventing illnesses by proposing ways of avoiding risk diseases devised by specialist physician groups within the University.

The important point is the Center's role does not end with providing genetic risk information and suggesting effective ways to prevent at risk diseases. It provides in as much depth as possible explanations and counseling about gene analysis results, which in many respects are difficult for people in general to understand, and offers nutritional guidance and lifestyle guidance with the aim of contributing to preventive medical care.

Furthermore, the Center carefully follows up after examinations by prepar-

ing a menu of checkup options in accordance with patients' risk. Some patients who had been unable to improve their lifestyle habits, despite being warned for many years about high blood glucose levels, modified their behaviors after disease risk was demonstrated using genomic information.

Director Kinya Ishikawa explains that this follow-up system is a unique strength of the Center for Personalized Medicine for Healthy Aging: "At the Center, we don't prepare manuals on examination flow or patient support. This is because appropriate examination items and medical checkup requirements vary from person to person. Here, we select examination items in accordance with the wishes of the individual and often change examination frequency or introduce additional examination items according to genomic information. I think the Center is highly regarded because of this ability to respond in accordance with the needs of each individual."

Expanding the Scope to Include Visitors from Overseas

During the nearly two years since the Center opened, the number of members has increased beyond expectations. According to Director Ishikawa, "Since the Medical Hospital is a health and medical care institution, it cannot actively publicize the medical checkup program, which is uninsured care. Even so, the program's reputation has spread.

Recently we have been receiving applications for individual membership from several people each week, and we already have five out of a maximum six corporate members. It seems that the Center is highly rated for genomic information provision as well as access to examinations and diagnosis by university hospital medical specialists."

When the Center first opened, one challenge was how to not only announce its existence to patients, but also publicize it within the Hospital. Now, some three years since the preparatory phase, awareness within the Hospital is fairly high, and the handover of patients from the Center to clinical departments is proceeding smoothly.

Recently, the Center has been receiving an increasing number of inquiries from overseas, mainly from elsewhere in Asia, and is preparing to accept overseas patients. However, since the ability to relax and undergo medical examinations in a restful atmosphere is a positive feature of the Center, the aim is to increase the quality of the program without excessively increasing the number of patients. Director Ishikawa says, "I want to enhance the program as a whole without compromising the Center's positive features, such as an environment for performing endoscopic examination pre-treatment in a private room with a lavatory and careful examinations performed by highly skilled medical specialists using advanced examination equipment."