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Research

With the research strength to drive national projects

※1 / 5 Major diseases

The 5 diseases including cancer, stroke, acute myocardial infarction, diabetes mellitus, and mental disorders.

※2 / Disability-adjusted Life Care (DALY)

Indicator to measure how much loss society suffers as a result of disease or accident. Calculated based on the sum years of life expectancy lost when life is spent in an unhealthy state and when death comes too soon.

※3 / AMED

Japan Agency for Medical Research and Development. AMED consolidates budgets for research expenses, which had previously been allocated from different sources: The Ministry of Education, Culture, Sports, Science and Technology, the Ministry of Health, Labour and

Welfare, and the Ministry of Economy, Trade and Industry, and promotes integrated research and development in the field of medicine, from basic research to practical applications, by ensuring a conducive environment.

From Genomics Research Creating animal models and iPS cells

With the current patient population in Japan exceeding 3 million, mental disorders are designated one of the 5 major diseases※1. Their Disability-Adjusted Life Year (DALY)※2, a measure of socioeconomic losses, stands at No. 1, showing they have a serious impact. However, since the causes of mental disorders remain unknown, they are diagnosed based on symptomology and there are as yet no fundamental treatments based on pathogenesis. If the patients rarely complain of any symptoms, both the diagnosis and initiation of treatment are delayed, and the fact is, that may result in an inappropriate diagnosis or treatment choice. To overcome the problems related to mental disorders, it is essential to elucidate the pathogenesis and develop diagnostic tools and treatment methods based on this knowledge. We have therefore been involved in elucidating the cause and pathogenic mechanisms of diseases using neuroscientific and genomic science techniques, and undertaking various forms of research so that we may develop treatments and prophylactic methods based on these discoveries. Our research projects have also been chosen as AMED※3 projects.

One is the creation of animal models of mental disorders based on the results of human genomic analysis. We have focused on the genome as the cause of schizophrenia, autistic spectrum disorders, and bipolar disorder. In addition to creating mice that possess the same genomic variant as these patients, we are also searching to see if there are Japanese monkeys with similar genomic variants. We are also creating cell and tissue models differentiated from iPS cells generated from blood cells donated by patients with genomic variants. Genomics research allows us to create animal models and cell and tissue models. Our goal is to elucidate the pathogenesis of mental disorders by comparing and investigating patient brain images and postmortem brain tissues through the use of these tools. Genomic analysis of patients with schizophrenia allowed us to confirm that the 22q11.2 deletion, designated an intractable disease, allowing us to discover part of the pathogenic disease mechanism.

Collaboration between clinical medicine and the basic sciences to support Life, Living, and Lives

A part of the All-Japan Industry-Academia collaboration, we are conducting research in cooperation with research organizations around the world. One of the reasons we lead in cutting-edge research, is because we have outstanding researchers specializing in a broad range of research from the basic sciences through clinical medicine. At Nagoya University Hospital, clinical departments establish a network to treat patients in collaboration. Geographically, we are particularly well-situated for cooperative research being in close proximity to the Primate Research Institute in Inuyama and the National Institute for Physiological Sciences in Okazaki.

Simultaneously, our priorities in research must always be to benefit the patient under medical care. Thus, cooperation is essential between the clinician who thoroughly understands patients' needs and the limitations posed by current diagnosis and treatment, and the basic sciences researcher. As a clinician myself, I practice medicine and provide genetic counseling, and am also involved in undertaking broad research themes together with basic research scientists. Bridging clinical and basic research is essential to ensuring the benefits of our research become available to society without delay. To realize this, we need to educate and nurture research physicians, and clinicians with an understanding towards research more than ever.

Common to all research, not only must it help to lengthen life, but also enhance the quality of living and life. Our goal matches AMED's proposal for research that supports life (animus), living, and lives. It is with this unshakable conviction that will strive to meet the needs and hopes of our patients and their families.



Elucidating the pathogenesis of mental disorders To develop diagnostic tools and treatment methods

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