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Joint Degree Program for Graduate Students at the Nagoya University Graduate School of Medicine

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ABSTRACT

In a world of increasing academic mobility, most universities seek to give their students opportunities to experience education in different countries, which is especially true for senior research students. The Nagoya University Graduate School of Medicine started a joint degree program (JDP) for PhD students with the University of Adelaide, Faculty of Health Science (Australia) in 2015 and with Lund University Faculty of Medicine (Sweden) in 2017. Furthermore, we have started a new JDP with the University of Freiburg, Faculty of Medicine (Germany) in 2018. This article reports the issues specific to counterpart medical schools, including student's recruitment, the curriculum, and the general differences between each schools. JDPs are not only important for educational collaboration, but also as a strategy to encourage international research collaboration, which is a core criterion to a university's world-ranking reputation. Acquiring knowledge about educational strategies that are implemented in different foreign medical schools represents a unique opportunity to improve our own curriculum.

Keywords: Joint Degree Program, single degree, international research collaboration, combined committee

Abbreviation:

JDP: Joint Degree program

DDP: Double Degree program

JSP: Joint Supervision Program

MD: Doctor of Medicine

PhD: Doctor of Philosophy

MEXT: Ministry of Education, Culture, Sports, Science and Technology

SGBM: Spemann Graduate School of Biology and Medicine

THE: Times Higher Education World University Ranking

QS: Quacquarelli Symonds World University Rankings

SAHMRI: The South Australia Health and Medical Research Institute

ICT: Information and Communication Technology

SGBM: Spemann Graduate School of Biology and Medicine

AC21: Academic consortium 21

FLAN: Freiburg, Lund, Adelaide, and Nagoya

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INTRODUCTION

There has been a recent move worldwide for a large number of universities to internationalize their curriculum and implement student's exchange agreements with foreign counterparts.¹⁻³ An international education program and its related research collaboration is the core infrastructure used for internationalization. International collaboration is related to citation index, as well as to a university's reputation based on university ranking lists (Figure 1). There are many similar terms related to international educational collaboration, such as joint degree, jointly awarded degree, double degree, doubly badged degree, cotutelle, dual degree, and joint supervision. The aforementioned terms describe similar academic activities, but have entirely different meanings in different countries, or even in different universities within the same country.⁴⁻⁷ As a consequence, any agreement or discussion concerning academic activities across international partners must clearly define the meaning of the terms used. Based on the current situation in terms of procedures related to the establishment of new joint degree programs (JDPs) in Japan, it seems that foreign universities are more autonomous with status that is relatively independent from their respective Ministry of Education. This is true at least for German, Swedish, and Australian institutions in higher education.⁸ In the other hand, Japanese universities are required to submit their application for a new JDP to the Ministry of Education, Culture, Sports, Science and Technology (MEXT). The content of the lengthy submitted documents, which may be longer than 600 pages, is then

Establishment of international joint unit for research and education

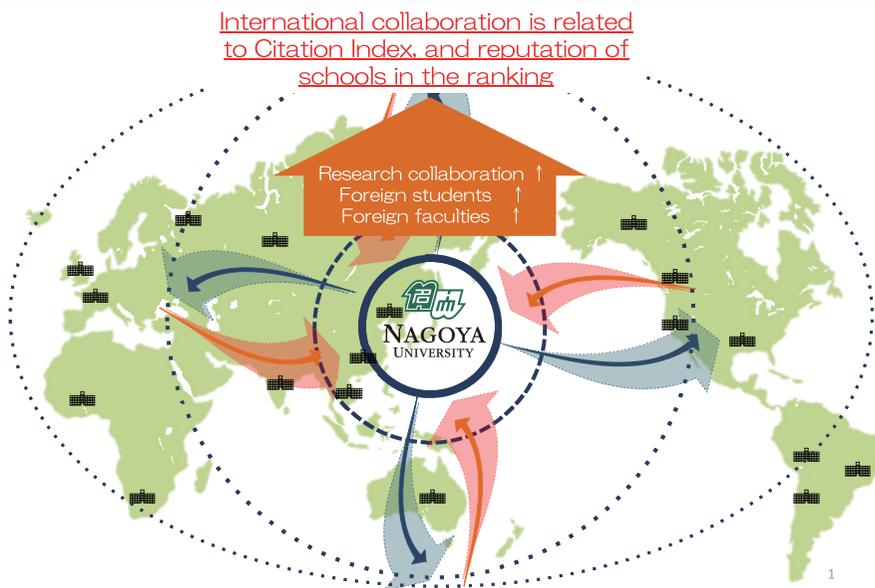


Fig 1. Establishment of the international joint unit for research and education

Our aim is to establish international joint unit for research and education and to increase the number of foreign students and foreign faculties. As a consequence, we may rise up in the world university rankings through international research collaboration. A joint degree program is one of our strategies for internationalization and connecting strongly to sister medical schools. This effort will contribute to gathering information about the student curriculum, administrative management, and the latest research topics.

reviewed by MEXT for final approval, which is required for all Japanese JDPs.

The Japanese education system had been long restricted and, in fact, not allowed any JDP because it is not appropriate, in light of quality assurance, to allow foreign universities that are outside the jurisdiction of Japanese laws to play part in the conferral of Japanese academic degrees. In this regard, the Japanese educational system continues to respect the ‘principle of territoriality of laws’ and exclude the involvement of foreign universities from Japan’s School Education Law and other laws and regulations, even when a JDP is newly established as a system in a Japanese jurisdiction (as an ‘International Cooperative Curricula Scheme’). Therefore, pursuant to the School Education Law and other laws and regulations, a JDP under this Japanese scheme is deemed as ‘a degree conferred by Japanese universities’ allowing universities in foreign countries to sign jointly with Japanese universities on a relevant diploma, while the actual process in reality may differ from legal treatment. With regard to the quality of educational activities of partner universities in foreign countries, the scheme will make it mandatory for Japanese universities to conclude agreements with partner universities and establish an ‘International Cooperative Department’ or ‘Major’ to implement the aforementioned ‘International Cooperative Curricula Scheme’.

Among all medical schools in Japan, the Nagoya University Graduate School of Medicine became, in 2015, the first MEXT-approved institution in Japan to have a JDP program with a for-

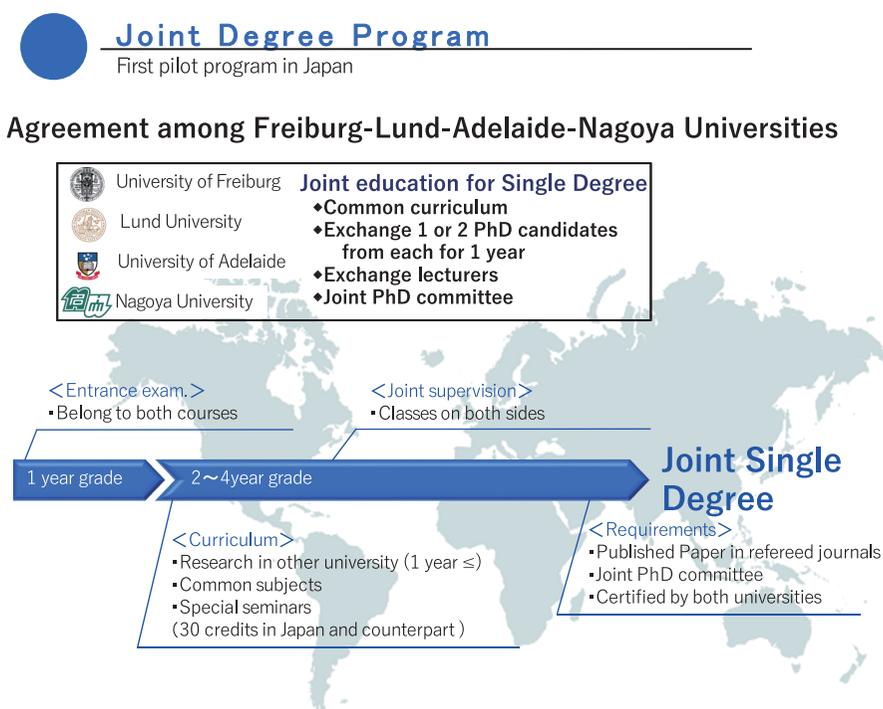
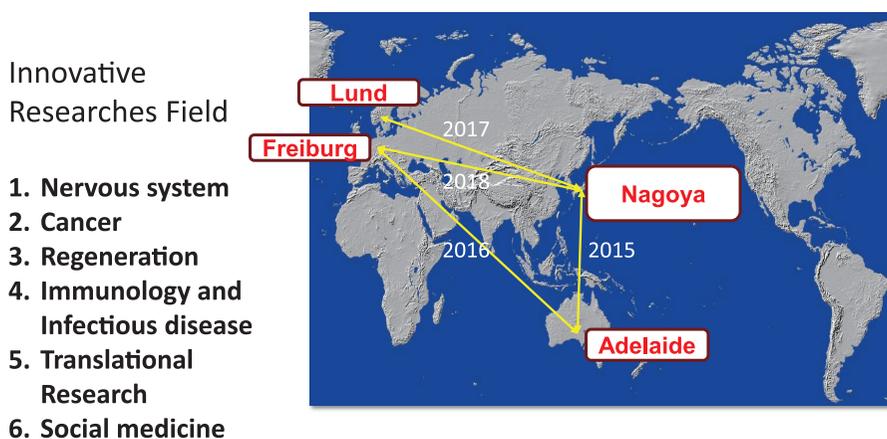


Fig. 2 Joint degree program (JDP) curriculum

A JDP is a program in which students learn fundamental knowledge and techniques in their main school during their first year, then move to the counterpart school and study at least for one year in years 2 to 4 before coming back to their main school again. At least one published academic paper in a refereed journal is required for a student’s dissertation. The thesis is evaluated by the joint PhD committee, and a single diploma is conferred with both school’s representative’s signatures.

eign medical school with Adelaide. The JDP requires enrollees to study and research a common theme in a counterpart school for at least 1 year; then, under the evaluation and recommendation of a common examination committee for the thesis, candidates can receive an official ‘Joint Single Degree’ testamur signed by relevant representatives of both universities. Before setting up the JDP, we signed a Joint Supervision Program (JSP) as a JDP pilot program between Adelaide, Nagoya, and Freiburg Universities in 2014 (Figure 2). The Nagoya University Graduate School of Medicine started enrolling JDP students in the PhD course with the University of Adelaide, Faculty of Health Science (Australia) in October 2015, and with the Lund University, Faculty of Medicine (Sweden) in April 2017. Furthermore, we are preparing an additional JDP with the University of Freiburg, Faculty of Medicine (Germany) that is expected to start in October 2018 (Figure 3). Only three years after Nagoya University introduced the first Japanese JDP with the University of Adelaide in 2015, there are currently a total of 19 JDPs in Japan, including seven JDPs established between medical schools (Table 1). For example, Tokyo Medical and Dental University started enrolling JDP students in a PhD course with the University of Chile (Chile) in April 2016, and with Chulalongkorn University (Thailand) in August 2016.

Global Research Triangle among FLAN members



Our Medical school is pioneer of JDP in Japan.

JDP is contributed to the numbers of International Research Collaboration.

Fig. 3 Global research triangle among Freiburg, Lund, Adelaide, and Nagoya (FLAN) members
Nagoya University started to enroll students in a joint degree program (JDP) with the University of Adelaide in 2015, with Lund University in 2017, and plans to start with the University of Freiburg in 2018. A JDP contributes to the amount of international research collaboration. We are attempting to innovate research fields (nervous system, cancer, regeneration, immunology and infectious disease, translational research, and social medicine) through this international alliance.

Outline of Joint Degree Program at Nagoya University Graduate School of Medicine

Table 1 Approved JDP by MEXT in Japan (including expected program)

Domestic university	Partner country	Partner university	Faculty(School)name	Course	Date
University of Tsukuba	France	Bordeaux University	Graduate School of Comprehensive Human Sciences Sciences	Master	2017. 9
	Taiwan	National Taiwan University			
	Malaysia	Malaysia-Japan International Institute of Technology	Graduate School of Life and Environmental Sciences	Master	2017. 9
Tokyo Medical and Dental University	Chile	University of Chile	Graduate School of Medical and Dental	Doctor	2016. 4
	Thailand	Chulalongkorn University	Graduate School of Medical and Dental	Doctor	2016. 8
Gifu University	India	Indian Institutes of Technology	Graduate School of Natural Science and Technology	Master	2019. 4
Nagoya University	Australia	The University of Adelaide	Graduate School of Medicine	Doctor	2015.10
	England	University of Edinburgh	Graduate School of Science	Doctor	2016.10
	Sweden	Lund University	Graduate School of Medicine	Doctor	2017. 4
	Thailand	Kasetsart University	Graduate School of Bioagricultural Science	Doctor	2018. 4
	Germany	University of Freiburg	Graduate School of Medicine	Doctor	2018.10
	Australia	The University of Western Australia	Graduate School of Bioagricultural Science	Doctor	2019. 4
	England	University of Warwick	Graduate School of Humanities	Doctor	
Nagoya Institute of Technology	Australia	University of Wollongong	Graduate School of Engineering	Doctor	2018. 3
Kyoto University	Germany	Heidelberg University	Graduate School of Letters	Master	2017.10
	Canada	McGill University	Graduate School of Medicine	Doctor	2018. 4
Kyoto Institute of Technology	Thailand	Chiang Mai University	Graduate School of Science and Technology	Master	2017. 4
Yamaguchi University	Thailand	Kasetsart University	Graduate School of Science and Technology for Innovation	Master	2019. 4
Nagasaki University	England	University of London	School of Tropical Medicine and Global Health	Doctor	2018.10
Ritsumeikan University	America	American University	College of International Relations	Bachelor	2018. 4

1. What is the difference between a JDP and a double degree program?

These terms have entirely different meanings in different countries, or even in different universities within the same country. To clarify this difference, MEXT elaborated an extract on their guideline to explain the differences between a JDP and a double degree program (DDP), as clarified on the following paragraphs:⁹

A JDP is a single academic degree jointly conferred on students who have completed a single joint educational program established by universities that jointly set up the said program. The latest revisions of the Standards for the Establishment of Universities, and the relevant regulations, will make it possible for Japanese universities to confer “joint degrees” in their names and the names of partner universities in foreign countries on those who have completed prescribed programs.

A DDP is an academic degree separately conferred on students who have completed multiple educational programs at the same academic degree level, established by universities under a partnership and satisfied under the requirements of each of the universities. Such degrees will

be conferred on qualified students by each of the universities.

In the case of JDPs, universities organize the JDP-related syllabus together, and design a special curriculum following their JDP curriculum policy. Two or more schools need to discuss their admission policy, curriculum policy, and diploma policy at the beginning, and then recruit students worldwide following their admission policy. In contrast to a JDP, a DDP does not require a single admission policy, curriculum policy, or diploma policy at the time of establishment. Of importance for Japan, a DDP doesn't need the prerequisite of the approval by MEXT for starting the curriculum. A DDP can be established based on a consensus between two schools, and under agreement for a DDP.¹⁰ Usually, a JDP requires students to accomplish one thesis in the academic field for a single diploma, whereas a DDP requires students to accomplish two different theses in the academic field, or sometimes, in different academic fields.¹¹⁻¹⁶ Therefore, a JDP guarantees deep knowledge of content in a one related academic field, while a DDP guarantees wider knowledge of a related field (even sometimes in a different academic field).¹⁷ While for JDPs, the PhD course period is not extended, a DDP's PhD course period is usually protracted, and an additional one or two years are needed to acquire a double diploma. Although these are fundamental differences between JDPs and DDPs, some changes were recently introduced and certain DDPs may not require an extension of the enrolment period or having two theses, if the examination committee is combined and includes members from both universities. Although in this case, the combined examination committee evaluates only one thesis, which is similar to a JDP, there are still different aspects because a proper JDP requires a comprehensive discussion regarding common use policy and curriculum. Therefore, institutions with signed JDPs may have stronger relationships compared with institutions that have DDPs. Under the situation of this stronger relationship between institutions with signed JDPs, the possibility of establishing a new international collaboration is more likely than in the case of a DDP.

2. Which challenges are associated with JDP recruitment in medical schools?

In Japan, the MD course curriculum is six years, and these students are able to enter a PhD course without obtaining a master's degree. After the graduation from medical school, graduates need to spend another extra two years as a junior medical intern and four to six years as a senior medical intern training for each specialty. Due to this fact, although graduate medical schools in Japan offer two-year master's courses, there is limited interest from their graduates and the enrollees are mostly non-MD holders. Therefore, in the case of medical schools in Japan, recruitment from their own master's students for JPD enrollment is not very effective compared with master's courses run by non-medical graduate schools. Another hurdle for recruitment is the specialist board certification process for physicians. The number of physicians entering PhD courses in medical school has been decreasing. Their priority seems to be completing the board certification process, and only a few decide to pursue a PhD and gain research experience in a foreign country. It seems that nowadays, PhD and MD career paths are diverging, while at the same time the percentage of non-MDs enrolled in PhD courses in medical school remains relatively low. Considering that Japanese graduate schools usually do not provide scholarships or financial support for domestic PhD candidates, most MD holders who decide to pursue a PhD, have to continue their clinical work while they do research. This is mainly because they are in an age where they have a family and must provide support to their family. In addition to that, one of the reasons of the graduates to come back to medical school after completing an undergraduate course is to see rare clinical cases and learn special techniques that are available only at highly specialized institutions, such as medical schools. Therefore, in most cases, a clinical department gives their PhD students the chance to experience at least one year of clinical practice at the beginning of their PhD course and then start research in their second year. Basic

science laboratories have a set of issues related to PhD courses. Specifically, the beginning of a PhD course is a very important period in terms of deciding whether an MD-holding PhD candidate will become a full-time basic scientist or return to clinical work. In other words, if they can be sure of their own talent for basic research, they can decide to dedicate their life to basic research; but if not, they will have to return to clinical work. Therefore, the first two or three years in PhD course are critical, which is why they prefer to study and research in the same laboratory in own country, and would not go to different country, and develop a productive relationship with their supervisor in a familiar research environment.

3. *What are the strong points and specialties of the University of Adelaide, Faculty of Health Science?*

The University of Adelaide was established in 1874 in South Australia Adelaide, and is the third oldest University in Australia. In 2018, it was 134th in the Times Higher Education World University Ranking (THE) and 109th in the Quacquarelli Symonds (QS) World University Rankings, with five novel prize winners including John Robin Warren and Howard Walter Florey. John Robin Warren is famous for his study of *Helicobacter pylori*. Howard Walter Florey is famous for his study of penicillin. The University of Adelaide is a member of the Group of 8 in Australia, and a member of AC21 that Nagoya University established as the top-ranking 20 research universities consortium. Their specialty research fields are agriculture, medicine, energy, and mineralogy as well as translational research that has resulted in several commercial products.

South Australia's local government has attempted to make Adelaide the biggest science research area. The South Australia Health and Medical Research Institute (SAHMRI) is a symbol for this challenge. The Royal Adelaide Hospital and the Pharmaceutical Research Center are located beside SAHMRI. Translational research between basic research and clinical trials is done relatively easily in this area. Translational research from the University of Adelaide is famous for the discovery of *Helicobacter pylori* as being the core reason for chronic gastritis. It is also famous for the burn unit that developed a skin transplantation spray.

4. *What are the strong points and specialties of the Lund University, Faculty of Medicine?*

Lund University is located in southern Sweden, and was established in 1666. In 2018, it was ranked 93rd in the THE, and was 78th in the QS World University Rankings, with four Nobel Prize winners including Sune Bergström, who is famous for discovering prostaglandin, and Arvid Carlsson, who is famous for discovering the importance of dopamine as well as Parkinson's disease research. Sweden has received a high evaluation for its Information and Communication Technology (ICT) tool, and the University of Lund is famous for an eHealth project using this ICT big data including social security numbers, personal medical records, taxes, and income. This project enables comprehensive analysis of the social security system and improves the health system in general.

5. *What are the strong points and specialties of the University of Freiburg, Faculty of Medicine?*

The University of Freiburg was established in 1457, in Germany. In 2018, it was ranked 82nd in the THE, and was 171st in the QS World University Rankings, with 19 Nobel Prize winners including 10 in the field of Physiology or Medicine. As of 2015 in Germany, there were 16 Nobel Prize winners in the field of Physiology or Medicine, of which 10 were awarded to researchers affiliated with the University of Freiburg. The Max Planck Institute of Immunology and Epigenetics is located in the city of Freiburg, and PhD students are able to work and study there. The University of Freiburg has a unique educational system for the PhD graduate course implemented at the Spemann Graduate School of Biology and Medicine (SGBM). SGBM

developed a multidisciplinary approach, and PhD candidates come from the School of Medicine, Science and Agriculture. This unique system combines several academic disciplines or professional specializations in an approach to a complex scientific problem, and has links with different branches of German industry.

CONCLUSION

Nagoya University has organized the academic consortium AC21; the University of Adelaide and University of Freiburg are included as members of this consortium. Before starting a JDP, our medical school had plenty of knowledge about the University of Freiburg and the University of Adelaide through this AC21. Our first aim in 2015 was to create a triangular alliance between Freiburg, Adelaide, and Nagoya. Lund University was added to the aforementioned tripartite academic partnership in 2017. The JDP with the University of Freiburg was delayed, and in the spring of 2018, it was finally submitted the application form to MEXT, and has been approved in July in 2018. The reason for this delay was related to the academic degree name. MEXT required the universities to use the same academic degree name, because upon a student's successful completion of the JDP, both universities award a single academic degree. Specifically, instead of the PhD credential that is used by Japanese universities, a doctor rerum naturalium (Dr. rer. nat.) has been awarded by SGBM. We spent approximately two years resolving this issue, and as a result, University of Freiburg agreed to use the Doctor of Philosophy (Medicine) as the academic degree name awarded upon successful completion of the JDP.

As mentioned before, a JDP is not only an educational program; it also provides an impetus for international research collaboration. In that sense, we have established a Freiburg, Lund, Adelaide, and Nagoya (FLAN) alliance, which is a partnership between the universities with which we have signed mutual JDP agreements. This meeting is organized annually, and the host is rotated, so that each FLAN member organizes a meeting once every four years. During FLAN meetings, we invite principal investigators (PIs) to present their research. We also ask the PIs to use the FLAN meeting to recruit students who are potentially interested in joining a JDP and to establish research connections with PIs from other FLAN universities. Our intention is to use the FLAN meetings as a platform to recruit new JDP students and to establish research connections between PIs affiliated with the FLAN universities (Figure 3).

There are some concerns about the future situation of JDPs. We fear that JDPs may not become popular in Japan under the current legal system, despite the advantages JDPs have over DDPs. That is to say, the current Japanese legal system dictates that a new program (SENKOU) be established for each JDP. Therefore, we have a total of three SENKOU; one for each university (i.e. University of Adelaide, University of Freiburg, and Lund University). As mentioned previously, MEXT would like to maintain the quality of SENKOU based on their evaluation standard. This standard mandates to provide plenty of documentation including, but not limited to, a blueprint of the architecture, the course curriculum, and a list of faculty members. Both sides – the Japanese university and its foreign counterpart – should be involved in preparing the aforementioned documentation. It is sometimes difficult to explain to a counterpart school why such information is required to establish a JDP for a relatively small number of students (two to four per year). Furthermore, this system is completely alien to non-Japanese academic institutions because for most European and Australian universities, establishing a new JDP does not require government intervention. Conversely, Japanese universities can learn about a different system that regulates the operations of universities in foreign countries, the educational curriculum, policy and nature of a PhD course, and much more. To make the Japanese educational system

more international, we hope Japanese laws change soon and that JDPs spread to many schools in Japan. However, even if the situation changes and each school could establish a new JDP without intervention, the government still should evaluate its activity and the quality of its JDP, and then consider a supportive grant based on the results. We believe that, in this borderless society of the world, we should avoid becoming the “isolated Islands,” in terms of the global academic landscape.

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CONFLICT OF INTEREST

All Authors declare no conflict of interest. All authors are responsible for the content and writing of the paper.

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