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Biotechnology Development Collaboration System and Limitations of Domestic Physician Scientists

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Abstract

The purpose of the domestic physician scientist support program is to promote the development of various biotechnology. Therefore, it can be said that examining whether the purpose of support is being faithfully implemented has an important meaning for the future domestic biotechnology development ecosystem. Therefore, this study limited the subject of analysis to 79 MD-PhD experts who participated or participated in doctor scientist programs at major universities in Korea. Among them, a total of 25 researchers, one researcher from each classroom in parasitology, microbiology, pharmacology, biochemistry, physiology, and anatomy, which had the highest paper citations in the last five years (2016-2021), were selected to examine the relationship between joint research.

It was selected as the subject of review. As a result, 25 selected pseudo-scientists(MD-PhD) identified domestic and foreign researchers who participated as co-researchers when publishing in overseas academic journals for the last 5 years(2016-2021), and identified the affiliation and name of the top 5 among them, as well as the pseudo-scientist(MD-PhD), it was possible to identify the relationship of a total of 123 co-researchers(excluding 2 missing values) of the top 5 co-researchers with a high degree of cooperation with respect to the researcher(25 in total), and the collaboration of pseudo-scientists. Relationships, major researchers, and research institutes were examined. Nodexl Basic 2018 ver. (Microsof) was used for the analysis, and the relationship between researchers could be visualized by applying network analysis techniques.

Keywords: *physician scientist, biotechnology, Nodexl Basic, network analysis*

1. Introduction

In the case of advanced countries, as they have recently learned that the biohealth industry can create innovation and economic value in various industries, they are paying much attention to the establishment of a governance system and collaboration system for biotechnology development to foster the biohealth industry. (KAMC, 2021) In particular, as core technology development in the bio-health industry can be developed through collaboration between various disciplines based on clinical processes, the establishment of a virtuous cycle ecosystem related to this is recognized as as important as related technology research. Gotian & Anderson (2020) emphasized the importance of those who hold a medical license and received the research training required for successful scientists, who are creative and continuously active as physician scientists, and emphasized that their share in biotechnology development is very important. [1].

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2. Reviews of Previous Research

Until now, the method of grasping the research trends of the majority of physician scientists has remained

In addition, Davila (2016) defines a physician-scientist as a person who enables new discoveries in the treatment and understanding of human diseases while performing a 'unique role in linking basic scientific research with clinical practice'. Among them, the possibility of contribution to technology development and its limitations are being paid attention to by the collaborative system of physician scientists as intermediary researchers who combine basic medicine or combine science in clinical and related fields among doctors performing clinical practice. [2-3].

at inferring the latest research trends by identifying the clinical medical discussions of research papers published in the SCI level of Nobel laureates in Physiology or Medicine for the past five years.

However, this study is the first attempt in terms of exploring the possibility of improving the quality of research through a collaborative system between researchers beyond a simple quantitative comparison, and it can be said to be of great significance. [4-6].

3. Method

After selecting 79 physician scientists from major universities with domestic physician scientists training programs, comparing their citations for the last 5 years, parasitology, microbiology, pharmacology, biochemistry, physiology, and anatomy, the highest among them. One researcher was selected for each classroom. As a result, network analysis was conducted using Nodexl Basic 2018 ver. (Microsof) to examine the relationship between the 25 citation index rankings in joint research, and as a result, the collaboration system between researchers was analyzed. [7-10].

Figure 1 shows 'How to review the Analysis method of Physician Scientists Collaborative relationship'.

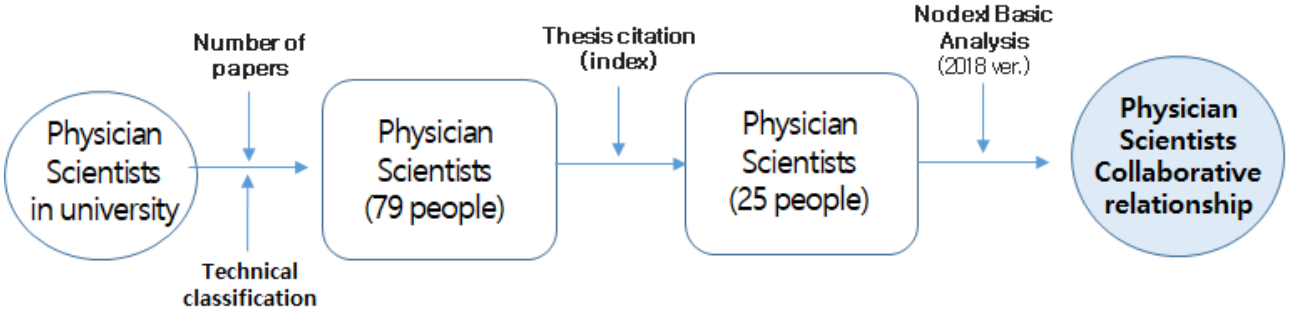

Figure 1. Research Design

4. Results

4.1 Technical classification(Number of papers)

Among 79 physician scientists (MD-PhD) from 5 universities, one researcher each from parasitology, microbiology, pharmacology, biochemistry, physiology, and anatomy with the highest paper citations in the

last 5 years (2016-2021) , a total of 25 people were selected as review subjects to examine the relationship between joint research.

Table 1 shows 'Dissertation Status of Major Physician Scientists (MD-PhD) by Major in Domestic Universities '.

Table 1. Dissertation Status of Major Physician Scientists (MD-PhD) by Major in Domestic Universities

Belong	Number	Name	Major	Number of papers	Citation index	Classroom average
S. univ	1	a	anatomy	43	1516	495
	2	b	pharmacology	51	499	268
	3	C	biochemistry	83	1145	441
	4	d	physiology	40	471	145
	5	E	microbiology	70	788	282
	6	F	parasitology	22	245	162
Y.univ	7	a	anatomy	9	313	121
	8	b	pharmacology	50	1439	549
	9	C	biochemistry	50	816	256
	10	d	physiology	2	21	21
	11	E	microbiology	28	415	366
	12	F	parasitology	41	223	130
K. univ	13	a	anatomy	54	761	594
	14	b	pharmacology	128	733	667
	15	C	biochemistry	6	34	19
	16	d	physiology	27	624	213
	17	E	microbiology	37	409	253
SA. univ	18	a	anatomy	56	165	116
	19	b	pharmacology	1	23	23
	20	C	biochemistry	170	3202	1,261
	21	d	physiology	40	286	70
	22	E	microbiology	12	114	79
KA. univ	23	a	biochemistry	43	3178	3,178
	24	b	physiology	102	2126	908
	25	C	microbiology	92	958	566

4.2 Survey Respondents' Analysis

As a result of analyzing the relationship within the affiliation of physician scientists, a total of 148 key

authors (based on the citation index) of 5 universities in Korea, 25 MD-PhDs, 123 major co-researchers (5 per person, top link) Affiliations were found in 57 institutions. Among them, there were 3 institutions (L1) with 6 nodes (number of connections), S. University Parasitology Department and S Hospital. The research capacity of the three institutions connected by the above six nodes was relatively active, and among them, two institutions (L2) with four nodes (number of connections) were S University Pharmacology Department and Y University Parasitology Department. Among them, institutions (L3) with 3 nodes (number of connections) appeared as Y University Department of Basic Medicine, SA University Department of Biochemistry, and SA University Department of Physiology.Figure 2 shows 'Detailed classification system diagram for each major sector of the sleep industry.'.

Figure 2 shows 'MD-PhD relationship network analysis (between MD-PhD affiliations).'.

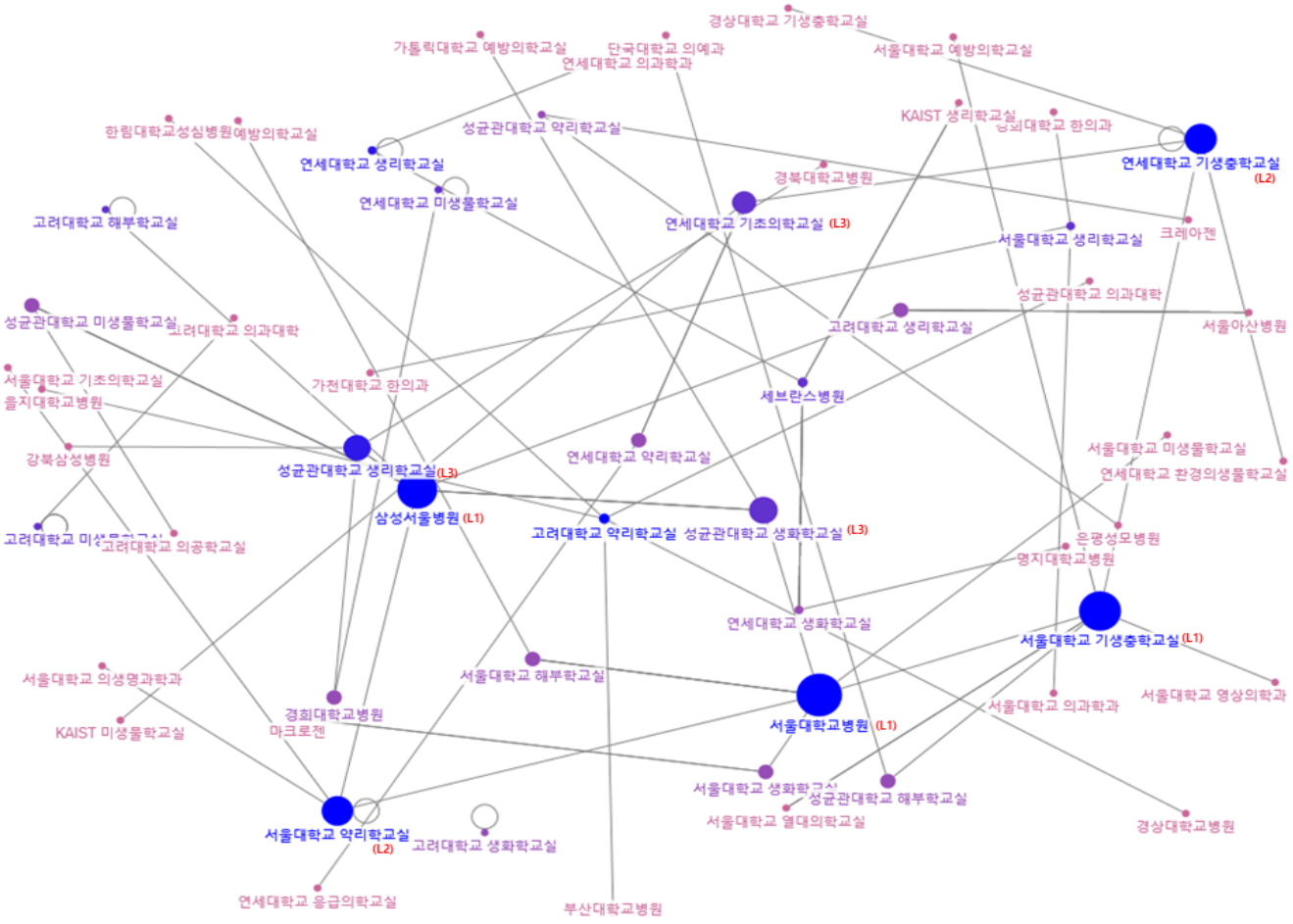

Figure 2. MD-PhD relationship network analysis (between MD-PhD affiliations)

3.2 Significance of the Analysis

As a result of analyzing the relationship centered on the personal research network of physician scientists, MD-PhD 25 major co-researchers of 123 MD-PhD majors in each major -PhD was found in 76 (61.8%). Among them, 5 out of 5 co-researchers were all MD-PhDs in 8 cases: 2 from Seoul National University, 2 from Yonsei University, 2 from Korea University, and 2 from Sungkyunkwan University. In addition, there were 2 cases where 4 out of 5 co-researchers were MD-PhD, 1 from Seoul National University and 1 from Sungkyunkwan University. On the other hand, if there is no or less than one link with a pseudoscientist as a

co-author, there is one person each from Yonsei University, Korea University, and Seoul National University, and two from KAIST, indicating that diversity in collaborative research between researchers is secured..

Figure 3 shows ‘MD-PhD relationship network analysis (between MD-PhD individuals).’.

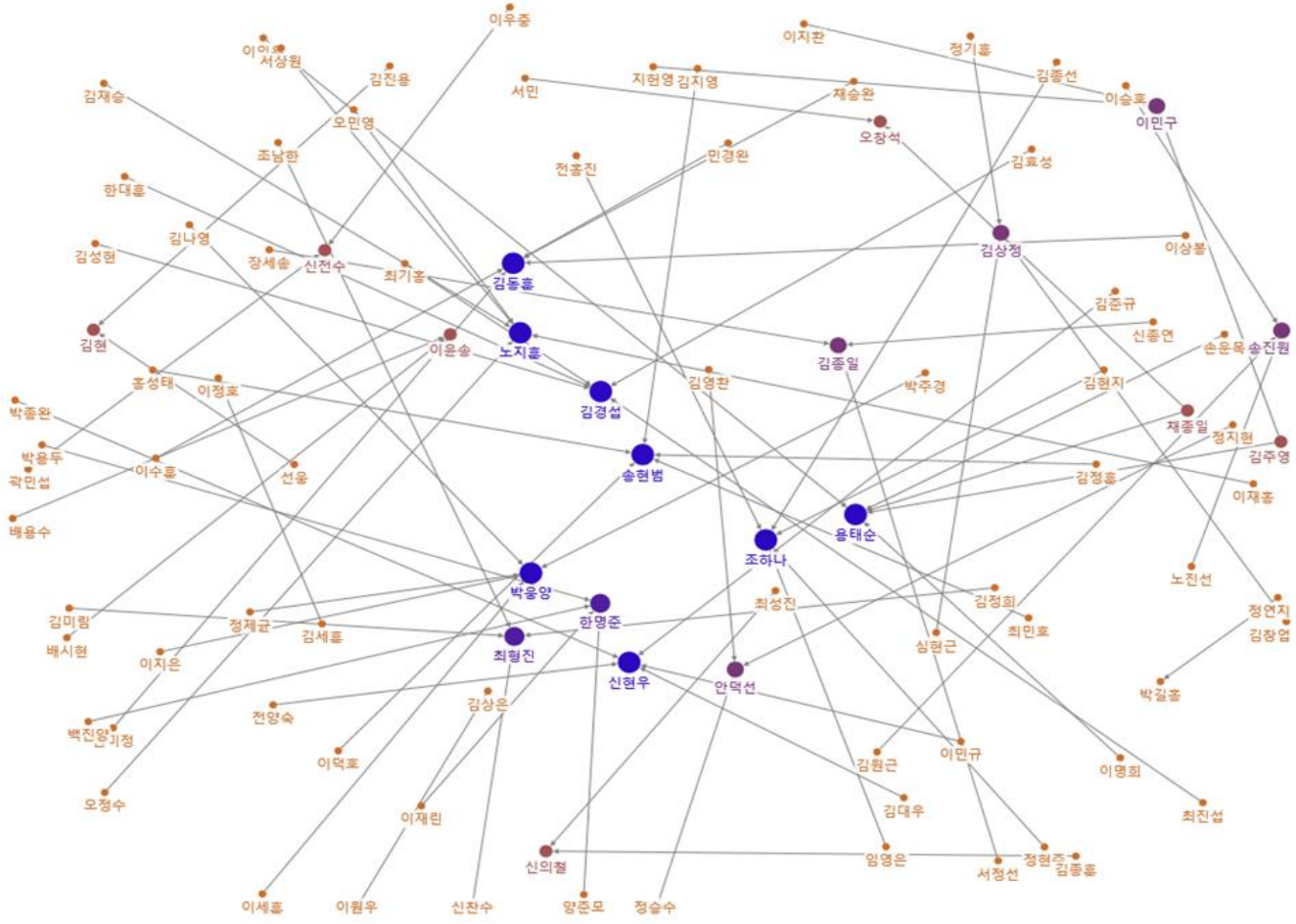

Figure 3. MD-PhD relationship network analysis (between MD-PhD individuals)

4. Discussions and Conclusion

As school start-ups and technology transactions are actively conducted around major hospitals in Korea, the role of physician scientists is gradually expanding. This is because the needs of medical consumers, that is, acceptability in industrial sites, determine the direction of supaport and the possibility of success. In particular, after Covid-19, as social responsibility and national interest in 'medical' have increased more than ever, the industry has already predicted that the future industry will peak in the medical field, and there is a clear role of physician scientists at the peak.

The domestic physician scientists training course has been less than 10 years old, and compared to the physician scientists system of major developed countries such as the United States, the subsidy and level of support are poor, but some results are showing. However, the collaboration system between researchers for biotechnology development was found to be insufficient except for some experts, and it is judged that

additional research is needed on ways to strengthen such a collaboration network in the future.

Acknowledgement

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References

[1] Korea Health Industry Development Institute (2019), a study on the reorganization of the doctor training system for the training of doctors and scientists
[2] AAMC (2018), National MD-PhD Program Outcomes Study
[3] Health Industry Development Institute (2021), MD-PhD full-time doctoral course status
[4] Korea Science Foundation (2002), planning research for the establishment of a comprehensive plan for basic medical science promotion. p24
[5] Korea Health Industry Development Institute (2021), Health Industry Brief Vol.334, p
[6] National Research Foundation of Korea (2020), Nobel Prize in Science Comprehensive Analysis Report
[7] Korean Medical Education (2000), Life and Medical Science Combined Degree Course Development Study p312
[8] Hujo Hong et al. (2018) Current status and challenges of fostering domestic and foreign physician scientists
[9] Keum-Bong Choi, “A Study on the Health Management of Polypharmacy Use in the Elderly”, International Journal of Advanced Smart Convergence Vol.10 No.4, p.206-214, 2021. https://doi.org/10.7236/IJASC.2021.10.4.206
[10] Namyun Kim, Sung-Dong Kim, "A Recommendation System for Health Screening Hospitals based on Client Preferences". International Journal of Advanced Smart Convergence Vol.9 No.3 p145-152, 2020. https://doi.org/10.7236/IJASC.2020.9.3.145