

# Between Engagement and Isolation: Population Genetics and Transnational Nationalism in South Korea

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## Introduction

In 1984, when South Korean geneticist Kim Yung Jin (金英眞, 1932–2002) finally set up the Genetics Laboratory at the Department of Biology, Chungnam National University, Daejeon, he announced the start of long-term research on the genetic structure of the Korean population. He lamented the current research situation in which “the genetic constitution and frequencies of the Korean population is barely known.” For Kim, this was regrettable given that the Korean people “are proud of our racial homogeneity (*danil minjok*) that have been kept during the long history of over 4,000 years.” It was a shame as well, because scientists not only from “developed countries but also from developing countries have been already revealing their nation’s genetic characteristics.”<sup>1</sup> Indeed, the 1980s was the period when Korean

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<sup>1</sup> Yung Jin Kim and Chong Soon Kim, “Hangugin jipdanui bunja yujeonhakjeok yeongu 1. Oxidoreductase yujeonja joseonggwa bindoe gwanhayeo 한국인 집단의 분자유전학 연구 1. Oxidoreductase 의 유전자 구성과 빈도에 관하여 (Genetic Structure and Gene Frequencies of

geneticists, driven by nationalist sentiment, raced to study the protein polymorphism in the Korean population. At that time many animal geneticists moved into the field of human genetics. Their graduate students were encouraged to write theses on this research subject. The passion for studying Korean genes led to an increase in the number of research articles on the topic. Throughout the 1980s, they occupied around a quarter of the total number of articles published in one domestic genetics journal.

This national science did not emerge from vacuum. Nationalism alone would not have been sufficient to promote this type of research, because scientific research requires a material basis shared within the wider scientific community beyond national borders. In the previous decades, South Korean geneticists had learned research methods and frameworks from foreign scientists and conducted research using foreign-born scientific instruments. Moreover, many research projects were funded by international funding bodies. They engaged with the International Biological Program (IBP, 1964–1974), the first global biological initiative to support international research projects, through which they could invite Japanese scientists to Seoul.<sup>2</sup> The Koreans also flew to Japan and the United States to receive training in the cutting-edge research methodologies. In the process of such transnational exchanges, they managed to shape their research interest in the genetic structure of the Korean population as well as improve the material means to pursue the research program.

The transnational making of nationalist science was not unique to Korean geneticists. When scientific collaboration emerged as a means of Cold War foreign policy in the 1950s and 1960s, Latin American and Middle-Eastern geneticists exploited the transnational exchange with the U.S. and British scientists to build domestic scientific infrastructure and contribute to their diverse nation-building projects.<sup>3</sup> The difference between South Korean geneticists and those in other developing countries was their relationship with foreign scientists. U.S. human geneticists had been fascinated with Latin America, because the mixed-population there—Mestizos, Mulat-

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Oxidoreductase: Molecular Genetic Studies of Korean Population),” *Genes & Genomics* 6:3 (1984), 152–153.

<sup>2</sup> For the IBP, see Elena Aronova, Karen S. Baker, and Naomi Oreskes, “Big Science and Big Data in Biology: From the International Geophysical Year through the International Biological Program to the Long Term Ecological Research (LTER) Network, 1957–Present,” *Historical Studies in the Natural Sciences* 40:2 (2010), 183–224.

<sup>3</sup> Susan Lindee, “Scaling Up: Human Genetics as a Cold War Network,” *Studies in History and Philosophy of Biological and Biomedical Sciences* 47 (2014), 185–190.

tos, and Indigenous people—was crucial to the study of genetic mixture and isolation.<sup>4</sup> In the Middle East, Jews and other minorities were considered valuable research subjects for the study of genetic disorders.<sup>5</sup> In addition, in many cases, geneticists in these regions had students or colleagues working in Europe and the United States. These immigrant researchers served as go-betweens integrating the local geneticists into the international scientific community led by their European and American colleagues.<sup>6</sup> This was absent from the South Korean geneticist community: the Korean population was scientifically uninteresting to the mainstream scientific community in the West and there were no Korean immigrant geneticists to lead them to the international scene.<sup>7</sup> In this context, Korean geneticists sought a way of connecting themselves to foreign scientists otherwise indifferent towards their research and population by building upon their colonial relationship with Japanese researchers and by taking part in global cooperative projects using their own scarce funds.<sup>8</sup>

Focusing on research activities carried out by Korean geneticists who worked at or had graduated from the Department of Zoology, Seoul National University, this paper examines the grudging nature of transnational collaboration between Korean and foreign scientists and its role in the formation of nationalist genetic research. It

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<sup>4</sup> Ricardo Ventura Santos, “Indigenous Peoples, Postcolonial Contexts and Genomic Research in the Late 20th Century: A View from Amazonia (1960–2000),” *Critique of Anthropology* 22 (2002), 81–104; Vanderlei Sebastião de Souza and Ricardo Ventura Santos, “The Emergence of Human Population Genetics and Narratives about the Formation of the Brazilian Nation (1950–1960),” *Studies in History and Philosophy of Biological and Biomedical Sciences* 47 (2014), 97–107.

<sup>5</sup> Elise K. Burton, “‘Essential Collaborators’: Locating Middle Eastern Geneticists in the Global Scientific Infrastructure, 1950s–1970s,” *Comparative Studies in Society and History* 60:1 (2018), 119–149.

<sup>6</sup> For the Chinese case and the role of Chinese immigrant scientists with respect to the transnationalization of Chinese science during the Cold War, see Zuoyue Wang, “Transnational Science during the Cold War: The Case of Chinese/American Scientists,” *Isis* 101:2 (2010), 367–377.

<sup>7</sup> Physical chemist Ree Taikyue at the University of Utah played the role of go-between in connecting Korean chemists to the American physical chemistry community in the postwar period. For more details, see John DiMoia, “Transnational Scientific Networks and the Research University: The Making of a South Korean Community at the University of Utah, 1948–1970,” *East Asian Science, Technology and Society: An International Journal* 6:1 (2012), 17–40.

<sup>8</sup> Jaehwan Hyun, “Making Postcolonial Connections: The Role of a Japanese Research Network in the Emergence of Human Genetics in South Korea, 1941–1968,” *The Korean Journal for the History of Science* 29:2 (2017), 291–324; Manyong Moon, “The Politics of Science in Korean Biology: From the DMZ Ecological Survey to the Nature Conservation Movement,” *The Korean Journal for the History of Science* 42:2 (2020), 431–447.

argues that the rise and fall of genetic research on the Korean population as a national science was a result of the dynamics of opportunistic collaboration of Korean geneticists with foreign scientists. In the 1960s and 1970s, Korean geneticists made efforts to connect with Japanese and American geneticists to be part of the international scientific community and obtain scientific and financial support. Due to the under-recognized nature of Koreans as both practitioners and subjects of human population genetic research, the Korean geneticists had to work together with second-tier scientists with research agendas disparate from the mainstream geneticist community. In the course of the opportunistic collaboration, the Korean research style of studying the genetic polymorphism of the Korean population within the nationalist framework gradually took form. In the 1980s, however, when they became self-sufficient in terms of research methods, equipment, and financial support based on previous transnational exchange and new governmental funding for basic science, they began to develop an inward-looking research program. They became reluctant to collaborate with foreign scientists and focused on competing or collaborating with other domestic geneticists. As a result, genetic research on the Korean population turned out to be a sort of national game in which only Korean geneticists participated. The game simply added more information on genetic frequencies of known serum proteins and isozymes without any methodological challenges. The Korean geneticists' reluctance to collaborate with foreign scientists would isolate them from new research trends and leave them underrecognized in the mainstream of human population genetics. The oscillation between proactive engagement and isolationism led to the rise and fall of this national science.

While engaging with the global historiography of Cold War scientific collaboration, this study will contribute to the history of South Korean science by illuminating the multidimensional aspects of collaboration between Korean scientists and foreign researchers. Historians of science have reframed their understanding of Cold War scientific collaboration between superpowers and the "Third World" as a unilateral aid to reciprocal events for both sides.<sup>9</sup> Furthermore, with the shift of the focus from the American side to the recipients, recent literature has shown that underlying the seemingly reciprocal cooperation were heated contestations.<sup>10</sup> Along this line, the

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<sup>9</sup> John Krige, *American Hegemony and the Postwar Reconstruction of Science in Europe* (Cambridge, MA: MIT Press, 2008); John Krige, "Building the Arsenal of Knowledge," *Centauros* 52 (2010), 280–296; John DiMoia, "Atoms for Sale?: Cold War Institution-Building and the South Korean Atomic Energy Project, 1945–1965," *Technology and Culture* 51:3 (2010), 589–618; AnaBarahona, "Transnational Science and Collaborative Networks: The Case of Genetics and Radiobiology in Mexico, 1950–1970," *Dynamis* 35:2 (2015), 333–358.

<sup>10</sup> Michael Lewis, "Indian Science for Indian Tigers?: Conservation Biology and the Question of Cultural Values," *Journal of the History of Biology* 38 (2005), 185–207; John Krige, "Embedding the National in the Global: US-French Relationships in Space Science and Rocketry in the 1960s,"

literature exploring the postwar history of Korean science has paid particular attention to Korean scientists' active role in forging collaborative relationships with prominent American scientists and science policymakers and in reshaping collaborative research projects for their purposes.<sup>11</sup> This paper will shed new light on it by showing the marginal nature of Korean geneticists' collaboration and their ambivalent attitudes towards collaboration.

## Koreans—Scientifically Uninteresting Population?

The genetic analysis of human blood emerged as one of the key methodologies in anthropological and biomedical research after World War II. The discovery of new blood groups and hemoglobin polymorphism and related genetic disorders attracted interest from the newly founded international organizations coordinating scientific research and global health. Under the support of United Nations-affiliated agencies as well as other non-governmental scientific organizations and private foundations, American and British geneticists initiated the collection of data on the geographical distributions of blood groups and other serum proteins worldwide. From the early 1950s, British hematologist Arthur Mourant (1904–1994) in the Blood Group Reference Laboratory in London and chemical pathologist Hermann Lehmann (1910–1985) in the International Reference Center for Abnormal Hemoglobins in Cambridge collected blood samples around the world under the auspices of the World Health Organization.<sup>12</sup>

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in Naomi Oreskes and John Krige eds., *Science and Technology in the Global Cold War* (Cambridge, MA: MIT Press, 2014), 227–250; Audra Wolfe, “What’s in a Zone? Biological Order versus National Identity in the Biological Science Curriculum Study,” in Patrick Manning and Mat Savelli eds., *Global Transformations in the Life Sciences, 1945–1980* (Pittsburgh: University of Pittsburgh Press, 2018), 146–159.

<sup>11</sup> Seong-Jun Kim 김성준, “1950nyeondae Hangugui yeonguyong wonjaro doip gwajeonggwa gwahak gisuljadeurui yeokal 1950년대 한국의 연구용 원자로 도입 과정과 과학기술자들의 역할 (Development of Science Rather than Nation: Roles and Motives of Domestic Scientists in South Korea’s 1950s Nuclear Program),” *Hanguk gwahaksa hakoeji* 한국과학사학회지 (The Korean Journal for the History of Science) 31:1 (2009), 139–168; Manyong Moon 문만용, “Hanguk gwahakgisuljadeurui talsingminjuui galmang: hangugui hyeondaejeok gwahakgisulchejeui giwon 한국 과학기술자들의 탈식민지의 갈망: 한국의 현대적 과학기술체제의 기원 (The Post-colonial Desires of Korean Scientists: The Origin of Modern Science and Technology System in Korea),” *Yeoksawa damnon* 역사와 담론 (History and Discourse) 75 (2015), 179–222.

<sup>12</sup> Although his Cambridge center was endorsed by the WHO in 1965, Lehmann had been studying abnormal hemoglobin from East Africa to India in the Medical Research Council (MRC) Blood Transfusion Research Unit since the early 1950s. John Dacie, “Hermann Lehmann. 8 July 1910–13 July 1985,” *Biographical Memoirs of Fellows of the Royal Society* 34 (1988), 406–449.

In the 1960s, the WHO again supported the diverse IBP projects studying blood groups and abnormal hemoglobin surveys related to genetic disorders.<sup>13</sup> While developing statistical methods for phylogenies, Italian geneticist Luca Cavalli-Sforza (1922–2018) carried out a genetic expedition to Zaire (present day Congo) to collect blood samples from the local pygmy population. Leading U.S. geneticist James V. Neel (1915–2000), who had already planned to study abnormal hemoglobin in the “primitive peoples” of West Africa in the 1950s, used the WHO/IBP support to study the genetic structure of “primitive” populations. He was fascinated with the “vanishing” populations because they were isolated from modernization, and could help geneticists figure out “the dynamics of the functioning of the human genetic pool under ‘natural’ conditions and the way it had played out.”<sup>14</sup> Convinced with the scientific value of the “primitive” people, Neel undertook a series of expeditions to conduct genetic surveys of the indigenous people in Brazil. Neel’s efforts became the backbone of the U.S. genetic and anthropological projects under the IBP and influenced the research agenda of other national IBP committees.<sup>15</sup> For instance, echoing the American geneticist’s interest in the “vanishing” people, Japanese IBP anthropologists and geneticists also set out to study the Ainu people in Hokkaido as the core research project, examining the genetic structure of the Japanese population.<sup>16</sup>

Koreans were completely excluded in the expanding global research expeditions. Despite the widespread nationalist belief that Koreans were racially (or at least ethnically) homogeneous, the Korean people were not isolated from modernization and did not have any indigenous peoples within their territory. The Korean population was not interesting from the perspective of medical genetics either. Japanese geneticists collaborating with Neel’s genetics team at the University of Michigan were producing an extensive dataset of blood groups and hemoglobin polymorphism in their population—generally considered similar to the Korean population.<sup>17</sup> South Korea’s unstable position as a newly-independent nation in the political scene was

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<sup>13</sup> Soraya de Chadarevian, “Human Population Studies and the World Health Organization,” *Dynamis* 35:2 (2015), 359–388.

<sup>14</sup> Santos, “Indigenous Peoples, Postcolonial Contexts and Genomic Research in the Late 20th Century” (cit. n. 4), 88.

<sup>15</sup> Joanna Radin, *Life on Ice: A History of New Uses for Cold Blood* (Chicago: The University of Chicago Press, 2017), 86–120.

<sup>16</sup> See the summary of the Human Adaptability section on Hiroshi Tamiya and the Japanese Committee for the International Biological Program eds., *Summary Report on the Contribution of the Japanese National Committee for IBP, 1964-1974* (Tokyo: University of Tokyo Press, 1978).

<sup>17</sup> For Mourant’s evaluation of Japanese anthropological research on blood group distribution, see Arthur Mourant, “The Genetic Markers of the Blood,” in Geoffrey Ainsworth Harrison ed., *Population Structure and Human Variation* (Cambridge: Cambridge University Press, 1977), 9–46, especially 19.

another factor in the international geneticist community's disinterest in Koreans as a research subject. For example, in 1967, Cavalli-Sforza and his colleague used the blood group distribution data of Koreans in South Korea and the immigrant Japanese in Canada as data sourced from the same population.<sup>18</sup> Many European geneticists were often unable to recognize the political separation of the two Koreas from Japan and were uninterested in finding the differences of Koreans from the Japanese.

South Korean geneticists were also unappealing as a collaboration partner even when foreign scientists were studying the Korean population. They were usually affiliated with biology departments, disconnected from medical institutions such as clinics, hospitals, or blood banks, making it difficult for researchers to obtain blood samples and related medical records. For this reason, in 1960-70s South Korea, blood group "genetics" and related transnational exchange were driven by medical researchers even though these clinicians were indifferent to genetics and did not identify themselves as geneticists.<sup>19</sup>

In competing for foreign scientific support, geneticists affiliated with biology departments were disadvantaged compared to those in the medical professions. For instance, Kang Yung Sun (1917–1999), professor at the Department of Zoology, Seoul National University, and the recognized founder of the discipline of genetics in the country, had a good eye for advantageous topics likely to receive research grants from U.S. and international funding agencies. When the Population Council of the Rockefeller Foundation showed interest in South Korea in the late 1950s, Kang quickly emphasized his expertise in the "population problem" to foreign funders and obtained support for his research and sent his golden-boy Cho Wan-Kyoo (b. 1928) to study reproductive genetics in the United States.<sup>20</sup> However, the Population Council soon withdrew their support for Kang's team and instead decided to fund medical researchers working in the field of public health.<sup>21</sup> This was partly because Kang's vital statistics data was haphazardly collected through his personal ties with primary schools and clinics in several provinces, whereas medical researchers could produce more reliable data—on sex ratio at birth in a given region—using hospital records. Basically, human-related surveys undertaken by the geneticist

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<sup>18</sup> Luigi L. Cavalli-Sforza and Anthony Edwards, "Phylogenetic Analysis: Models and Estimation Procedures," *American Journal of Human Genetics* 19:3 (1967), 249.

<sup>19</sup> Jaehwan Hyun, "Blood Purity and Scientific Independence: Blood Science and Postcolonial Struggles in Korea, 1926–1975," *Science in Context* 32:3 (2019), 239–260.

<sup>20</sup> A letter from Marshall C. Balfour to Warren O. Nelson, January 3, 1963, The Rockefeller Archive Center, Population Council Records, FA432, Series 2, Box 109, Folder 1045.

<sup>21</sup> For the Population Council's support of the population control research and movement in South Korea, see John DiMoia, *Reconstructing Bodies: Biomedicine, Health, and Nation-Building in South Korea Since 1945* (Stanford: Stanford University Press, 2013).

group could not be as systematic as those carried out by medical researchers who had access to their own medical institutions.

Korean geneticists continued to seek ways to connect themselves to the international genetics community under such unfavorable circumstances. Their efforts would come to fruition even though their foreign partners would be at the margin of the mainstream of human population genetics.

## Making Transnational but Peripheral Connections

When the IBP began in 1963, the South Korean biologists moved faster than the U.S. biologists.<sup>22</sup> The IBP was officially launched under the auspices of the International Council of Scientific Unions (ICSU), aiming to understand “the biological basis of productivity and human welfare.”<sup>23</sup> This long-term global initiative to collect information on living organisms worldwide was comprised of seven program areas covering ecological studies and human biology. The National Academy of Sciences of the Republic of Korea (KNAS) had been keeping their eye on the IBP since the first suggestion at the general assembly of the ICSU meeting in London held in September 1961.<sup>24</sup> In May 1964, Korean biologists established the Korean National Committee for the IBP (KIBP) under the endorsement of the KNAS. Kang Yung Sun became chairman of the KIBP and convener of the subcommittee of Human Adaptability (HA) focusing on human biology including population genetics.<sup>25</sup> Lee Chung Choo (李廷株, b. 1927), Kang’s student and *de facto* leader of Kang’s genetics lab, became secretary of the KIBP and the main member of the KIBP-HA.

Kang and other Korean biologists sought financial support from the Korean government, the Asia Foundation, the U.S. Agency for International Development

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<sup>22</sup> The US National Academy of Sciences (USNAS) organized an ad hoc US National Committee on the IBP in late 1963 and the official national committee for the IBP was established in September 1964. The US Committee only began to support the research projects from July 1967. See W. Frank Balir, *Big Biology: The US/IBP Synthesis Series No. 7* (Stroudberg, Pennsylvania: Dowden, Hutchinson & Ross, 1977).

<sup>23</sup> Edgar B. Worthington, *The Evolution of IBP* (New York: Cambridge University Press, 1975).

<sup>24</sup> Oegyo gurakbu (Foreign Policy Club), “The Nine General Assembly of the International Council of Scientific Unions Meeting in London on 25-28 September, 1961,” *Daehan minguk haksurwon hoebo* 대한민국학술원회보 (The Bulletin of National Academy of Sciences of the Republic of Korea) 3 (1961), 58–64.

<sup>25</sup> Korean National Committee for the IBP (KIBP), *Report for the IBP No. 1* (Seoul: National Academy of Sciences of the Republic of Korea, 1967).

(USAID), and the USNAS, but failed to secure research funds.<sup>26</sup> Whereas the ecology-related subcommittees could expect the support at least from the collaborative ecological survey of the Korean Demilitarized Zone indirectly through the Office of Ecology, Smithsonian Institution, the future of geneticists working in the HA subcommittee looked bleak.<sup>27</sup> As a way to meet the “global” standard, Kang’s subcommittee planned their national projects by emulating the Japanese National Committee for the IBP (JIBP), which was considered a model example of the IBP in the Asian region. Yet, many JIBP-HA subprojects were medicine-oriented and thus were not feasible given that the KIBP consisted solely of biologists.<sup>28</sup> They also looked for their own “Ainu”—indigenous—people to attract foreign scientists. For example, they studied the genetic characteristics of “isolated populations” tucked away in the Southern islands such as Hongdo and Heuksando.<sup>29</sup> These efforts garnered little interest since the islanders were not indigenous people maintaining “primitive” lifestyles distinct from the mainstream population in the Korean peninsula. Finally, it was the Japanese scientists that offered a helping hand for the KIBP geneticists in

<sup>26</sup> *Ibid.* See also “Segyeui daeyeoeseo—hangugui gukje chamyeo (wan) saengmul jawonui gibbon josa 세계의 대열에서—한국의 국제 참여 (완) 생물자원의 기본조사 (On the Global Frontier—The Korean Participation: Basic Surveys of Biological Resources),” *The Kyunghyang Shinmun* 경향신문 (1966. 1. 1), 5. They only obtained 1,500 US dollars for their research from the Korean government in the fiscal year of 1966. See Moon, “DMZ Saengtae josa” (cit. n. 8).

<sup>27</sup> The DMZ project was a cooperative planning project carried out by the Korean Commission for Conservation of Nature and Natural Resources and the Smithsonian Office of Ecology via a liaison of the US conservationist Harold J. Coolidge Jr. (1904–1985). Even the collaboration project also ended on a planning level in 1968. Yung Sun Kang, *Hagok Gang Yeongseon baksa jeongnyeon toeim ginyeom munjip* 하곡 강영선 박사 정년퇴임 기념 문집 (The Collected Works of Doctor Kang Yung Sun for the Celebration of His Retirement) (Seoul: Hagok Gang Yeongseon baksa jeongnyeon toeim ginyeom munjip saeopoe, 1982), 215–218. For the explanation about the early closure of the collaboration, see Jaehwan Hyun, “Brokering science, Blaming Culture: The US-South Korea Ecological Survey in the Demilitarized Zone, 1963–1968,” *History of Science* (forthcoming).

<sup>28</sup> A representative case was mixed-blood children (*honhyeora* in Korean and *konketsuji* in Japanese) research. In Japan, it was enabled by orphanages who allowed physical anthropologists to take measurements of their mixed-blood children. In South Korea, medical researchers undertook the research without any involvement with the IBP. Chang Chin Yo 張進堯, anatomist and physical anthropologist at Seoul National University College of Medicine, carried out anthropometric studies of the mixed-blood children and Yi Samuel (李三悅, 1926–2015), hematologist at Yonsei University College of Medicine, conducted blood group surveys of them. For the list of the planned project list, see KIBP, *Report for the IBP No. 1*.

<sup>29</sup> See Kang’s publication list in 1966–1968 in Kang, *Hagok Gang Yeongseon baksa jeongnyeon toeim ginyeom munjip*.

this desperate situation.<sup>30</sup> Japanese interest in scientific exchange with KIBP scientists was motivated far more by diplomatic intentions than scientific interests. From the early 1960s on, under significant pressure from the United States, the Japanese government took on the new role of regional patron for development assistance in the Asian region.<sup>31</sup> In this context, the Japan Academy, which was supported by the Japanese Ministry of Education and managed the JIBP, announced the need for scientific collaboration with non-communist Asian countries.<sup>32</sup> The JIBP also played a similar, new role in the field of biological sciences. Tamiya Hiroshi (田宮博, 1903–1984), professor of botany at the University of Tokyo and the JIBP chairman, was keen to cooperate with scientists in developing countries in Asia.<sup>33</sup> In early 1971, Kang visited Tokyo to meet JIBP scientists and request research collaboration.<sup>34</sup> As a result, a JIBP-KIBP joint meeting was held in Seoul in October 1971.

It is worth noting that the outcome of the JIBP-KIBP joint meeting was described quite differently in the records of the two national IBP committees. The Korean side recorded that they had made an agreement to initiate several cooperative projects, in particular in the HA section.<sup>35</sup> In contrast, the Japanese side reported that they “only discussed possible research exchange (*kenkyū kōryū*) in each section.”<sup>36</sup> The Japanese side proposed maintaining regular communication between each section in the two national committees and informing the Korean side that the Asian-region specified IBP seminar would be convened through the support of JIBP in 1972.<sup>37</sup> Indeed, Yoshimura Hisato (吉村寿人, 1907–1990), the convener of the JIBP-HA section,

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<sup>30</sup> For the history of JIBP, see Hiroshi Tamiya, “Evolution and General Activities,” *JIBP Synthesis Volume 20: Summary Report on the Contribution of the Japanese National Committee for IBP, 1964–1974* (Tokyo: University of Tokyo Press, 1973), 1–5.

<sup>31</sup> Miyagi Taizo, *Sengo nihon no ajia gaikō* (Japan’s Postwar Policy toward Asia) (Tōkyō: Mineruba shobō, 2015); Hiromi Mizuno, “Introduction: A Kula Ring for the Flying Geese: Japan’s Technology Aida and Postwar Asia,” in Hiromi Mizuno, Aron S. Moore, and John DiMoia eds., *Engineering Asia: Technology, Colonial Development, and the Cold War Order* (London: Bloomsbury Academic, 2018), 1–40.

<sup>32</sup> Kotani Masao, “Ajia no kokusai gakujutsu kōryū (Asia’s International Academic Exchange),” *Japanese Science Monthly* 25:11 (1973), 1–2.

<sup>33</sup> Hiroshi Tamiya, “Opening Address,” in Svuiti Mori and Tatuo Kira eds., *Proceedings of the East Asian Regional Seminar for the International Biological Programme* (Kyoto: Japanese National Committee for the IBP, 1973), 1–2.

<sup>34</sup> KIBP, *Report for the IBP, No.6* (Seoul: The Korean National Academy of Sciences, 1972), 67–69. JIBP, “Gaikokujinno rainichi (Foreigner Visits),” *JIBP nyūsu* (JIBP News) 15 (1971), 1.

<sup>35</sup> *Ibid.*, 67–68.

<sup>36</sup> JIBP, “Korea-Japan IBP Seminar,” *JIBP nyūsu* 17 (1972), 3.

<sup>37</sup> *Ibid.*, 1–3.

did not show any interest in genetic research undertaken by Kang's team.<sup>38</sup> Tamiya later regretted that the JIBP had not deepened their collaborative relationship with Korean scientists.<sup>39</sup> Whereas the KIBP geneticists reported that they had promoted collaborative projects with the JIBP geneticists, the JIBP-HA reports did not state such projects in the official reports and newsletters after the 1971 Seoul meeting. Where did the discord come from?

To cut a long story short, both versions contain different aspects of the truth: the Korean geneticists did initiate a collaborative project with Japanese geneticist Ohkura Koji (大倉興司, 1921–1997) at Tokyo Medical and Dental University in 1973.<sup>40</sup> Ohkura was a member but was not one of the core scientists in the JIBP-HA committee. Ohkura's collaboration with Kang was not endorsed as an official JIBP-HA project and was not even included in the summary report of JIBP activities.<sup>41</sup> Seen from their perspective, Kang and the Korean geneticists believed their work with Ohkura to be collaborative IBP-HA research.<sup>42</sup>

## (1) Studying Koreans with a Japanese Nationalist Scientist

Ohkura was an eccentric and isolated figure in the JIBP-HA committee. He was a graduate of Nihon University Medical School and had developed his career by working as a secretary in the Japanese Society of Human Genetics (JSHS), newly formed in 1956. Furuhashi Tanemoto (古畑種基, 1891–1974), a prominent blood group scientist and the first president of the JSHS, helped Ohkura secure a position as assistant professor at the Department of Human Genetics at Tokyo Medical and Dental University, established by Furuhashi after his retirement from the University of Tokyo Faculty of Medicine. Ohkura was never promoted to full professor until his retirement. JIBP-HA projects were mainly led by physiologists and anthropologists from Kyoto University and the University of Tokyo, and a handful of geneticists were also graduates of the University of Tokyo Faculty of Medicine. There was no place for non-Tōdai (東大) graduates like Ohkura.

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<sup>38</sup> Yoshimura seemed not to consider Kang's work meaningful. He rejected Kang's submission to the IBP-HA Methodology Workshop, held in Kyoto in 1966, which Yoshimura prepared as a convener.

<sup>39</sup> Tamiya, "Evolution and General Activities" (cit. n. 30), 1–2.

<sup>40</sup> KIBP, *Report for the IBP, No.6* (cit. n. 34).

<sup>41</sup> See the HA section summary delivered by Yoshimura in Tamiya, "Evolution and General Activities" (cit. n. 30).

<sup>42</sup> Chung Choo Lee, *Deokgang I Jeongju gyosu jeongnyeon toeim ginyeom munjip saeopoe* 덕강 이정주 교수 정년퇴임 기념 문집 사업회 (The Collected Works of Professor Chung Choo Lee for the Celebration of His Retirement) (Seoul: Deokgang I Jeongju gyosu jeongnyeon toeim ginyeom munjip saeopoe, 2001), 42.

Ohkura endeavored to make up for his mediocre academic profile by succeeding Furuhashi's research program aggressively, which also led to his isolation from the mainstream research trends despite his productivity. Furuhashi had been collecting and analyzing blood group distribution in Japan and neighboring regions to identify the biological difference of the contemporary Japanese people since the prewar period. In particular, Furuhashi had been looking for "clines"—gradients of the genetic frequency of blood group distribution along a line of geographic transition—among populations in order to determine the serological relations between the Japanese and neighboring people. His work aimed to define the Japanese as a "serological" race that could be distinguished from neighboring Asians races while searching for the origins of contemporary Japanese from West Asia.<sup>43</sup> As Furuhashi's follower, Ohkura also collected non-ABO blood group distributions in Japan and neighboring countries to identify their clinal relationship. His somewhat unique approach was not shared IBP-HA geneticists within and outside Japan. Since the use of clines in this way was easily criticized for its basis in an *a priori* classification of human populations, physical anthropologists and population geneticists began to devise and investigate numeric taxonomy, phylogenetic method, and other mathematical formulas from the 1960s. Moreover, instead of focusing on clines and gradients among human groups, population geneticists turned their attention to isolates of specific groups—another pattern of human diversity.<sup>44</sup>

In the same vein, Ohkura also developed his interest in the gene frequencies of acatalasemia in Japanese and neighboring populations. Acatalasemia is a rare recessive genetic disease—a gangrenous disease within the oral cavity caused by deficiencies of erythrocyte catalases. At first, American geneticists at the Atomic Bomb Casualty Commission, Japan, studied the genetic disease together with Japanese researchers and found some cases in which erythrocyte catalase activities had been reduced to half the value of normal activity. They coined the term "hypocatalasemia"

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<sup>43</sup> For Furuhashi's pre- and postwar research program, see Hyun, "Blood Purity and Scientific Independence" (cit. n. 19). Nakajima Hachiro 中嶋八良 at the Department of Legal Medicine, with Ohkura at the Department of Human Genetics, was a faithful junior colleague of Furuhashi. He joined the department as an assistant in 1955 and became an assistant professor in 1974. Nakajima and Ohkura conducted overseas fieldwork in East Asia and the Middle East to collect blood samples in order to search for Japanese origins. Later, Matsumoto Hideo (松本秀夫, 1924-2012) joined this overseas research.

<sup>44</sup> Veronika Lipphardt, "'Geographical Distribution Patterns of Various Genes': Genetic Studies of Human Variation after 1945," *Studies in History and Philosophy of Biological and Biomedical Sciences* 47 (2014), 55–59.

to describe these activities.<sup>45</sup> Yet the American geneticists soon lost interest in the gene due to the limitation of its clinical and anthropological use—the genetic disease was rarely discovered among non-Asians and even among Asians, most cases were Japanese.<sup>46</sup> But Ohkura viewed the rarity of the gene in non-Japanese populations as a Japanese genetic marker and planned an overseas survey of acatalasemia distribution, the aim of which was to search for the origin of the Japanese people.<sup>47</sup> From the mid-1960s, Ohkura's laboratory conducted field surveys in Japan, Okinawa, and Taiwan during which they examined the genetic distribution of acatalasemia and complex blood group systems in order to speculate on Japanese origins.

Eventually, the collaborative project with the KIBP geneticists became an extension of Ohkura's overseas surveys. The collaborative research on the genetic frequency of acatalasemia and blood group systems in the Korean population aimed to discover genetic clines within Koreans and the neighboring people.<sup>48</sup> The Korean side's conversion was made because of the process of sampling and analysis together, not theoretical discussion. Ohkura's team regularly met the KIBP geneticists and went on field trips together. From 1972 to 1979, Ohkura visited Seoul at least ten times, conducting fieldwork in twelve regions of South Korea during which he collected 13,000 blood samples.<sup>49</sup> A Japanese assistant stayed at Kang's genetics lab to teach Lee Chung Choo and other graduate students immunochemical and biochemical techniques, as well as ways to calculate the value of catalase activity in blood samples. A sufficient number of anti-serums for non-ABO blood systems, such as MNs, Lewis blood groups, and acatalasemia screening agents were also offered by the Tokyo group. The large amount of anti-serums and screening agents allowed the Seoul group to enlarge their collection size from hundreds to thousands. The outcomes of the cooperative research were reported in annual JSHG meetings in Japan.

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<sup>45</sup> Edwin T. Nishimura, Howard B. Hamilton, Thomas Y. Kobara, Shigeo Takahara, Yoshio Ogura, and Katsusaburo Doi, "Carrier State in Human Acatalasemia," *Science* 130:3371 (1959), 333–334.

<sup>46</sup> Masana Ogata, "Acatalasemia," *Human Genetics* 86 (1991), 331–340.

<sup>47</sup> A Letter from Howard B. Hamilton to James V. Neel, October 15, 1963, American Philosophical Society, Mss.Ms.Coll.96, Box 27, Folder 1, "Hamilton, Howard B."

<sup>48</sup> Yung Sun Kang, "Hangugin jipdane isseoseo Acatalasemiaui bindowa bunpo 한국인 집단에 있어서 Acatalasemia 의 빈도와 분포 (The Frequency and Distribution of Acatalasemia among the Korean Population)," in *The Proceedings of the 1976 Conference for Homeland and Abroad Korean Scientists* (Seoul: The Korean Federation of Science and Technology Societies, 1976), 17–20.

<sup>49</sup> Koji Ohkura, "Kang Yung Sun sensei to no fureai (A Rendezvous with Mr. Kang Yung Sun)," in *Hagok Gang Yeongseon baksa jeongnyeon toeim ginyeom munjip* (cit. n. 27), 371.

Ohkura's group actively took part in the meetings, sometimes joined by Kang and Lee.<sup>50</sup>

The KIBP geneticists embodied the Ohkura group's research agenda as well as their research method. While collaborating with Ohkura, Kang and Lee came to understand biochemical genetic markers as indicators of the genetic relatedness between Japanese and Korean individuals. Historian Marianne Sommer calls this kind of understanding of genes—as biological markers of the historical origins of human populations—the idea of an “anthropological gene.”<sup>51</sup> The Koreans embodied this idea in the course of their collaboration with Japanese scientists. A nationalistic passion underlying Ohkura's overseas survey was also integrated into their research purpose. In 1976, summarizing his collaborative research on the acatalasemia distribution in the Korean population, Kang claimed that their research indicated the biological distinctiveness of the Korean population and its role as a cultural and biological mediator between the Chinese and Japanese populations.<sup>52</sup> Kang and Lee concluded that their study of the frequency of acatalasemia in the Korean population supported the alleged ancient history of cultural dissemination in East Asia in which Bronze Age culture was disseminated from the Chinese continent to the Japanese archipelago through the Korean peninsula.<sup>53</sup>

<sup>50</sup> Paik Sang Gi, interviewed by author, February 23, 2017, Daejeon, Korea.

<sup>51</sup> Marianne Sommer, “History in the Gene: Negotiations between Molecular and Organismal Anthropology,” *Journal of the History of Biology* 41:3 (2008), 473–528.

<sup>52</sup> For the detailed analysis of their research and its limitations, see Jaehwan Hyun, “Yujeonjeok minjok mandeulgi: Hangugui illyu yujeon yeongu, minjok jeongcheseong, geurigo chogukjeok gwahak gyoryu, 1926-2009 유전적 민족 만들기: 한국의 인류 유전 연구, 민족 정체성, 그리고 초국적 과학 교류, 1926-2009 (The Making of a Genetic Nation: Human Heredity, National Identity, and Transnational Scientific Exchange in South Korea, 1926-2009),” (Ph.D. dissertation, Seoul National University, 2018), 264–266. For the historical context of such conceptualization of the Korean population in relation to neighboring groups in human heredity research, see Joon Young Jung 정준영, “Piui injong juuiwa singminji uihak: gyeongseong jedae beobuihak gyosirui hyeoraekyeong illyuhak 피의 인종주의와 식민지 의학: 경성제대 법의학고수실의 혈액형 인류학 (Racism of “Blood” and Colonial Medicine: Blood Group Anthropology Studies at Keijo Imperial University Department of Forensic Medicine),” *Uisahak 의사학* (Korean Journal of Medical History) 21:3 (2012), 513–550.

<sup>53</sup> Kang, “Hangugin jipdane isseoseo Acatalasemiaui bindowa bunpo” (cit. n. 48), 17–20. See also Kang Yung Sun and Lee Chung Choo, “Hangugin jipdanui hyoso gyeolpibe gwanhan yujeonhakjeok yeongu: mukatalliaje hyeolcheong yujeon injauui bindowa bunpo 한국인 집단의 효소 결핍에 관한 유전학적 연구: 무카탈라아제 혈청 유전인자의 빈도와 분포 (A Genetic Study of the Enzyme Deficiency in the Korean Population: The Frequency and Distribution of an Acatalasemia Gene),” *Akademi nonchong 아카데미 논총* (The Journal of Freedom Academy) 4:1 (1976), 223–230.

Studying the genetic constitution of the Korean population turned into a nationalistic project to prove the uniqueness of the Korean people distinguishing them from neighboring populations. Lee and his colleagues and students within and outside Seoul National University would promote this type of research with nationalistic motivations on the one hand, and with a view to learning new technologies and new research materials such as serum proteins and isozymes, on the other. The nationalistic geneticists would get their hands on the techniques via Lee's retraining in an American lab totally uninvolved with anthropological genetics.

## Retraining in an American Clinical Genetics Lab

When collaboration with Ohkura came to an end, Lee Chung Choo had the chance to rebuild his genetics lab in a more systematic way, based on his year-long studies in the United States. In 1975, when Seoul National University moved to a new campus, the SNU-AID Graduate Program of Basic Sciences was set up, supported by a USAID development loan of five million US dollars and a Korean government grant of two million US dollars, for five years. The program comprised of five subprograms: the U.S. and Korean visiting professor exchange program, the faculty development program, the library procurement program, the equipment purchase program, and the research support program.<sup>54</sup> Using this support from the SNU-AID Program, Lee Chung Choo was able to move from his position as a professor of liberal arts to the Department of Zoology, where he officially established the Laboratory of Human Genetics and was appointed as professor of genetics.<sup>55</sup> Also, as a visiting exchange professor supported through the SNU-AID Program, he studied abroad in Philadelphia, from 1978 to 1980.<sup>56</sup>

For his training in the United States, Lee chose the clinical genetics laboratory at Temple University School of Medicine and Temple University Hospital in Philadelphia, led by the pulmonary disease specialist Friedrich Kueppers (who had earned his MD in 1961).<sup>57</sup> The connection to Kueppers was as opportunistic as the previous

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<sup>54</sup> USAID, "AID Loan No.489-v-091/Project No. 489-22-660-709: Loan Authorization provided from Education and Human Resources Development (Korea; Seoul National University Graduate Program of Natural Sciences)" (Washington, D.C.: Department of State, 1975); "USAID, 489-22-660-709: Project Appraisal Report: Seoul National University (SNU) Graduate Program of Basic Science" (Washington, D.C.: Department of State, November 11, 1976); Seoul National University, "SNU-AID Program of Basic Sciences Progress Report: May 1, 1979–May 5, 1979" (Seoul: Seoul National University, 1979).

<sup>55</sup> Before Lee established his human genetics laboratory, the biochemical lab was only part of Kang's genetics lab. Lee Chung Choo, interviewed by author, July 4, 2017, Seoul, Korea.

<sup>56</sup> Lee, *Deokgang I Jeongju gyosu* (cit. n. 42), 42–43.

<sup>57</sup> *Ibid.*

Japanese exchange. A Korean medical biochemist Shim Bong Sup (沈鳳燮, 1926–2017) at the Catholic Medical University, Seoul, worked on finding genetic variants in serum proteins (plasma proteins), as part of understanding the genetics of rare metabolic diseases from the 1960s.<sup>58</sup> Shim’s research was transferred from the biochemical genetics lab of Alexander G. Bearn (1923–2009) at the Rockefeller Institute of Medical Research through Shim’s postdoctoral fellowship there in the early 1960s.<sup>59</sup> Shim taught a “Biochemical Genetics” course at Kang’s department in 1968 and several graduate students at Kang’s lab were dispatched to Shim’s to learn the basic methodologies of biochemical research for their KIBP projects.<sup>60</sup> Kueppers was Shim’s colleague during his stay in Bearn’s lab, where he had worked on the polymorphism of Alpha-1antitrypsin deficiency (A1AD).<sup>61</sup> He was well known to the KIBP geneticists as Shim had already invited Kueppers to give an academic lecture in Seoul in 1969.<sup>62</sup>

At Temple, Kueppers furthered his interest in A1AD polymorphism by adopting new techniques such as agarose and polyacrylamide gel electrophoresis and an immunofixation method. In doing so, Kueppers’ lab identified the genetic variation of A1AD and its correlation to the incidence of lung diseases in a specific population. During Lee’s visit, Kueppers taught him how to identify variations in isozyme and serum proteins through electrophoresis.<sup>63</sup> The techniques allowed Lee to identify polymorphisms of molecules, which had been impossible using traditional biochemical approaches that checked the chemical response of blood samples to reagents.<sup>64</sup>

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<sup>58</sup> Paik Sang Gi, interviewed by author, February 23, 2017, Daejeon, Korea. Hong Kyung-ja, a former graduate student of Kang Yung Sun at Seoul, became a professor of medical biochemistry at Catholic Medical University.

<sup>59</sup> Sim Bong Sup (1926–2017), director of the biochemistry lab at Catholic University, was trained at the Rockefeller Institute in identifying the phenotypical polymorphism of haptoglobin through electrophoresis. Haptoglobins are one of the serum proteins—proteins present in blood plasma, also called blood proteins—that bind free hemoglobin released from erythrocytes and work as inhibitors of its oxidative activity.

<sup>60</sup> Paik Sang Gi, interviewed by author, February 23, 2017, Daejeon, Korea.

<sup>61</sup> Just as Shim at the Catholic Medical University worked on the specific serum protein haptoglobin, Kueppers worked on Alpha 1-antitrypsin. This protein works as a protease inhibitor. In contrast to Shim’s changing interest in the molecular function itself, Kueppers maintained his medical interest in protein polymorphism.

<sup>62</sup> Catholic University Medical College, *Gatollik daehakgyo uigwa daehak 50nyeonsa: 1954–2004* 가톨릭대학교 의과대학 50년사: 1954-2004 (The 50 Years History of Catholic University Medical College) (Seoul: Catholic University Medical College, 2004), 192.

<sup>63</sup> Lee, *Deokgang I Jeongju gyosu* (cit. n. 42), 43–44.

<sup>64</sup> *Ibid.*

Kueppers was not particularly interested in Lee's Korean population-specific research, because he was a clinician practicing pulmonary medicine, not a population geneticist. In the early years after Lee returned to Seoul, Kueppers helped Lee publish the results of serum protein polymorphisms by analyzing the data and connecting him with medical genetics labs in West Germany.<sup>65</sup> Yet such relationship did not last long. Lee's work on the polymorphism of A1AD or any other serum proteins of the Korean population had little clinical implication because their research subjects were haphazardly recruited from secondary schools, colleges, country towns, military barracks, and even their own labs. It was also common for Lee and his students to extract their own blood for analysis. In this respect, the interaction between Kueppers and Lee was quite limited and non-sustainable. Indeed, Lee's team returned to their interest in studying the genetic constitution of the Korean population with the new techniques they had learned from Kueppers, rather than turning their attention to medical genetics. As I will show below, government support for basic research that began around that time would consolidate their self-centered research orientation.

## Self-Sufficiency: Population Genetics as an Inward-Looking Science

From the mid-1970s on, the Korean government began supporting "basic" research in universities, with a new understanding that "basic science" served as the basis of technology development.<sup>66</sup> The Korea Science and Engineering Foundation, which was founded in 1977 modeled on the U.S. National Science Foundation, reflected the government's renewed interest in basic science.<sup>67</sup> It coincided with the recognition of the biological sciences as "useful" for developing a biotechnology industry.<sup>68</sup>

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<sup>65</sup> Moon You Oh, Chung Choo Lee, and Friedrich Kueppers, "Transferrin (Tf) and Group – Specific Component (Ge) Varants in Korean Population," *Genes & Genomics* 7:2 (1985), 69-74.

<sup>66</sup> Buhm Soon Park 박범순, Taemin Woo 우태민, and Youjung Shin 신유정, *Sahoosogui gicho gwahak: gicho gwahak yeonguwongwa saeroun jisik saengtaegye 사회속의 기초 과학: 기초 과학 연구원과 새로운 지식 생태계* (Basic Science in Society: Institute for Basic Science and the New Ecology of Knowledge) (Paju: Hanwool, 2016).

<sup>67</sup> For the role of KOSEF in shaping the idea of "basic science" and changing the place of universities in R&D, see Kichun Kang 강기천, "Mokjeok inneun gicho yeongu: hanguk gwahak jaedan seollim ihu gicho yeongu oeyeonui hwakjang, 1977-1989 목적 있는 기초 연구: 한국과학재단 설립 이후 기초 연구 외연의 확장, 1977-1989 ("Mission-Oriented Basic Research": The Establishment of the Korea Science and Engineering Foundation and the Expanding Concept of Basic Research in South Korea, 1977-1989)," *Hanguk gwahaksa hakoeji 한국과학사학회지* (The Korean Journal for the History of Science) 42:1 (2020), 224-246.

<sup>68</sup> For the institutional history of genetic engineering in South Korea, see Shin Hyang Sook 신향숙, "1980nyeondae Hangugeseo yujeon gonghagui deungjanggwa jedohwa 1980년대 한국에서

The Korean Ministry of Education newly initiated the Basic Research Institute Growth Program (*Gicho gwahak yeonguso yukseong saeop*) spending about fourteen million US dollars from 1979 to 1989 and the Subsidy Program for Academic Research on Genetic Engineering (*Yujeon gonghak haksul yeongu joseongbi*) spending about 48.5 million US dollars from 1985 to 1989.<sup>69</sup> Faculty members and alumni of the Department of Zoology, Seoul National University served as program managers and members of review and evaluation committees for the programs. Therefore, Lee's colleagues were likely to receive support from these new funding sources.<sup>70</sup>

At the time, Lee's human genetics lab had already formed the basis of expanding their research program. The program aimed to identify the polymorphism of a defined number of serum proteins in the Korean population using electrophoresis, and compare the data to other populations' databases. Underlying the program was the nationalist idea that the Korean people were a unique and distinct biological population. Indeed, Lee's team paid most of their attention to the clinal relationship of protein polymorphism distributions among Chinese, Korean, and Japanese populations that he had found with Kang during their acatalasemia research.<sup>71</sup> The rationale of this line of study was ill-founded: the only reason for the study was that the genetic constitution of the Korean population was understudied compared to other human groups, so the nationalist consciousness was essential in its operations. Pragmatic reasons should not be ignored when seeking to understand the expansion of the research program, however. It seemed well-defined and easy to set up—particularly regarding research material collection: researchers could easily obtain blood samples and other human tissue by recruiting students from their colleges or secondary schools.

Backed up by government support, senior animal geneticists—all of whom were once Kang's students and Lee's senior colleagues at the Department of Zoology, Seoul National University—entered Lee's single-player game from the early 1980s on. Kim Yung Jin, a zoological geneticist working on genetic variations in amphibians and reptiles at Chungnam National University, began a long-term research project on the genetic constitution of the Korean population in 1984. Chung Yong-Jae (鄭瑢載, 1925–2013), a fruit fly geneticist at Ewha Womans University, with the

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유전공학의 등장과 제도화 (The Advent and Institutionalization of Genetic Engineering in South Korea in the 1980s)," (Ph.D. dissertation, Jeonbuk National University, 2013).

<sup>69</sup> *Ibid.*, 149; Hyun, "Yujeonjeok minjok mandeulgi" (cit. n. 52), 278–280.

<sup>70</sup> Hyun, "Yujeonjeok minjok mandeulgi," 279.

<sup>71</sup> As an example, see, Chung Choo Lee 이정주 and Moon You Oh 오문유, "Hangugin jipdanui Transferrin C Subtypes wa Haptoglobin Phenotypes ui bunpowa yujeonja bindo 한국인 집단의 Transferrin C Subtypes 와 Haptoglobin Phenotypes 의 분포와 유전자 빈도 (Gene Frequencies and Phenotypes of Transferrin C Subtypes and Haptoglobin in Korean Population)," *Hanguk dongmul hakoeji 한국동물학회지* (The Korean Journal of Zoology) 26:3 (1983), 211–217.

help of his former student Park Kyung-sook (朴京淑, b. 1948) at Sungshin Women's University, began to collect blood samples from college students and analyze them with electrophoresis in 1985.

It was Paik Yong Kyun's (白龍均, 1925–2018) Medical Genetics Laboratory at Hanyang University College of Medicine that had the biggest presence in the national scene. In collaboration with the West German pharmacogeneticist H. Werner Goedde (1927–1996), Director of the Institute of Human Genetics at the University of Hamburg, Paik led the genetic research on the polymorphism of alcohol dehydrogenase deficiency—the cause of different alcohol sensitivity between Asian and non-Asian groups—in the Korean population.<sup>72</sup> At first Lee expected to collaborate with Goedde's team, but again, Paik's affiliation with a medical institution made Goedde favor him over Lee's group.<sup>73</sup> Instead of looking for other foreign collaborators, as he had done in previous decades, Lee quickly turned his attention to his domestic colleagues.

Lee's domestic network expanded beyond Seoul National University in due course. Related articles occupied 20% (27 articles) of the number of the articles published in *The Korean Journal of Genetics* from 1978 to 1989. Twenty-six graduate students earned their masters or Ph.D. degrees with theses on this scientific work.<sup>74</sup> New PhDs were employed in genetics-related departments newly established by the government policy of supporting genetic engineering.<sup>75</sup> The number of laboratories conducting this scientific work increased from one to nine and reached eleven at its peak in 1989. The size of the research network was notable, particularly considering that, even in 1992, there were only 34 Korean animal geneticists (including human geneticists by definition) in total.<sup>76</sup>

Geneticists participating in the national game were unfavorable to transnational exchange. The degree of reservations about transnational collaboration varied: at one

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<sup>72</sup> For the details of Paik's collaboration with Goedde, see Jaehwan Hyun, "Hanminjogui ppurireul malhaneun uisadeul: uihak yujeonhakgwa hangugin giwollon, 1975–1987 한민족의 뿌리를 말하는 의사들: 의학 유전학과 한국인 기원론, 1975–1987 (Doctors Telling about "the Root of Koreans": Medical Genetics and the Korean Origins, 1975–1987)," *Uisahak* 의사학 (Korean Journal of Medical History) 28:2 (2019), 551–589.

<sup>73</sup> Lee Chung Choo, interviewed by author, July 4, 2017, Seoul, Korea.

<sup>74</sup> Hyun, "Yujeonjeok minjok mandeulgi" (cit. n. 52), 281–289.

<sup>75</sup> Shin, "1980nyeondae Hangugeseo yujeon gonghagui deungjanggwa jedohwa" (cit. n. 68), 210–220.

<sup>76</sup> Pak Jaehyeok 박재혁, Gwahak gisul bunya yeongu jamjaeryeok paageul wihan illyeok gujo bunseoge gwanhan yeongu 과학기술분야 연구잠재력 파악을 위한 인력구조 분석에 관한 연구 (Research on the Manpower Structure Analysis for Surveying Potential Research Capabilities in the Fields of Science and Technology) (Seoul: Science and Technology Policy Institute, 1992), 179–180.

pole, Kim's group at Chungnam National University recognized Goedde's team as a foreign threat. They believed that the study of the Korean population should be undertaken by Koreans themselves.<sup>77</sup> At the opposite end of the spectrum, Lee's group at Seoul National University occasionally assisted Goedde and Paik's work, albeit reluctantly. Only once did Lee put his name as second author to their 1988 publication for the reason he had helped them collect blood samples from his students' colleges in Gangneung and Jeju as well as Chungnam National University.<sup>78</sup> Most geneticists were situated somewhere between Kim's hostility and Lee's reluctant favor: they were indifferent to what foreign scientists were doing, and preferred to focus on domestic competition and collaboration. For instance, although Lee's human genetics lab did help the Paik-Goedde team, they collaborated more frequently with domestic groups, in particular with Kim's genetics lab at Chungnam. Kyung-sook Park at Sungshin also joined the research network. Lee's students, who settled down in other provinces like Gangneung, Gongju, and Jeju as professors of biology or genetics in national universities, also participated in the collaboration. Kim's nationalistic project titled "The Molecular Genetic Studies of the Korean Population" was indeed a domestic project, which was conducted through collaboration with the above-mentioned domestic researchers from 1984.<sup>79</sup> The project's publications, even though some papers were written in English, mostly appeared in domestic genetics journals. As a result, their research results were rarely exposed to and cited by foreign geneticists. Only one Singaporean medical research group cited Lee's article about the A1AD polymorphism coauthored with Kueppers in relation to population genetic research on Korean origins.<sup>80</sup> This domestic approach and self-centered research during this period led to them increasingly isolated from the outside world.

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<sup>77</sup> Ahn Gwang Sook, interviewed by author, February 23, 2017, Daejeon, Korea. Kim was a quite nationalistic figure despite his training in the University of Texas, Austin and continued collaborative work on amphibians and reptiles with his American colleagues. For another example concerning Kim's nationalistic involvement in cherry blossom origins, see Manyong Moon 문만용, "Somei yoshino, Wangbeot-namu, Beotkkonnori: Yeoksa munhwawa gwahakui gwangye maetki 소메이요시노, 왕벚나무, 벚꽃놀이: 역사 · 문화와 과학의 관계 맺기 (Somei-yoshino, Wangbeot-namu, and Cherry Blossom Viewing: The Relationship Between Science and History & Culture)," *Bigyo ilbonhak* 비교일본학 (Comparative Japanese Studies) 34 (2015), 61–85.

<sup>78</sup> Yong Kyun Paik, Chung Choo Lee, Heide G. Benkman, and H. Werner Goedde, "Genetic Polymorphism of  $\delta$  Aminolevulinate Dehydrase in Several Population Groups in Korea," *Genes & Genomics* 10:3 (1988), 123–126.

<sup>79</sup> Kim and Kim, "Hanguginui bunjayujeonhakjeok yeongu" (cit. n. 1).

<sup>80</sup> N. Saha and J. S. H. Tay, "Origin of the Koreans: A Population Genetic Study," *American Journal of Physical Anthropology* 88:1 (1992), 27–36.

The isolation finally led Korean geneticists to a dead-end in the early 1990s. They failed to introduce new statistical methods for studying genetic distance and accumulating blood materials and medical records, and the extensive work during the 1980s could not contribute to either anthropological or medical interests in the Korean population. The heterogenous mappings of the clinal relationship between Koreans and neighboring populations based on the data of different protein polymorphisms revealed nothing about the origins of the Korean population except for the repeated assertion that Korean people were biologically unique.<sup>81</sup> A new generation of geneticists who had studied abroad in research institutions working on molecular anthropology in Japan and the United States began to feel that the protein polymorphism data was not useful for studying the genetic origins of the Korean population.<sup>82</sup> Medical geneticists were also unsatisfied. The data did not help them identify the genetic association between protein polymorphisms and diseases as they were collected by analyzing blood samples of different anonymous subjects without any disease or health status records. Even blood materials used in the analysis were unsaved, so it was impossible to design follow-up studies using new techniques.<sup>83</sup> Ultimately, in the mid-1990s, the isolated program was replaced by new transnational projects that were emerging in the field of genetic history and genomics, and was gradually forgotten in the history of Korean genetics.

## Conclusion

The collaborative relations between Korean and foreign scientists in the field of population genetics drastically changed over three decades. In the mid-1960s, Korean geneticists strived to connect themselves with the international community despite the inattentive attitudes of their overseas counterparts. In the following decade, as a result of those efforts, they engaged in collaborative works with non-mainstream researchers in Japan and the United States and learn research methods and frameworks necessary for the genetic analysis of blood in the Korean population. When

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<sup>81</sup> This was Lee's conclusion about what genetics could explain about the origin of Koreans. Chung Choo Lee 이정주, "Hyeoraekyeong 혈액형 (Blood Groups)," in Jung Bae Kim 김정배 ed., *Hangugui jayeongwa ingan* 한국의 자연과 인간 (Humanity and Nature in Korea) (Seoul: Urigyoyuk, 1997), 32–35.

<sup>82</sup> For South Korea's generational shift of population genetics in the mid-1990s, see Jaehwan Hyun, "Tracing National Origins, Debating Ethnic Homogeneity: Population Genetics and the Politics of National Identity in South Korea," *Historical Studies in the Natural Sciences* 49:4 (2019), 351–383.

<sup>83</sup> Paik Sang Gi, interviewed by author, February 23, 2017, Daejeon, Korea; Ahn Gwang Sook, interviewed by author, February 23, 2017, Daejeon, Korea.

the government began to support their genetic research in the early 1980s, Korean researchers became more introspective. Their research network reached out only within domestic circles; they were reluctant to include foreign scientists. As a result of this voluntary isolationism, their research—based on the non-mainstream approach—met no methodological challenges from outside. Combined with the limitation of human-subject recruiting practices, the non-mainstream research style separated them from the international geneticist community in terms of both anthropological and medical genetics. In the last decade of the twentieth century, the research program ended with a generational shift, which coincided with young geneticists' engagement with the transnational research network collecting mitochondrial and Y chromosome DNA data worldwide.<sup>84</sup> In this respect, I argue that the dynamics of opportunistic collaboration, oscillating between proactive involvement and voluntary isolationism, was one of the crucial factors in the emergence and eclipse of the research program.

The Korean geneticists developed their research program as a nationalist project justifying the core narrative of Korean nation-building, that Koreans are a unique biological population independent from neighboring groups. Their search for the biological uniqueness of the Korean population in part sprang from their Japanese partner Ohkura's nationalist research project. In other words, the nationalist framework of Korean genetics community took form in the process of the transnational exchange. The role of transnational exchange in the making of nationalist science has become a common theme in recent literature on Cold War scientific collaboration in population genetics. Despite the extensive literature in transnational nationalism, the Korean case is still worth dwelling on: whereas domestic nationalism was the main drive of the formation of nationalist framework of genetic research in other regions, in South Korea, it came from their Japanese collaborator. Korean nationalism always existed as a background, but it was integrated into the research program only after the Koreans accepted Ohkura's approach.

In the literature exploring the postwar history of science in South Korea, collaboration with foreign scientists has been considered a key factor of the development of South Korean science at an international level and thus defined as the norm of what was desirable for Korean scientists. According to historian Moon Manyong, it was international scientific collaboration that helped Koreans materialize their "postcolonial desire," to advance science as a basis for building a new nation-state.<sup>85</sup> The research focusing on scientific development through transnational exchange often results in historians overlooking heterogeneous forms of collaboration. In contrast to

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<sup>84</sup> Hyun, "Tracing National Origins, Debating Ethnic Homogeneity" (cit. n. 82).

<sup>85</sup> Manyong Moon, "Postcolonial Desire and the Tripartite Alliance in East Asia: The Hybrid Origins of a Modern Scientific and Technological System in South Korea," in *Engineering Asia* (cit. n. 31), 165–188.

the previous literature centered on the relationship between Korean scientists and renowned American scientists in the “mainstream” community, the Korean geneticists collaborated with lesser-known Japanese scientists or American clinicians outside of their specialization. Perhaps this marginal type of collaboration was more common in scientifically uninteresting countries like South Korea.

Furthermore, the case of South Korea reveals that Korean geneticists were not always in favor of collaboration with foreign researchers. When they became self-sufficient in terms of research methods and financial support, the genetics researchers began to harbor reservations about international collaboration. The ambivalence of Korean geneticists towards collaboration indicates that Korean scientists’ valuation of collaboration was not always positive and could shift with changes in the conditions and contexts of their research activities. Finally, this study shows that paying attention to the multidimensional aspects of transnational exchange is central to understanding how transnational collaboration impacted the emergence of a new science in a recipient country in combination with its own nationalist agenda.

## Abstract

This paper examines the rise and fall of genetic research on the Korean population from the 1960s to the 1980s. The research program, which was mainly undertaken by Korean geneticists who worked at or graduated from the Department of Zoology, Seoul National University, was inherently nationalist in sentiment. Engaging with the recent literature in Cold War scientific collaboration in population genetics, this paper focuses on the role of transnational exchange in the shaping of this nationalist science in South Korea. It argues that the dynamics of opportunistic collaboration of the Korean geneticists with foreign researchers over three decades was one of the crucial factors in the emergence and eclipse of the research program. This study will contribute to the previous literature by illuminating the marginal nature of Korean geneticists' collaboration and their ambivalent attitudes towards collaboration, and suggesting the needs to pay more attention to the multidimensional aspects of transnational exchange during that period.

**Keywords:** population genetics, scientific collaboration, national science, transnational exchange, Cold War