

Actinic Prurigo in the Mexican Indigenous Population. Are There True Benefits for the Indigenous Communities Involved?

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Abstract. With the Human Genome Project, the genome and the mapping thereof was declared to remain in the commons and freely available to all researchers. Shortly after, patents on products and methods related to many genes started to be granted on the justification of supporting and boosting the biotechnology and pharmaceutical industries so as to strengthen the countries' economies and to allow the creation of helpful medical products that would improve society's health and healthcare. Nowadays, the debate between the aforesaid stances has been stoked citing the risks of protecting a Patent System that may cause a heavily restricted access to knowledge and information or of protecting a Scientific Commons. Today, there has not been any clear conclusion with respect to the incentive or deterrent effect of patents or of the Commons. The reason is that neither of the expressed stances is absolute and the question cannot be answered in the abstract. This work in progress aims to provide a glimpse on how the patent system impacts the relationship between researchers and Mexican indigenous peoples as human research subjects and indigenous peoples' access to healthcare as beneficiaries of the resulting Medical Products and Services in real and concrete situations.

Keywords. Patents, Human Genetic Information, Indigenous Peoples, Healthcare, Mexico

Introduction

After the first draft of the Human Genome Project, it seemed natural that the genome and the mapping thereof was to remain in the commons, freely available to all researchers, and no patents were to be granted.¹ Shortly after, patents on products and methods related to many genes started to be granted on the justification of supporting and boosting the biotechnology and pharmaceutical industries so as to strengthen the countries' economies and to allow the creation of helpful medical products that would improve society's health and healthcare. Nowadays, the debate between the aforesaid stances has been stoked citing the risks of a "Second Enclosure" (one of knowledge)² and of a "Tragedy of the Anticommons"³ created by a strong patents system and those of a patent system that is weakly enforced and that does not include human genes (and related materials) as patentable subject matter. In other words, the debate confronts the potential consequences of a lack of or of heavily restricted access to knowledge and information created by patents and their related licenses and the ones of having no biotechnology and pharmaceutical industries due to a lack of incentives to invest monetary and human resources resulting from not being able to obtain and enforce patents. To date, there has not been any clear conclusion with respect to the incentive or deterrent effect of patents or of the commons. This is so because neither of the expressed stances is absolute and the question cannot be answered in the abstract. The main and final purpose of this work in progress is to determine how the patent system impacts the relationship between researchers and Mexican indigenous peoples as human research

1 William J. Clinton. "Special Event: Clinton Announces Findings From Human Genome Project to be Shared with Global Scientific Community." CNN Transcripts CNN online:
<<http://edition.cnn.com/TRANSCRIPTS/0003/14/se.01.html>>

2 James Boyle. "The Second Enclosure Movement And the Construction of the Public Domain." (2003) 66 Law and Contemporary Problems 33.

3 Michael Heller. "The Tragedy of the Anticommons: Property in the Transition from Marx to Markets." (1997) Harvard Law Review 111.

subjects and indigenous peoples' access to healthcare as beneficiaries of the resulting medical testing, medical treatments, and drugs related to gene sequences (hereinafter collectively referred to as "Medical Products and Services") in real-life, concrete situations.

I. Background

Given the development of genetics and biotechnology, the current research on diseases is providing a different perspective on understanding the pathology, treatment, and ethics related to said research. The current study of the skin disease Actinic Prurigo is an example of this new understanding. The current study of Actinic Prurigo has revealed a particular association with the presence of the Human Leukocyte Antigen HLA-DR4 DRB1*0407 in certain indigenous communities (Mazatecas, Nahuas, Mayas, and Chimilas) and related mestizos (the offsprings of a Spaniard and an American Indian) in Mexico, Colombia, Ecuador, Bolivia, Honduras, and Guatemala. It is suggested that people with the HLA-DR4 DRB1*0407 are likely to be susceptible to develop Actinic Prurigo. This suggestion is supported by the results obtained in research, for instance in Mexico, where this subtype of HLA has been found in more than 92.8% of Actinic Prurigo patients⁴ and in Colombia in more than 97.5% of Actinic Prurigo patients⁵. These findings are useful in the detection of a risk factor to develop Actinic Prurigo and in the study of its pathogenesis, and factors that may be essential in the manufacture of diagnostic tests. The manufacture of more effective and efficient medicines and even the development of genetic therapy to neutralize the susceptibility could also be created. These findings would benefit, not only the population of the countries so far mentioned, but also the population of the countries where the Actinic Prurigo is spreading such as the United States, Canada, and Great Britain.

While in other cases involving human subjects in medical researches there are certain ethical principles that need to be complied with such as benefit sharing, informed consent, human rights, and human dignity,⁶ given that in this case indigenous communities are involved, there are more complex concerns.⁷ Most of the indigenous communities in the world, all of these Mexican groups are geographically and economically marginalized making less than \$7 USD a day and having limited and very precarious access to healthcare services. Taking into account the foregoing circumstances, what constitutes benefit sharing for research subjects that live in such precarious conditions? What does this vulnerable group need? What is the best way to ensure that those benefits are created and more importantly, shared with this special kind of research subjects, meeting thus, their needs?

This study aims at answering the above-mentioned questions. To do that, in the first part, it describes the Actinic Prurigo, including not only its clinical characteristics, but also its genetic component and the characteristics of the population who suffers from it, the current treatment, and the research network. It also describes the precarious conditions under which these indigenous communities live, particularly in connection with access to healthcare services. Further, it sets out the current terms and conditions under which the Actinic Prurigo-related research is carried out by researchers from the Instituto Nacional de Ciencias Medicas y Nutricion Salvador Zubiran in Mexico, including the kind of access to treatment the sampled communities have and whether they benefit from any capacity building. It also describes the way the participating researchers approach and deal with the relevant intellectual property. The second part analyzes what benefit sharing comprises in general terms and in connection with the indigenous peoples involved in the Actinic Prurigo medical study and

4 S. Zuloaga-Salcedo, et. al., "Class I and Class II Major Histocompatibility Complex Genes in Mexican Patients with Actinic Prurigo" (2007) *BJD* 7801 at 1. (Zuloaga)

5 Alfonso Suarez, et.al., "Association of HLA Subtype DRB1*0407 in Colombian Patients with Actinic Prurigo" (2006) *22 Photodermatol Photoimmunol Photomed* 55 at 55. (Suarez)

6 See *Universal Declaration on Bioethics and Human Rights*, (Paris: United Nations Educational, Scientific and Cultural Organization, 2005).

7 See for example, the case of the Krahô ethnic communities and the Federal University of São Paulo (UNIFESP) Tania Bubela, et.al., *Respecting, Promoting, and Protecting Traditional Knowledge: A Comparative Case Study of Brazil, Kenya, and Northern Canada*. (The Innovation Partnership) at 15-66

whether the current practice of benefit sharing is in fact adequate or whether the application of the rules related to the commons is necessary. Finally, it calls the attention into the fact that it is not only important to create benefits, but also to make sure those benefits are actually shared.

II. Getting the facts straight

i) Actinic Prurigo

Actinic Prurigo is a rare form of photodermatosis that consists of pruritic symmetric skin lesions that appear predominantly in face (superciliary arches, eyebrows, malar areas, dorsum of nose and lower lip) chest, neck, and extremities as an allergic reaction to exposure to ultra violet light A and B. The lesions are inflamed macules, papules, nodules, crusts, plaques and hyperpigmentation on the skin that itch and usually appear hours or days after exposure to sunlight. In 45% of the cases, the skin lesions are accompanied by conjunctiva, hyperemia, photophobia, tearing, hyperpigmentation, and pseudopterygium that may cause visual impairment.⁸ The appearance of the symptoms worsen in summer and sometimes spring.

The current medical studies have suggested that Actinic Prurigo most probably has a genetic component that, in combination with exposure to ultra violet light A and B, causes the disease. According to these studies, Actinic Prurigo has been observed to be frequent in Amerindians and mestizos carrying the gene HLA-DR4/DRB1*0407. Specifically, the results of studies involving Mexican patients have shown that 92.8% of Actinic Prurigo patients have the HLA-DR4 gene and 80.7% the HLA-DRB1*0407 gene.⁹ In studies involving Colombian patients, 97.5% of Actinic Prurigo patients presented the HLA DRB1*0407.¹⁰ The populations of Amerindians where this gene has been found and where Actinic Prurigo has observed to be more frequent are Mazatecas, Nahuas, Mayas, and Chimilas located principally in Mexico, Colombia, Guatemala, Bolivia, Peru, and Honduras. Given the genetic component contained in the genetic structure of some amerindians therein located and the immigration of some mestizos carrying the relevant gene, there have been some Actinic Prurigo cases found in the United States, Canada, and Great Britain. Notwithstanding that the high percentages mentioned above related to the frequency with which the gene HLA-DR4/ DRB1*0407 is found in Actinic Prurigo patients, only 3.5% of the Amerindian population and less than 1% of the Mexican mestizo population has the gene in question and therefore develops Actinic Prurigo.

Even though the disease can appear at any age, its onset usually occurs during childhood. It most predominantly afflicts women (ratio 2:1). The seriousness of the lesions depends on the intensity of the ultra violet light, the time of the day at which the patient exposes his or herself to sunlight, and the amount of time of exposure. Therefore, it has been observed that, besides the time of exposure, the severity of the disease also depends on the latitude and altitude where the Actinic Prurigo patient resides.¹¹ Another factor that has experimentally been suggested triggers and influences the level of the symptoms is the exposure to the fumes that come from wood-burning stoves.

Actinic Prurigo is not fatal and not infectious (it only afflicts the people that have the genetic susceptibility to trigger the lesions). Nonetheless, it affects the patients' lifestyle because, regardless of the treatment that could be prescribed, sun exposure is to be avoided, at least at the times of the day where ultra violet light A and B are stronger. Actinic Prurigo can also affect the patients' lifestyle because of the scars the skin lesions leave, especially on the face.

Up to this date, there is no cure for Actinic Prurigo. However, some of its effects can be controlled. The most common medicine used to treat the effects of Actinic Prurigo is thalidomide. Because of thalidomide's quality to inhibit tumor necrosis factor alpha and its anti-inflammatory

8 Jorge E. Arrese, et.al., "Effectors of Inflammation in Actinic Prurigo" (2001) J. Am. Acad. Dermatol. 957 at 957. (Arrese)

9 Zuloaga, *supra* note 4 at 1.

10 Suarez, *supra* note 5 at 56.

11 Arrese, *supra* note 8 at 957.

effects, it has been observed that thalidomide helps reduce the production of tumor necrosis factor alpha which is stimulated by ultra violet light B and it also reduces the inflammations of most of the lesions. Actinic Prurigo patients, except pregnant women, have to take thalidomide tablets regularly (most of the times one tablet a day) for at least two months to treat the lesions.¹² Besides thalidomide, antihistamines are also prescribed to reduce the effects of the histamine and help, thus, reduce the rash and itching. Topical creams, such as corticosteroid (a class of steroid hormones) creams or ointments, are also recommended to help the rash disappear. In chronic cases, it is also prescribed to use methotrexate, a drug used in treatment of cancer and autoimmune diseases to inhibit cellular reproduction. Finally, sunscreens must be used to prevent the rash from developing and sun exposure at some times of the day should be avoided, particularly between 11 am and 3 pm.

The treatment of Actinic Prurigo in Mexico is usually provided through the public healthcare system, although there are some private practices as well that could provide treatment. In Mexico there are up to 20 places where the disease can be diagnosed through a clinical examination and a skin or lip biopsy that costs around \$80 USD. These places are located in Mexico City, San Luis Potosi, and Jalisco. The medicines are only provided at no charge for patients classified as level 1.¹³ The patients classified in the subsequent levels pay different fees in accordance with their socio-economic level. It is important to mention that in the particular case of the thalidomide, given that it is a controlled drug in Mexico because of its teratogenic effects, it can only be obtained in determined places and only by medical prescription.

Actinic Prurigo has been researched on for decades, including researches from Mexico, Colombia, Argentina, Spain, Belgium, United Kingdom, United States, Australia, among many other countries. In Mexico, the main institutions involved in the research of Actinic Prurigo have been Instituto Nacional de Ciencias Medicas y Nutricion Salvador Zubiran, Hospital General Dr. Manuel Gea Gonzalez, Instituto Nacional de Cardiologia Ignacio Chavez, Centro Dermatologico de San Luis Potosi, Hospital General San Luis Potosi, Centro Dermatologico Jalisco, Universidad Nacional Autonoma de Mexico, Universidad Panamericana, and Universidad Autonoma de San Luis Potosi. The particular research project described in this paper has been funded by scientific grants awarded by the Consejo Nacional de Ciencia y Tecnologia (Conacyt) and by the Mexican Health Ministry.

ii) Indigenous Population

In 2005, Mexico had a total population of 103,263,388 out of which 10,103,571 (9.8% of the total population) were indigenous peoples.¹⁴ According to the Political Constitution of United Mexican States (Constitution), an indigenous people is comprised by all those who descend from the population that inhabited current Mexico's territory before the Spanish colonization, that have maintained, up to this date, their own social, economic, cultural, and political institutions, and that identify themselves as members of an indigenous people.¹⁵ Despite the criteria provided by the Constitution, the criteria commonly used by census and other governmental statistics to identify an indigenous people is the

12 Salford Royal NHS Foundation Trust. Department of Dermatology, *Actinic Prurigo* (Salford: Salford Royal NHS Foundation Trust 2008) at 3 online: <<http://www.srht.nhs.uk/news-media/patient-leaflets/dermatology/actinic-prurigo/?locale=en>> and interview of Dr. Julio Granados Arriola chairman of the Department of Immunogenetics of the Instituto Nacional de Ciencias Medicas y Nutricion Salvador Zubiran (24 February 2009)

13 The public healthcare system in Mexico is divided in 7 levels. Level 1, which is the lowest, is reserved for people of no fixed address. Members of indigenous communities are usually classified in level 2. The insufficient resources in the public healthcare system in comparison with the large population and the population's needs make the schedule of appointments very few and far between. Furthermore, inhabitants of rural areas and indigenous communities have poor medical coverage, situation that results in additional travel expenses.

14 National Institute of Statistics, Geography and Data Processing, *Conteo de poblacion y vivienda 2005*. (Mexico: Instituto Nacional de Estadistica y Geografia 2005) online: <<http://www.inegi.org.mx/inegi/default.aspx?s=est&c=10202>> (INEGI)

15 *Constitucion politica de los Estados Unidos Mexicanos 1917* (Mexico) art. 2. [translated by author].

language.¹⁶ As such, in Mexico, there are 62 indigenous languages and therefore, according to the National Commission for the Development of Indigenous Peoples, there are 62 indigenous peoples located in its majority in Yucatan, Oaxaca, Quintana Roo, Chiapas, Campeche, Hidalgo, Puebla, Guerrero, San Luis Potosi, and Veracruz.

Although some members of indigenous peoples have professional careers and live in big cities, most of them still live from agriculture. Their socio-economic reality has been greatly influenced by the discrimination and exploitation that they have suffered from non-indigenous people for centuries. As such, on the one hand, 80% of indigenous peoples' members make less than \$7 USD a day,¹⁷ regardless of their long hours of hard work. On the other hand, some of them have been forced to move to very isolated areas where they can maintain their lands, their autonomy, and their ethnic identity. This isolation has also prevented them from having proper access to the educational and healthcare services that are usually provided by the government. In 2005, out of the 10,103,571 that are indigenous peoples, 6,107,572 (35.9%) of them live in high and very high marginalized areas of the country.¹⁸ The result of this marginalization just impoverishes and marginalizes them even more, making it, thus, a vicious cycle resulting in indigenous peoples suffering from serious malnourishment, deficient access to healthcare, monolingualism, poor education, family disintegration, and continued discrimination. In the particular case of access to healthcare for instance, community members of El Estudiante in Puente de Ixtla, Morelos, had to respond themselves to their current situation in which, in order to get healthcare services, they needed to walk at least one hour to the nearest health centre. Consequently, they built themselves and with their own resources (land, construction materials) a health centre. However, up to this day, they are still waiting for the government to provide them with staff, lab equipment, medicines, and furniture.¹⁹ A similar situation occurs in the state of Guerrero, where, according to the Minister of Health of the state, 400 healthcare centres have been closed, particularly in marginalized areas, for lack of resources, medicines (even paracetamol and basic antibiotics) and personnel (doctors, physicians, nurses).²⁰

The government agencies that provide support and protection to indigenous peoples in Mexico are the following. First of all, there is the National Commission for the Development of Indigenous Peoples. Created in 2003, it aims at contributing to the integral and sustainable development of indigenous peoples and at helping them to maintain their self-determination and to exercise their autonomy. The Ministry of Education has created special schools for indigenous children promoting their bilingual and intercultural education and maintaining the indigenous peoples' culture and ethnic identity. The Ministry of Health, along with the Ministry of Social Development, have developed programs and policies purporting to reduce the indigenous peoples' poverty and marginalization by improving the indigenous communities' access to health, education, telecommunications, drinking water, electricity, and storm drain, especially in Chiapas, Oaxaca, and Guerrero.²¹ Some non-governmental organizations dedicated to indigenous peoples have also been involved in projects similar to the ones described above. An example of this type of non-governmental organizations is Fondo para la Paz, whose members have devoted themselves to helping some indigenous communities to improve their agricultural techniques, to install pipelines, to change their wood-burning stoves, and to train them in connection with basic hygienic norms, among other things.²²

16 Federico Navarrete Linares, *Los pueblos indigenas de Mexico* (Mexico: Comision Nacional para el desarrollo de los Pueblos Indigenas 2008) at 14. (Navarrete)

17 Felipe Calderon Hinojosa, *Plan nacional de desarrollo 2007-2012* (Mexico: Presidencia de la Republica 2006) at 201.

18 INEGI *supra* note 14.

19 Hector Raul Gonzalez, "Hace centro de salud comunidad de Ixtla" *Periodico Reforma* (10 March 2009) online: <<http://www.reforma.com/estados/Articulo/488/975154/>>

20 Jesus Guerrero. "Tiene Guerrero 400 clinicas sin operar." *Periodico Reforma* (25 April 2011) online: <http://www.reforma.com/estados/Articulo/1208552/>

21 Navarrete *supra* note 16 at 16-17.

22 See <http://www.fondopaz.org/index.php?option=com_frontpage&Itemid=1>

The socio-economic situation of the Mazatecas, Nahuas, Mayas, and Chimilas, which are the indigenous peoples that, given their genetic structure have been found to be susceptible to develop Actinic Prurigo is as follows. The Mazatecas are located in Oaxaca, Veracruz, and Puebla and have a population of 305,836. Their main economic activities are the seed of corn, sugar cane, rice, rubber, and coffee, as well as cattle raising.²³ The Nahuas are located in Guerrero, Puebla, Veracruz, San Luis Potosi, Tlaxcala, and Estado de Mexico and have a population of 2,445,969. Their main economic activities are agriculture (corn and bean), animal raising, art in papel amate as well as other types of art, and commerce with their art.²⁴ The Mayas are located in Tabasco, Chiapas, Veracruz, San Luis Potosi, Quintana Roo, Campeche, and Yucatan and have a population of 2,475,575.²⁵ Their economic activities are agriculture (henequen, corn, bean, fruits), silviculture, fishing, furniture making, ceramics and other natural fiber products crafting.²⁶ The Chimilas are located in Colombia, in the departments of Antioquia, Caldas, Risaraldas, Valle, and Magdalena. Their main economic activity is agriculture and animal raising.²⁷ The four indigenous peoples suffer from geographical isolation of some kind (mostly in the jungle in the case of some Mayans), deficient living conditions (no drinking water, no storm drain), transportation, and communication infrastructure (no roads), poor education, in some cases monolingualism (not that much in the case of the Chimilas²⁸), high levels of poverty²⁹, malnourishment, even since pregnancy stages, anti-hygienic and polluted environment,³⁰ and insufficient healthcare centres and services (basic healthcare services provided by a medicine intern and a nurse from Monday to Saturday, insufficient medicines, usually of bad quality and just for basic afflictions, without the possibility to transport patients to other locations).³¹

iii) Current practices in the medical study of Actinic Prurigo³²

The medical study of Actinic Prurigo object of this paper is carried out by researchers from el Instituto Nacional de Ciencias Medicas y Nutricion Salvador Zubiran (Department of Immunology and Rheumatology, Mexico), Hospital General Dr. Manuel Gea Gonzalez (Dermatology Department, Mexico), Instituto Nacional de Cardiologia Ignacio Chavez (Cellular Biology Section, Physiology Department, Mexico), Universidad Panamericana (Department of Molecular Biology, Faculty of Medicine, Mexico), and Hospital Universitario 12 de Octubre (Department of Immunology, Madrid). They have been involved in this project for over a decade. The resources to carry out the study have

23 Xicohtencatl Luna Ruiz, *Mazatecos. Pueblos indigenas del Mexico contemporaneo* (Mexico: Comision Nacional para la Defensa de los Pueblos Indigenas 2007) at 30 & 34-35.

24 Catharine Good Eshelman & Guadalupe Barrientos Lopez, *Nahuas del alto Balsas. Pueblos indigenas del Mexico contemporaneo* (Mexico: Comision Nacional para la Defensa de los Pueblos Indigenas 2004) at 11-16

25 Comision nacional para el desarrollo de los pueblos indigenas. <<http://www.cdi.gob.mx/>> and interview of Nadia Cristina Romero anthropologist for the Escuela Nacional de Antropologia e Historia and Universidad Nacional Autonoma de Mexico (9 April 2009).

26 Mario Humberto Ruz, *Mayas. Pueblos indigenas del Mexico contemporaneo* (Mexico: Comision Nacional para la Defensa de los Pueblos Indigenas 2006) at 61. (Ruz)

27 Nancy M. Flowers, "Chimilas" online: World Culture Encyclopedia <<http://www.everyculture.com/South-America/Chimila.html>>

28 *Ibid.*

29 According to the United Nation Development Program, the region of Metlatonoc in the political state of Guerrero has the level of economic development of Malawi, country whose economy occupies the 137th place out of 179 countries assessed by the International Monetary Fund. Human Development Report. Mexico 2004, online: United Nations Development Programmes <<http://hdr.undp.org/en/reports/nationalreports/latinamericathecaribbean/mexico/name.3337.en.html>>

30 Ruz *supra* note 26 at 79

31 *Ibid* at 84-85.

32 All of the details regarding the practices and mechanisms of the Actinic Prurigo medical study object of this paper were provided by Julio Granados Arriola through a series of interviews carried out on January 22, 2009, February 15, 2009, February 28, 2009, March 14, 2009, March 17, 2009, April 7, 2009, and April 12, 2009 and internal documents. (Granados' Conversation).

been funded through scientific grants to which the researchers have applied to. The sampled population has comprised men, women, pregnant women, and children, preferably older than ten years old who have been sampled by providing biopsies and blood samples or cotton swabs or mouthful of water spit in a cup in the case of children. The purpose of the study is to determine the pathology of Actinic Prurigo in order to understand it and to study and confirm its causes and factors, and effects. The resulting knowledge and information could help, according to one of the researchers interviewed, to prescribe the best medicine to treat the effects of the disease, to develop new and more effective medicines, and even to develop a genetic therapy that would prevent the disease from being detonated.

In connection with any related intellectual property, none of the researchers involved in the project has applied for a patent for any of their findings. The only type of intellectual property that has been claimed has been copyright over the articles associated with the project that have been published. Notwithstanding the foregoing, in the United States Patents and Trademarks Office (hereinafter the "USPTO") there are at least three patents granted whose claims mention the HLA-DR4/DRB1 gene associated with Actinic Prurigo. The first one is a patent granted over an HLA-DR4 tetramer complex wherein the complex comprises an isolated HLA-DR4 used in detecting T-cells in peripheral blood, specific for infection or latency of mycobacterial infection, such as *M. tuberculosis* and *M. Leprae* among others.³³ The second patent granted is over a method to diagnose rheumatoid arthritis related to HLA DRB1*0401, DRB1*0404, DRB1*0407 and DRB1*0101.³⁴ The third patent granted by the USPTO is over an isolated DNA molecule of human leukocyte antigen DRB1-14c to provide a reagent that determines a type of a HLA-DR antigen.³⁵ None of the researchers consulted for this study knew about the above-mentioned patents granted by the USPTO. They explained that, as part of the habits in the research centres where they work, a legal check usually occurs at the stage of commercial exploitation and not before.³⁶ However, when they were informed of the USPTO patents, two of them showed some concern about the impact that they could have on their research, the funding provided for the project, and the project itself (its development and its resulting Medical Products and Services). None of the above-mentioned patents or otherwise similar to them are granted by the Mexican Institute of Industrial Property.

In connection with matters of informed consent and benefit sharing, the medical study begins by contacting the leaders (or counsel of elders) of the sampled communities to inform them the details, goals, and the people and institutions involved as provided when there are indigenous peoples involved. Once the leaders' (or counsel of elders') consent is obtained, the researchers approach the communities' members. They inform each of the community members about the goals (determine the relation between the presence of the HLA-DR4/DRB1*0407 gene and the Actinic Prurigo, thereby, confirming the latter as an autoimmune photodermatosis, and probably finding a better treatment and a preventive therapy), mechanisms (skin or lip biopsy, blood sample, cotton swab or mouthful of water spit in a cup), stages (it includes details of follow ups), costs (none), risks (none that it would be worth mentioning in this paper), people involved, people responsible for the study, and contact information. With the above-mentioned information, and before proceeding with any part of the study, the researchers ask the people interested in participating in the study to sign and date an informed consent form. This informed consent form includes all the information mentioned before in written detail, the signature of the person to be sampled and studied, the signature of the researcher or person in charge of taking the samples, two witnesses and the date(s) when these signatures are obtained.

Besides the information regarding the details of the study, the leaders of the community (or counsel of elders) and the community members are also informed of the benefits they would receive

33 See United States Patent 7,678,379 owned by Beckman Coulter, Inc.

34 See United States Patent 7,320,873 owned by N.V. Organon.

35 See United States Patent 5,663,047 owned by Mitsui Petrochemical Industries, Ltd

36 Conversation with Jose Luis Solleiro, (12 January 2010) General Director of the *Departamento de Vinculación* (University-Industry Liaison Office) and Granados' Conversations *supra* note 32.

from the study. As such, they are informed that there will be no monetary retribution for the samples provided, that any participation is completely voluntary and the list of services and benefits that the researchers will provide them. The list of such benefits and services include free general consultation, diagnostic tests on their level of glucose and lipids and tests on their blood type, as well as training for the community's health promoters on basic healthcare and hygiene-related matters in general terms and also regarding specifically Actinic Prurigo (i.e. special care to Actinic Prurigo lesions, care regarding exposure to sunlight).

III. Getting the benefits straight

The researchers of the Actinic Prurigo medical study, prior to any other action, approached, explained the details of the study to, and obtained the consent of the leaders of the community (or counsel of elders), then did the same with each of the people to be sampled, and then proceeded with the proper medical and research stages of the study. Considering the foregoing, it is possible to conclude that, in general terms, the consent on behalf of the sampled people was properly obtained according to the Universal Declaration on Bioethics and Human Rights issued by the UNESCO and the International Ethical Guidelines for Biomedical Research Involving Human Subjects prepared by the Council for International Organizations of Medical Sciences (CIOMS) in collaboration with the World Health Organization (WHO).³⁷ However, a positive conclusion may not be that easy to draw with respect to the concept of “benefit sharing.”

According to the Biomedical Research Guidelines, benefit sharing should include monetary benefits in case there are commercial products developing from biological specimens. The concept of benefit sharing could be defined as:

“the action of giving a portion of advantages/profits derived from the use of genetic resources or traditional knowledge to resource providers to achieve justice in exchange, with a particular emphasis on the clear provision of benefits to those who may lack reasonable access to resulting healthcare products and services without providing unethical inducements.”³⁸

However, what constitutes those “advantages” or “profits”? What portion of those is “right”? The Bioethics Declaration proposes a benefit sharing through (a) sustainable assistance; (b) access to quality health care; (c) new diagnostic and therapeutic products stemming from research; (d) support for health services; (e) access to scientific and technology knowledge; (f) capacity-building facilities.³⁹

The Biomedical Research Guidelines on the other hand, focuses also on what benefit sharing comprises with respect to the participants of the study. For instance, it provides that there could be monetary or other benefits resulting from the development of commercial products from biological specimens, in case there are any.⁴⁰ It also pinpoints what benefit sharing should comprise specifically when the research involves communities with limited resources or vulnerable people. In connection with communities with limited resources, the Medical Research Guidelines states that:

“... the sponsor and the investigator must make every effort to ensure that:

37 However, the modalities for withdrawal of the consent or the privacy and confidentiality provisions are missing from the Informed Consent Form used in the Actinic Prurigo medical study. See *Universal Declaration on Bioethics and Human Rights*, 19 October 2005 at article 6, 7. (Bioethics Declaration) *International Ethical Guidelines for Biomedical Research Involving Human Subjects*, November 2002 at guideline 5 & 18. (Biomedical Research Guidelines).

38 D. Schroeder, “Global Medical Ethics” 33 *Journal of Medical Ethics* 2007 online: <<http://jme.bmj.com/cgi/content/full/33/4/205>>

39 The Bioethics Declaration provides that “benefits resulting from scientific research should be shared with society as a whole and within the international community, in particular with developing countries.” *Bioethics Declaration, supra* note 37 at Article 15.

40 *Biomedical Research Guidelines, supra* note 37 at Guideline 5(20).

- the research is responsive to the health needs and the priorities of the population or community in which it is to be carried out; and
- any intervention or product developed, or knowledge generated, will be made reasonably available for the benefit of that population or community.”⁴¹

In connection with vulnerable people,⁴² the Biomedical Research Guidelines specifically require a special justification for involving vulnerable people as research subjects and states that their rights and welfare must be carefully safeguarded arguing that this special protection is based on the vulnerable people's limited capacity or freedom to make a decision and grant or decline their consent. As such, the outcome of the knowledge resulting from the medical research should provide access to tangible and targeted benefits for the vulnerable people consisting of “improved diagnosis, prevention or treatment of diseases or other health problems characteristic of, or unique to [them].”⁴³

In the particular case of mention, as described above, researchers provide healthcare services including on site and free consultation and treatment through the public healthcare system, either for free or for a very low cost. They also provide training and education to the communities' health promoters. However, there are certain aspects of the current benefits that could be improved and some more that could actually be added if the provisions included in the Bioethics Declaration and the Biomedical Research Guidelines are taken into account and implemented. The research seems indeed responsive to the unique community's health needs because the disease object of the study is prevalent in the population where the medical study is carried out and because the subjects of the study benefit from the diagnostic practices and from the medicines the researchers bring to the communities. However, in order to obtain personalized follow-up treatment, the indigenous patients need to make use of the public healthcare system, which, as mentioned before, usually involves traveling to healthcare centres that are located far away from their communities and waiting a long time to get an appointment. As such, in this case, a way of improving adequate benefit sharing and ensuring that the participating communities benefit from the study, researchers should bring enough medicines to the communities to fully treat their Actinic Prurigo leaving them medicines for the whole treatment in accordance with the diagnosis and consultation carried out. This would benefit them by sparing them the need to travel and expend their already scarce resources to obtain the medicines for the disease whose study they are contributing with.

The training and education provided by the researchers is currently regarding basic healthcare and hygiene-related matters in general terms and regarding Actinic Prurigo. However, notwithstanding that this knowledge will help them improve their health in general terms, there is no transfer of scientific and technological knowledge neither is there capacity building specifically related to Actinic Prurigo. Health promoters should be given the opportunity to access the resulting information and knowledge such as databases, reports, and interpretation of the results. Access should be accompanied by training and guidance on understanding the above-mentioned information and knowledge.⁴⁴ The

41 *Ibid.* at Guideline 10. In connection with this provision, the Biomedical Research Guidelines detail that the concept of “responsive to health needs” refers not only to target the research to diseases that are prevalent to the population being studied, but also to ensuring that all the health benefits (i.e. diagnosis, preventive, and treatments) are made available to that population.

42 The Biomedical Research Guidelines define vulnerable persons as “those who are relatively (or absolutely) incapable of protecting their own interests. More formally, they may have insufficient power, intelligence, education, resources, strength, or other need attributes to protect their own interests.” They then, include “poor people” and “some ethnic and racial minority groups” as members of this group of vulnerable persons. *Ibid.* at Guideline 13.

43 *Ibid.*

44 See for instance, Tania Bubela, et.al., *Respecting, Promoting, and Protecting Traditional Knowledge: A Comparative Case Study of Brazil, Kenya, and Northern Canada*. (The Innovation Partnership) at 15-66. In this case, concerns about how to best ensure proper benefit sharing with the participating indigenous communities from where the genetic samples

combination of access to knowledge and information and adequate training would enable the health promoters to detect other factors that could trigger the disease, allowing them, thus, to become more active in the development of the study. This new role of health promoters would bring about several benefits for the researchers and for the communities. On the one hand, given that it is the health promoters who are in constant contact with the population, this more active role would enrich the medical study with all the observations and details that they would be able to capture and document. On the other hand, this training and knowledge would allow the health promoters to learn how to perceive and interpret certain facts that are relevant to diseases and this could be applied to other diseases besides Actinic Prurigo. Another benefit to indigenous communities resulting from educating and training their health promoters is that, by learning the different phases that comprise the study and research, they would become more capable of advising community leaders (or counsel of elders) and community members on the terms and conditions under which the community's participation could result more beneficial on further research projects.

In order to talk about benefit sharing, there should also exist provisions that ensure capacity building for the government of the country where the medical study is carried out in order to make sure it has the skills and knowledge to provide its population with quality healthcare. This could be achieved by providing that when the sources of funding are public, the researchers involved in the project must share their results and knowledge with the agency that awards the funding. In Mexico, the Conacyt provides in its regulations that its scholars must contribute to Mexico's development by sharing their experience, skills, and knowledge acquired during the graduate studies it helped fund in the most reasonable and appropriate way possible. This provision could be extended to scientific projects the Conacyt helps fund.

Up to this part, I have discussed the concept of benefit sharing on a one-on-one basis: researchers-participating indigenous peoples as research human subjects in accordance with the ethical guidelines mentioned above; however this concept could also be assessed from another angle.

Regardless of the economic growth and creation of benefits that some policies such as the ones related to intellectual property could bring about, it is important to bear in mind that sometimes, the search for flow of economic resources to promote a country's economic growth, for the industry's development, and for the creation of incentives to innovate in R&D can actually result in several benefits that are not shared at all among a great sector of the population. Making benefits get to the sector that needs and uses them is the only way to actually see the value of those benefits and is the other angle under which benefit sharing could also be assessed. It is true that implementing benefit sharing standards along with the existence of patents is a way of achieving an efficient, ethical, and just allocation of benefits. However, should there be a risk of restricting further R&D, a more effective collaboration and innovation process, or simply allowing other agents to step in when the circumstances require so due to either a panorama of fragmented patent rights or disrupted the negotiations to use and work with patented inventions (the scientific anticommons described by Heller and Eisenberg), could be considered a way of hindering or restricting benefit sharing.

In this particular case, the participating researchers had not find any restrictions or impediments to their research up until the time they were interviewed. The foregoing could be a result of the stage on which the research project is (there has not been any commercial exploitation) or of that fact that the patents associated with the Actinic Prurigo are granted in the United States and not in Mexico, which is where the research project takes place. It could also be because the researchers know of the difficulties of enforcing or even of realizing that a patent has been infringed in non commercial stages or because they belong to public research centres and are governed by scientific norms.⁴⁵ Defenders of the patent system would claim that it is because the patent system does not hinder innovation in general or

(traditional knowledge) associated to the Krahô ethnic communities and the Federal University of São Paulo (UNIFESP) were thoroughly discussed.

45 Arti K Rai. "Regulating Scientific Research: IPR and the Norms of Science" (1999) 94 NW U.L. Rev. 77, 90-92.

because it just does not do it particularly in biotechnology and genetics.⁴⁶ But whatever the reason, competition has proved to be a good tool to spur innovation because of the possibility of having multiple simultaneous either collaborating or competing trying to make the product first, better or faster. It is also clear that the knowledge in the fields of biotechnology and genetics is still little and very complex and uncertain about what it can achieve so having collaboration and competition would be very beneficial. Furthermore, the fact that today and in this case the researchers interviewed have still not found impediments to their research does not mean that it is possible that “a real danger exists that allowing patent scope to be over broad may enable the individual of firm who first came up with a particular practical application to control a broad array of improvements and applications.”⁴⁷

For instance, it is possible to mention the case related to blindness due to vitamin A deficiency, it was found that genetically modified rice to produce vitamin A could be used to lower such cases. Researchers had to negotiate licenses to 70 patents and obtain access to 15 pieces of technical property spread over 31 institutions to produce the genetically modified rice.⁴⁸ Another example is the case of the BRCA1 and BRCA2 genes associated with breast and cervical cancer owned by Myriad Genetics and the restrictions imposed by the patent holders for laboratories that provided diagnostic tests.⁴⁹⁵⁰ All this negotiation could limit the extent to which benefit sharing is achieved restricting it to only the researchers and users who have the means to engage in negotiations. Therefore, it is of paramount importance to keep analyzing cases and to maintain a close surveillance of the patents that are being granted and particularly on the scope on which they are granted so as to ensure a constant pace in R&D and as I mentioned above, that the benefits of such R&D (resulting products) get to the sector that needs and uses them.

Conclusions

Benefit sharing is not easy to achieve. As seen in this case study, it is not even possible to come up with a list of things that will account for a proper benefit sharing in every case. There are several factors that need to be taken into account in each situation to actually conclude that true benefits have been achieved. There are several actors that could and should participate such as researchers, government agencies, policy makers, non governmental organizations, anthropologists, community leaders (or council of elders), health promoters, and even community members. And there are several ways to achieve the same goal.

The communities involved in the study suffer from extreme poverty. A link has been observed between poverty, unequal access to health, and mortality. This relation is based on two circumstances. On the one hand, it is based on the way in which malnourishment, an unsanitary environment, exposure to communicable diseases, and stressful socio-economic conditions weaken people's immune system and increase susceptibility to certain diseases. On the other hand, it is based on the way in which a late access to treatment and a late or even lack of preventive or diagnostic mechanisms increases the chances of mortality. This is true for any sector of the population (indigenous peoples and mestizos) that are considered marginalized.

Measures to provide indigenous communities with lands, trade opportunities, agricultural techniques, and social programs could be useful, such as the ones implemented by the government through the National Commission for the Development of Indigenous Peoples and some non

46 See David E. Adelman. “A Fallacy of the Commons in Biotech Patent Policy.” (2005) 20 Berkeley Tech L.J. 985 (Adelman)

47 Robert P. Merges & Richard L. Nelson. “On the Complex Economics of Patent Scope” (1990) 90 Colum. L. Rev. 839, 880.

48 Case cited by Adelman *Supra* note 46 at 13 & 14.

49 See E. Richard Gold & Julia Carbone, “Myriad Genetics: In the Eye of the Policy Storm” [unpublished].

50 It is important to mention that none of the arguments discussed in this paper refer to the moral and technical discussions about whether human genes are patentable subject matter. The reason for this expressed exclusion is that said discussion could be the subject of a complete different article.

governmental organizations such as Fondo para la Paz. Ensuring that research projects are developed ethically in accordance with the prior informed consent and benefit sharing as provided in the Bioethics Declaration and the Biomedical Research Guidelines could also be effective to protect vulnerable groups. Economic growth may provide resources to improve healthcare services in general. However, those healthcare services must be actually accessed by everyone, they must equally benefit all the sectors of the population and not just the wealthy part or in this case, the participating indigenous peoples.

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