

Montagnier and Gallo in the Discovery of HIV

Historical Analysis

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This paper examines the role played by Montagnier and Robert Gallo and their differences in the inventory of the cause of acquired immune deficiency syndrome (AIDS). Both are in the field of biomedical science and have been involved in many types of research, although the discovery of the human immunodeficiency virus (HIV) appears to be the major one.

There have been differences in who discovered the cause of AIDS, and even Robert Gallo was denied the opportunity to be awarded a Nobel Prize due to scientific misconduct. Notably, they had differences for almost a decade, but by 1993, Dr. Gallo approached Montagnier. During the meeting, they agreed that they both contributed to the discovery of human immunodeficiency as the cause of acquired immune deficiency syndrome (AIDS) (Fouts et al. 2015). They were both categorized as the leading scientists in the world after several searches that they conducted. Even though they collaborated on some work, they still have professional differences. Dr. Gallo argues that vaccines can be developed by attaching salmonella bacteria with the HIV genes. On the other hand, Dr. Montagnier argues that vaccines can only be abstracted from HIV proteins (Afeltowicz, 2012).

Robert Gallo

Robert Gallo is an American virologist in the field of biomedical science, where he mostly involves himself in research and discoveries. According to Harden and Fauci (2012), the most influential discovery was that of HIV as the infectious agent for acquired immune deficiency syndrome. In the Institute of Human Virology, which is at the University of Maryland, Department of Medicine, Gallo is recognized as the co-founder and director.

Early life

Robert Gallo was born to Italian immigrants in Waterbury, United States. In 1959, he received a Bachelor of Science degree in biology from the Province College. Four years later, Gallo earned himself a master's degree in the same field from Jefferson Medical College in Philadelphia. After his education at Chicago University, he was involved in research, mainly at the National Cancer Institute. While in the institution, he was appointed the head of the Laboratory of Tumor Cell Biology, where he worked for thirty years. He once stated that his career did not just happen but was influenced much by the death of his sister, who suffered from leukemia.

Robert discovered retroviruses in humans.

While he was the head of the laboratory, he had many colleagues, such as David Baltimore, who helped him in his research. Concerning the work of retroviruses, Gallo was influenced by the work of the late Howard Temin, who was a biologist in the same institution. He then concentrated on the study of retroviruses as the primary objective in the laboratory. In 1976, he requested one of his colleagues, e Doris Morgan, to do research on culture fluid of activated lymphocytes and then present the results. Curreli et al. (2013) indicate that T lymphocytes probably led to growth factor production. A group of scientists, including Frank Rossetti, Morgan, and Robert, authored a paper describing the T-cell growth factor (TCGF) in their method. In 1978, a committee was formed named Interlaken cytokine nomenclature, which changed the name T growth factor to interleukin-2 (IL-2). The latter group never described the biological effects of soluble molecules (Lewis, DeVico, & Gallo, 2014).

In the report, Dr. Gordon stated that extracellular media was functional in the transformation of blastogenic in the lymphocytes. Their report was not clearly described; hence, they never described the growth cell, type of cell, and the factors involved in the functions of the same. Initially, T-cells were thought to be dead cells over IL-2; they were meant to be grown by culture in T-cell immunology (Cocchi et al. 2012). Gallo's group was not satisfied; hence, they wanted to come up with purified and biochemically IL-2. They were in a position to grow T-cells while observing them and noting viruses that affected them. They discovered the T-cell leukemia virus (HTLV) as the retrovirus in humans. There was an outbreak of rare leukemia at the time; this made independent Japanese researchers search for the cause of the disease. The two groups had the same results, thereby concluding that T-cells were the first retrovirus in human beings. Following the research, Gallo was awarded the Lasker Award due to his leading role in the discovery. Subsequently, he has been awarded several prizes and awards due to his great work.

HIV/AIDS discovery

In May 1983, Gallo and his group published a scientific journal composed of four papers. In the paper, they demonstrated that the retrovirus that they had discovered was likely to be the cause of AIDS (Harden & Fauci, 2012). Their results were in contrast to those of the Pasteur Institute led by Luc Montagnier. The latter group observed that the retrovirus, known as the lymphadenopathy-associated virus, was the cause of AIDS. They got their results from a patient who was associated with AIDS. Later, Gallo discovered that the retrovirus that was named HIV-1 was the cause of Acquired Immune Deficiency Syndrome (AIDS) (Curreli et al. 2013). Afterward, Gallo and four other doctors in his laboratory discovered human herpesvirus 6 caused an infertile disease known as Roseola infantum. Gallo was also awarded the Lasker Award for the second time.

Paolo Lusso, Fiorenza Cocchi, and Gallo published a medical paper that indicated that chemokines were compounds that occurred naturally and were HIV inhibitors. In 1995, their research was announced as the scientific breakthrough of the year by a scientific magazine. In their research, they

described the role played by chemokines in controlling the progression of HIV in the [human body](#) (Cocchi et al. 2013). At the same time, they demonstrated how the white blood cells are affected by the virus until they are eventually dysfunctional. After that, entry inhibitors or chemokine antagonists were recognized as drugs used to treat HIV. Co-receptors for [HIV infection](#) were as well recognized, the molecule was said to be the HIV inhibitory molecules bind (Guan, et al 2014).

The Institute of Human Virology was founded in 1996. The primary founders were William Blattner, Robert Redfield, and Robert Gallo. Gallo led the team, and they continued to support the ongoing scientific research on people living with HIV/AIDS (Harden & Fauci, 2012). In Baltimore, they treated almost six thousand patients, while in Africa and the Caribbean, they treated over half a million patients. Bill and Melinda Gates Foundations awarded Gallo and his team \$ 15 million in 2007 to continue with their research for the cure of the deadly disease. During the second phase of the study, they received \$ 23.4 million from a consortium of funding sources. Additionally, the U.S. Army's Military HIV Research Program (MHRP) donated \$ 2.2 million for the project.

Issue of Nobel Prize

Even though Gallo received several awards due to his discovery, he was never awarded the biggest award, which was the Nobel Prize. The reason behind this was that a group in France led by Montagnier was said to have isolated HIV more than a year before Gallo's group. The Gallo group involved themselves in scientific research to the point of even growing a T-cell in order to determine the virus that causes AIDS. All this was not recognized since it was the Montagnier's group that published their results first and stated that the cause of AIDS is yet to be determined.

An investigative journalist by the name of Crewdson observed that there was a misappropriated sample of HIV in Gallo's research. Furthermore, the National Institutes of Health conducted their investigations and suggested that the Gallo group somehow put their things in their research. Due to these differences, the United States Office of Integrity had to analyze some samples that were established at the Laboratory of Cell Biology and from the Pasteur Institute. The analysis was done from 1983-1985 and was commissioned by the Hoffmann -La Roche group of scientists. The conclusion of the experts was that the samples used in Gallo's laboratory were from the mountaineer's lab. Montagnier confirmed this by indicating that they had sent a sample of the culture to Gallo's lab without knowing it contained the virus. They also observed that the virus was passed from one person to the other.

On 28 May 1985, the United States Department of Health and Human Services was declared the inventor of HIV viruses (Alizon et al 2013). In reaction to this, Montagnier filed a suit to challenge the patent. The governments agreed with the Pasteur Institute; the agreement led to Montagnier and Gallo being named as the co-discoverers. The two guys collaborated again in 1987 for the appearance of *Natural Chronology*. In 2002, they both wrote an article in which they published their fundamental role in the discovery of HIV. In 2008, Montagnier was awarded the Nobel Prize together with his

colleagues, but Gallo was not recognized. Montagnier stated that even Gallo was supposed to be on the list, but unfortunately, he was not.

In 2005, Gallo founded a biotechnology company where projects were developed and technologies commercialized in order to reduce the mortality rate mostly caused by viral diseases such as HIV/AIDS (Alizon et al. 2013). In 2011, Gallo, with various professors in the field of medicine, co-founded the Global Virus Network (GVN). The Global Virus Network mainly aimed to reduce the gaps that existed in the earliest research on viral epidemics. They also offered training programs to upcoming virologists in order for them to deal with such challenges effectively and efficiently.

Luc Montagnier

Early life

Luc Montagnier is a French nationalist popularly known for his work in the discovery of HIV viruses. He was raised by humble parents in Chabris, a village located in the Southern part of France. During his early childhood, his father suffered from streptococcal arthritis, which was a terrible disease. During the Second World War, there was starvation in the country, which made Montagnier never add even a single gram for several years. At the time, he used to visit his grandfather, who suffered from cancer. In 1947, two years after the war, his grandfather passed on, and Montagnier was significantly affected. Due to his father's and his grandfather's incidences, he made up his mind and decided to study medicine and research the cause and cure of cancer.

Education

While in high school, he performed perfectly well, and he was always ahead of the other students. Even though he grew up in a Roman Catholic Church, he left behind his beliefs and acknowledged himself to science. His father used his leisure time on electric batteries. His father's scientific life influenced him, and he set up a chemistry laboratory in their house. While still doing his stuff, he used the knowledge and skills he had gained from school to produce hydrogen gas and nitrogen compounds. He says that the nitrogen products had a tendency to blow his face from time to time.

Since he was good in both chemistry and physics, he was able to read popular physics books, especially atomic physics. Since he was not good in math, he decided not to register for Grande's Ecoles but instead to register for both the Faculty of Sciences and the School of Medicine in Poitiers. His initial passion was to start research in human biology, but unfortunately, there was no such field in the school. While in Poitiers, he spent his morning hours in the hospital, while in the afternoon, he was supposed to attend courses in geology, botany, and zoology. The latter three were the core disciplines in the field of science. Luc liked his new professor at the school, Pierre Gavaudan. The teacher taught him about the classification of plants and went far ahead and taught about DNA

double helix. It was during this time that Luc learned about the synthesis of protein by ribosomes as well as viruses' structure (Goicoechea et al. 2014).

Luc Montagnier's involvement in research

At Poitiers, he did his first research at the age of twenty-one years. The most influential factor was the availability of facilities such as the microscope that was used by his father. He involved himself in studying the phototaxy of chloroplasts. The Phototaxy of chloroplasts is where some algae show their unique size when exposed to light. He observed that in intense light, the algae enlarged, while in darkness, they reduced their size. Since the observation took only a few minutes, he used cinematography for his observations (Mbopi-Kéouet et al. 2012). He then proudly presented the small thesis to the faculty of sciences in Poitiers. Immediately after this time, he left Poitiers to go to Paris to further his studies. While in Paris, he was exposed to aspects of biology such as oncology, virology, and neurophysiology.

In 1957, he was influenced by Fraenkel and Schramm to become a virologist by using the modern approach of molecular biology. The professors mentioned that ribonucleic acid viruses caused the tobacco mosaic virus. In his study, Montagnier identified that the murine encephalomyocarditis virus was produced by a double-stranded Ribonucleic acid. He also demonstrated how ribonucleic acid can replicate, similar to deoxyribonucleic acid (Gallo & Jay, 2012). Since he wanted to perfect his knowledge of oncogenic viruses, he moved to Glasgow. The reason for him to move was that the Institute was where Michael Stocker, who was a major virologist at the time, was teaching. Additionally, a person like Renato Dulbecco, who was recognized globally in the field of virology, was spending his time there.

During the 1970s, Ribonucleic acid polymerase was isolated, and it resulted in viral particles such as the stomatitis virus. At the time, they discovered that oncogenic Ribonucleic acid could also be associated with a key enzyme in the human body. Another group found that the Rous sarcoma virus was infectious and transported viral information to Ribonucleic acid. Montagnier, on his side, approved the discovery by further stating that the chromosomal deoxyribonucleic acid was the main cause of the infection.

In 1973, he was appointed the head of the laboratory in the newly created Department of Virology, where he was further asked to conduct all research in the institution. His primal aim was to discover the causes of cancer. In 1975, he was joined by experts such as Chermann and Francoise Sinoussi. He convinced the two researchers to join his research about the causes of cancer. They started their research immediately and could receive blood samples from various hospitals in Paris.

Denis Morgan and Frank Ruscetti, who were collaborators with Dr. Gallo, discovered that in Vitro, the multiplication of human T lymphocytes was enhanced by a growth factor in the body. Luc said that the retroviruses in the mouse mammary tumor formation were not caused by either circulating lymphocytes or tumor cells (Curreli et al. 2013). With that knowledge, Montagnier and his group

tested for retroviruses in human cancers. They mostly researched anti-interferon serums and focused on [breast cancer](#) patients. In 1980, the group observed a deoxyribonucleic acid sequence in an African woman's breast cells. The only disadvantage was that they lacked developed machines, and they could not determine whether they were dealing with an exogenous virus or an endogenous retroviral.

The same knowledge used in cancer discovery was also used in the isolation of the human immunodeficiency virus. In 1982, a new and terrible disease was discovered, and it was likely that the mysterious disease was caused by a transmissible virus. Even though there were few cases in France immunologists as well as clinicians became interested in the condition. Luc Montagnier was approached by Françoise to organize a search for the disease. The search was conducted by a gay man who was traveling to the USA from time to time. The young man was showing early signs of the disease and was having a swollen node on his neck (Chang, Gallo, & Wong-Staal, 2014).

The research was initiated, and it involved the growing of T cells. Françoise suggested that they measure RT activity every three days, like in the previous case of cancer. In the second week, a positive result appeared, that is, polymeric DNA incorporated with radioactive thioamide (Montagnier et al. 2014). Even though they discovered that the cause was mainly a virus, they were not sure whether it was just a passing virus or the real cause of the disease. For them to find the answers, they had to test the virus chemically and immunologically. They found that when the virus was put under activated T lymphocytes, it was easily propagated.

After a short period, they discovered the virus causing AIDS was not related to the T-cell leukemia virus. When observed by microscope, the particles from both viruses were entirely different. In fact, under the [electron microscope](#), the virus was similar to the visna virus in sheep. The virus was causing long-term infections in horses as well as sheep and was said to come from the same family as the new virus in human beings. After the observation, Montagnier had to reorganize himself again since he and his team were dealing with a different virus. Every week, Montagnier's associates were supposed to bring their data on the ongoing research on the virus. The lymphadenopathy-associated virus was the name given to the viral isolates. The early signs of the disease appeared to be swollen lymph nodes. By September 1983, Montagnier was able to make the presentation of the data collected for a couple of months.

In my opinion, the committee that was involved in awarding the 2008 Medicine Nobel Prize was not fair; hence, they never recognized Gallo. Dr. Gallo and Luc went further and wrote an article identifying themselves as the primary discoverers of HIV. A committee that shows transparency in such awards should be appointed to prevent future discrimination of the same. It is noted that even Montagnier himself was surprised that the committee did not recognize Dr. Gallo, although he never refused to receive the award.

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