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07/14/2020



Vale Invests in Genetic Research to Help in the development of Vaccines and Drugs against the Novel Coronavirus

The company forged a partnership with Fiocruz to sequence the genome of at least 1,000 samples of the virus; it is the largest study ever conducted in the country

Vale Institute of Technology (ITV) and Fiocruz will carry out the most extensive genome sequencing study of the novel coronavirus (Sars-CoV-2) so far developed in the country. Both institutions will collect at least 1,000 samples of the virus that causes COVID-19, which has become the greatest challenge for humanity. The goal is to contribute with further knowledge about the virus in the search for a vaccine and medicine that can reduce the impact of the disease; foster epidemiological studies; correlate genetic variations of the virus with the clinical history of the disease; and develop more accurate diagnostic tests. Vale will invest R\$ 2.4 million in the research which began in June 2020 and will be conducted over a period of two years.

Samples will be provided by collection centers located in all Brazilian states. For sake of comparison, by May 2020, only 290 samples of Sars-CoV-2 had been sequenced in Brazil, with only 157 considered high quality. Other initiatives underway have not yet disclosed the sequences. This is still a small sample compared to what is needed to understand the genetic variability (mutation) manifested by the virus in Brazil, which gives it a unique identity. This study intends to collect at least 2,000 samples of the virus. The works combined will add significant scientific knowledge to the fight against the virus in the country. 35,000 high-quality SARS-CoV-2 genomes have already been sequenced worldwide, each representing the characteristics of the virus circulating in the regions where they were collected.

"We need to understand the 'Brazilian DNA' of Sars-CoV-2, find out how it spread across the country, the transmission routes and how mutations affect the target molecules for diagnostic tests, and drugs and vaccines to make these disease control tools more efficient," explained Guilherme Oliveira, scientific director at Vale Institute of Technology. According to Guilherme, a large number of sequenced genomes will enable them to refine the studies on the behavior of the virus based on its genetic variability. Mapping of genome sequences will generate information that will serve as a basis for studying new coronaviruses that may emerge in the future.

Another major goal of the COVID-19 Genome Project is to expand the research network for studying potential viruses that cause endemics and pandemics in the Amazon, such as arboviruses. "In the future, the goal is to determine the genetic sequence of these arboviruses and study their behavior in the cell based on their genetic variability, and from there develop drugs and vaccines, just like we are doing with Sars-CoV-2" Oliveira added.

"The idea for this project emerged during discussions between Instituto Leônidas e Maria Deane (Fiocruz Amazonas) and ITV to consolidate a partnership for the surveillance of viral pathogens in the northern region of the country. The project was later extended nationwide with the inclusion of other Fiocruz sites," said Felipe Naveca, deputy director of Research and Innovation at ILMD.

The novel coronavirus genetic research involves direct participation of 50 researchers and research fellows linked to research and bioinformatics centers in Belém, Manaus, Natal, Belo Horizonte and Rio de Janeiro directly involved in the genetic research of the novel coronavirus, supported by a network of collaborators across the country and abroad. ITV also cooperates with the Cabana Project, which brings together genomics experts in Latin America and Europe, and with the European Bioinformatics Institute, in Cambridge, UK, which maintaining an open database with information about the study available to researchers worldwide.

Reference

The Covid-19 Genome Project is one of the most important initiatives ever carried out by the Vale Institute of Technology, which celebrates its 10th anniversary in 2020. ITV is home to one of the most advanced DNA sequencing laboratories in Latin America. In four years, its researchers mapped the DNA of more than 8,000 specimens of fauna and flora in the Carajás region, including the genome sequencing of the Jaborandi (*Pilocarpus microphyllus*), the active ingredient used to treat glaucoma.

ITV has extensive experience in research and studies in Amazonian biodiversity, species genomics, recovery of mined areas, cave fauna and flora, and climate change, among others. "Vale Institute of Technology is a strategic asset for Vale, it shows the company's commitment to the development of Science and conservation of biodiversity. The Covid-19 Genome Project is yet another proof of this commitment," stated Luiz Eduardo Osorio, executive director of Institutional Relations, Communication and Sustainability at Vale. "ITV and its initiatives are examples of the more transparent and responsible pact that Vale is establishing with society," he concluded.

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