

Facing up to the COVID-19 pandemic in Argentina

From the onset of the SARS-CoV-2 pandemic and following the creation of the 'Coronavirus Unit', Argentinean scientists and technologists have contributed by leading basic and translational research initiatives, including developing diagnostic and serological kits, designing new therapeutic approaches, establishing epidemiological platforms, executing clinical trials and implementing social measures to protect the most vulnerable groups of the population.

Gabriel A. Rabinovich and Jorge Geffner

The onset of the SARS-CoV-2 pandemic coincided with the arrival of a new government led by Alberto Fernández in Argentina. One of the first steps taken by the new administration was to restore the [Ministry of Science and Technology](#). This critical mission had been relegated by the previous government to a smaller section under the control of the Ministry of Education. The recreation of the Ministry of Science and Technology was accompanied by a commitment to substantially increase funding to support science and technology.

The first case of SARS-CoV-2 infection in South America was reported in Brazil on 26 February 2020. The first reported case in Argentina followed shortly thereafter on March 3rd. Argentina alone, a nation with 44 million inhabitants, has reported more than 1.5 million infections and 41,204 deaths due to COVID-19 as of 15 December 2020. Today, Argentina ranks ninth in the number of infected inhabitants and has experienced a notably high mortality rate, which has been estimated at 879 deaths per million.

In the early days of the pandemic, the new Ministry of Science and Technology called for the creation of a Coronavirus Unit and called on the National Scientific and Technical Research Council (CONICET) and the National Agency for Promotion of Science and Technology to work together to concentrate the efforts of the entire scientific community on the challenges posed by COVID-19. At that time, several CONICET institutes dedicated to fundamental research rapidly reorganized their facilities, structure and operations to work collaboratively toward improving our diagnosis and understanding of SARS-CoV-2 infection within Argentina. These multicenter efforts engendered a strong sense of cooperation and solidarity. As such, thousands of young scientists, technicians and students began to work together on this critical effort.

The Coronavirus Unit has provided support for more than 100 basic and translational research initiatives. These



Credit: Oficina de Prensa, CONICET

projects are directed at critical goals, including the creation of new diagnostic kits, therapeutic approaches and epidemiological platforms. Given the ongoing difficulties in acquiring diagnostic reagents in the international market, several research groups undertook the important task of manufacturing reagents and generating kits within Argentina. Argentinean scientists have developed a robust serologic test to evaluate the antibody response to SARS-CoV-2 (ref. 1); more than 800,000 test kits have already been distributed at no cost to health authorities, private and public health institutions and nursing homes. Similarly, CONICET and the University of Buenos Aires researchers have developed efficient RNA-extraction-free protocols that can be used for RT-qPCR (quantitative PCR with reverse transcription)-based SARS-CoV-2 detection. Public-private consortia have also developed new clinical diagnostic tests based on isothermal amplification of SARS-CoV-2 RNA. Ongoing efforts are focused on the development of platforms to measure SARS-CoV-2-specific T cell responses in both patients who have recovered and individuals who have been vaccinated.

Scientific efforts in Argentina include pioneering contributions to therapy and

prevention. Early on in the pandemic, a group of 90 Argentinean scientists and physicians came together to create CPC-19 (Convalescent Plasma COVID-19) to educate health institutions and society as a whole on guidelines for the collection and use of convalescent plasma². Results from a randomized, double-blind, placebo-controlled trial (RCT) in Argentina using convalescent plasma that contained high titers of anti-SARS-CoV-2 antibodies revealed that this treatment modality reduced severe COVID-19 symptoms by half when administered to elderly patients within the first 72 h of illness³. By contrast, results from a second study revealed no differences in clinical status or overall mortality between patients treated with convalescent plasma vs. placebo at 5–10 days after the onset of symptoms⁴.

Argentina remains at the forefront of international efforts to control the pandemic. The nonprofit organization, Infant Foundation, was directly responsible for the enrollment of ~15% of the participants in the Pfizer-BioNTech vaccine



Credit: Jorge Geffner

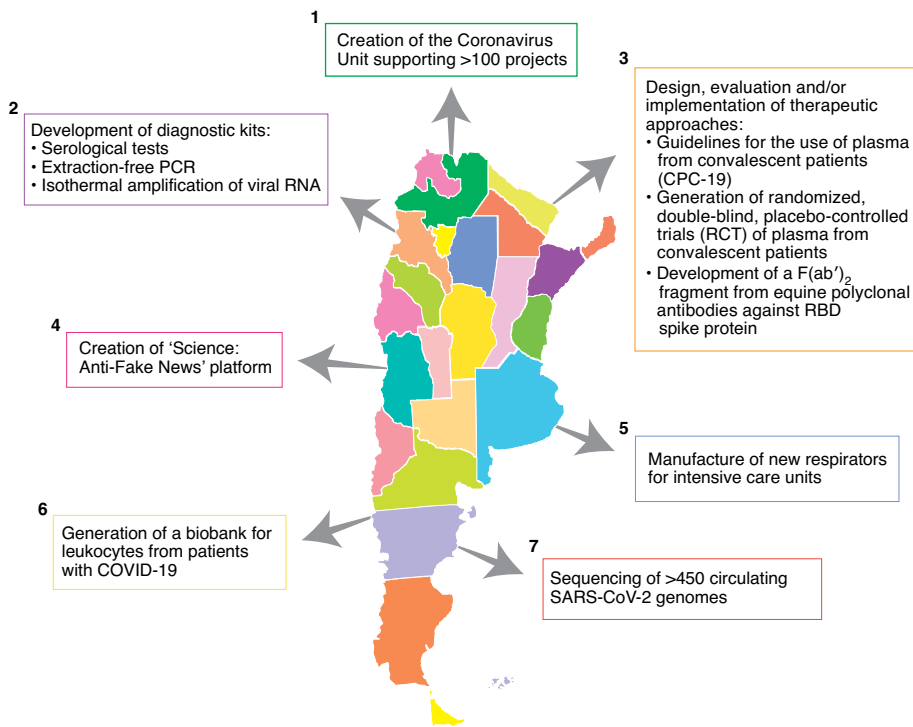


Fig. 1 | The central role of Argentinean science and technology in the battle against the SARS-CoV-2 pandemic. Credit: Marta Toscano

phase 3 RCT⁵. Moreover, the Argentinean biotech company, Inmunova, has developed a therapeutic agent based on F(ab')₂ fragments from equine polyclonal antibodies that recognize the receptor-binding domain (RBD) of the viral spike protein⁶, and a recently completed phase 2/3 RCT demonstrated both an adequate safety profile and improved clinical outcomes for patients with COVID-19. Additionally, CONICET researchers from San Martín University are engaged in an exploratory preclinical trial that features the viral spike protein antigen for a possible vaccine.

The Ministry of Science and Technology together with CONICET and other nonprofit organizations, including the Bunge & Born Foundation, has promoted the development of basic research projects focused on SARS-CoV-2 infection. Among these projects is the creation of a biobank, supported by these organizations, which is facilitating the collection and preservation of peripheral blood leukocytes from more than 1,000 patients with COVID-19

for the analysis of virological and immunological aspects of SARS-CoV-2 infection nationwide. Likewise, the PAIS consortium has integrated the efforts of researchers throughout Argentina and has already sequenced 450 genomes from circulating strains of SARS-CoV-2. This effort is critical for the identification of viral strains circulating in Argentina and for the surveillance of mutations that could have a critical impact on diagnosis, transmission and virulence. Scientists throughout Argentina have offered their services in the battle against this pandemic, including those with expertise in data science and associated disciplines such as physics and mathematics. In the same vein, the medical technology group, TECME, in collaboration with VENG, an Argentinean group focused on technological developments and services, has doubled the national capacity to generate respirators for clinical use.

Importantly, researchers from the social and human sciences are also playing a

decisive role in combatting this pandemic. Several recently begun projects are aimed at implementing protection and supportive measures, most notably in the context of poverty and high vulnerability. This is a critical factor to consider, given that more than 35% of the population in Argentina currently lives in poverty.

Finally, the extraordinary commitment of young researchers and students should be stressed. Triggered by their concerns about the threats associated with false information and their potential impact on public health, a group of young scientists created the 'Science: Anti-Fake News' platform to provide everyone with precise evidence-based information and to mitigate the spread of false news through social media.

By promoting and collaborating in the development of vaccination programs currently underway and, at the same time, generating strategies to address a possible second wave of infections, Argentinean scientists will continue to recognize their important role in promoting public health measures in the face of this devastating pandemic (Fig. 1). □

Gabriel A. Rabinovich^{1,2} and Jorge Geffner³

¹Laboratorio de Inmunopatología, Instituto de Biología y Medicina Experimental, Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Buenos Aires, Argentina. ²Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Buenos Aires, Argentina. ³Instituto de Investigaciones Biomédicas en Retrovirus y SIDA, CONICET, Facultad de Medicina, Universidad de Buenos Aires, Buenos Aires, Argentina. ✉e-mail: gabyrabi@gmail.com

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