



Advancing RD&I in the COVID-19 Technology Foresight project with AdisInsight



Complete drug lifecycle information in a single database

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- **Beatriz Fialho**, Head of Competitive Intelligence at Bio-Manguinhos.

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AdisInsight brings together essential scientific information on drugs in commercial development, key clinical trials, deals and safety profiles, in one easy-to-use database. This case study gives insight into the way Bio-Manguinhos/Fiocruz, an Institute for production and innovation in biologicals (vaccine, biotherapeutics and IVDs) in Brazil, used AdisInsight for its process and their experience working with the database. It is based on an interview with the Bio-Manguinhos Technology Foresight team and includes details about the Institute, the current project and Bio-Manguinhos COVID-19 research.

In 2020, the team responsible for technology foresight at Bio-Manguinhos/Fiocruz reached out to their Knowledge Management Department about a trial for Springer Nature's AdisInsight database. They had become aware of AdisInsight during their data research and a trial was arranged for Bio-Manguinhos/Fiocruz's foresight project for COVID-19.

While Bio-Manguinhos/Fiocruz was, and still is, one of the largest Latin American Institutes involved in the fight against COVID-19, the project discussed in this case study focuses on technology foresight for COVID-19 vaccine candidates to support the pre-procurement (Encomenda Tecnológica, ETEC) of a COVID-19 vaccine candidate and not vaccine research.

About Bio-Manguinhos

The Institute of Technology in Immunobiologicals (Bio-Manguinhos/Fiocruz) belongs to the Oswaldo Cruz Foundation (Fiocruz), and is based in Rio de Janeiro, Brazil. It was one of the main institutions at the forefront of COVID-19 initiatives in the region. The Institute operates one of the largest centers for vaccine technology in Latin America and supplies essential vaccines to the Brazilian Ministry of Health.

Bio-Manguinhos was founded in 1976 and is internationally recognized in the scientific community. It exports its production into more than 70 countries through United Nations agencies. The Institute yellow fever vaccine has been pre-qualified with the World Health Organization (WHO). Part of the Institute's work are also joint initiatives on the exchange of experiences and information, technical-scientific events, partnerships and cooperation. Bio-Manguinhos continues to invest in the innovation chain and in technological development and with cutting-edge technologies and advanced production processes. They have formed partnerships with public and private institutions to guarantee technology transfer and technological development agreements, and contribute to the evolution of the Institute's projects. The Institute complies with the requirements of Good Manufacturing Practices (GMP) and the quality certification of its laboratories make Bio-Manguinhos/Fiocruz an important agent for the improvement of public health in the country.



Springer Nature and the Oswaldo Cruz Foundation

The Oswaldo Cruz Foundation has published 3,602 research papers with Springer Nature between 2012 and March 2022 within the research categories Medical and Health Sciences, Biological Sciences, Public Health and Health Services, Medical Microbiology and Clinical Sciences.

Bio-Manguinhos COVID-19 research

Fiocruz has been part of the various national and international efforts to find and produce a vaccine against Covid-19. Bio-Manguinhos/Fiocruz has 49 years of experience in the production of vaccines. In March 2021, Fiocruz entered an agreement with the biopharmaceutical company AstraZeneca to start large-scale production of the Covid-19 vaccine in Brazil. The agreement between Fiocruz and AstraZeneca aimed to guarantee fully national production with the total transfer of technology, aiming at national autonomy. The Covid-19 vaccine Technology Transfer agreement formalized the transfer of knowledge that was already done by the technological partner, to speed up the production of the Drug Substance and Drug Product at the Bio-Manguinhos facilities.

Use of AdisInsight in the Technological Foresight project

In order to support the decision regarding the investment in R&D and/or licensing efforts towards a COVID-19 vaccine candidate, the Institute built an internal Technological Foresight network, to collect, prepare and analyse data and information about the science and technology related to SARS-COV-2 in different dimensions in 2020. For this project the team used AdisInsight, among other sources of information, a database that provides access to expertly written drug information, with a single search equivalent to searching across thousands of journals, conference proceedings, company websites and other published sources.



Collaboration between Bio-Manguinhos and AdisInsight

- Bio-Manguinhos has been using other resources and off-the-shelf market reports since 2010. These data sources were not used in a structured foresight process, but for specific purposes such as strategic planning review and specific product analysis. In 2019, the Institute ran trials with different databases, two of them with non-overlapping scope already subscribed by Fiocruz, and AdisInsight. When the team started the project for COVID-19 foresight at the end of January 2020, they started comparing results among two databases to define minimum data cleansing, wrangling and transformation requirements. In March 2020, they made the decision to use AdisInsight as their primary database.
- In previous pilot studies, coordinated by Beatriz Fialho and Diana Freire, in the field of plant-based technologies, parts of their searches directed them to data/information from AdisInsight. After identifying that some of the necessary information was available in AdisInsight, the team contacted Ana Paula da Silva Carvalho, the Knowledge Management manager at Bio-Manguinhos at the time, and Priscila do Nascimento Silva, the librarian responsible for managing subscriptions to information databases. The goal was to assess the viability of a test and discuss the possibility of acquiring a license.
- The main motive behind the decision to use AdisInsight, was the fact that the Drug ID was available in both XLS reports without the need of transformation process, which meant that data available only in the Key Drug Properties report could be correlated to Drug ID attributes in the Drug Development Status report which would simplify the process of data preparation.

In March 2020, Bio-Manguinhos made the decision to use AdisInsight as their primary database.

"COVID-19 showed the world that we need to collaborate in different networks that are somehow interconnected. However, most data was still proprietary, and we needed a new paradigm to work around that, so we could move even faster, as much as possible, on a safe ground."

- **Beatriz Fialho**, Head of Competitive Intelligence at Bio-Manguinhos

When the new team, coordinated by Beatriz Fialho and Diana Freire, started the Foresight for COVID-19, they designed a process and specific network. The design was based on previous work and experience in strategic planning and foresight from all members in the network. Due to their foresight project in plant-based technologies, the team had some previous knowledge on research about MERS and SARS.

For this project, AdisInsight was used as their primary database in their data collection process, which was one of the first steps in data preparation. However, at a later stage the data was combined with other sources. Beatriz Fialho, General Coordinator Foresight WG and BM's Board Executive Advisor at Bio-Manguinhos, coordinated the restructuring of foresight activities at Bio-Manguinhos that started at the end of 2019. She explained that since Fiocruz subscribed to AdisInsight they started using the database to design a methodology for data preparation (from data collection to data enrichment). In 2020, they launched a major foresight project on COVID-19, and most recently the Institute began to use the data for other foresight purposes. They did not use a specific subset of data, since the data enrichment was applied during the treatment step. According to Diana Freire, foresight analyst and lead team member of the foresight network, AdisInsight was used throughout the process.

For the data collecting process, the team started by designing the search protocol, followed by extracting the two available reports (Key drug properties and Drug development status), and used an Excel spreadsheet for the initial foresight steps (which included, data cleaning, data wrangling and data enrichment). Afterwards they used data visualisation software such as Power BI to run descriptive graphs and other kinds of visuals to analyse the data. During the enrichment process data from outside AdisInsight, that had been collected through searches and consultations of other specialised sites, scientific papers etc. was added. This meant that their data universe combined AdisInsight and other sources.

Used search protocols depend mainly on the breadth of the question to answer. Sometimes it focuses on a specific disease, including all correlated synonyms, and at other times it can be the technology field, or a company name. The team's preference is to start with a broader search and then streamline after they are able to understand data patterns. Bio-Manguinhos' team met with the AdisInsight Product Management team to better understand the AdisInsight ontology in order to create the most effective search strategy.

The team's main requirement was that the database should have at least one primary-key that would be present in all for download available reports and data categorization which are defined as robust as possible. The team started with analysing the data and then categorised attributes and the cardinality relation with the primary-key (when available) of the data structure in order to define the data preparation process and later on an entity-relationship-model. One of the key factors for the team was to know if the database contained information about product pipelines, projects, clinical studies, technologies, patents and/or scientific publications and how to extract and analyse the data.

Result assumptions are formulated, depending on the research question. For this project the team was working with the following questions:

- Which products are being developed by organisation type?
- In which development phase and for which indications?

This allows the team to answer other questions such as

- Who are the competitors?
- Which products are at a more advanced stage, etc.?

After the search the team defined a set of attributes not directly extracted from the data available, and then after the data clean-up, they moved on to data enrichment.

One of the benefits mentioned was that AdisInsight's Key drug properties report and Drug development status have the same Drug ID which helped with their data preparation process. Another benefit the team from Bio-Manguinhos highlighted was the history details in AdisInsight, which helped them in the enrichment process.

For Bio-Manguinhos' foresight project for COVID-19, containing foresight scenarios constructed from the information retrieved from AdisInsight, the team is currently doing a competitor/potential partner analysis for which they are applying a broader search scope. So far mainly statistics have been used and the AdisInsight data was combined with other collected data to prepare strategic analysis, using not only data visualisation software but also strategic matrix depending on the research question.

The team will use the data retrieved from AdisInsight as part of their technology roadmap to create some charts and combine with other sources of information.

How satisfied was Bio-Manguinhos with AdisInsight?

Due to the positive experience when working with the AdisInsight database and the Adis support team at Springer Nature, Bio-Manguinhos is planning to use AdisInsight for upcoming projects.

"Data from AdisInsight is highly valuable. What we valued most is that the Key drug properties report and Drug development status have the same Drug ID. This helped a lot with our data prep process. In addition, the history details in AdisInsight were very helpful in the enrichment process."

- Beatriz Fialho, Head of Competitive Intelligence at Bio-Manguinhos.

The team from Bio-Manguinhos liked the fact that data and information is made available after a technical analysis from the Springer Nature research team and provided including indication to original sources of curated data and additional information.

During its work with AdisInsight, Bio-Manguinhos voiced interest in executing a big data analysis where direct access to the content is more convenient than platform access. For this use case Springer Nature offers the AdisInsight Drug API which is intended to be used by the customer to incorporate AdisInsight content into software they have developed. Through API, institutions can specify a date range and the AdisInsight Drug API returns all the drug profiles that have been modified within that range. For each drug, the API will return the same information displayed in the corresponding drug profile on the AdisInsight platform. The information is returned in XML format. Find out more about the AdisInsight Drug API [here](#).

Publication of research results

As a result of this project, a series of live webinars was presented with thematic panels, each one with the presence of specialists who debated the different contributions of Bio-Manguinhos' technological prospection in the understanding of COVID-19, the identification of opportunities for action and partnerships, the initiatives in progress, as well as the challenges and perspectives in facing the pandemic in each product line.

The first panel, "COVID-19 in focus: Technological foresight at Bio-Manguinhos", presented one of the strategies that Bio-Manguinhos has adopted to face the pandemic caused by SARS-CoV-2. The results from the different methodologies employed in the foresight activity subsidised decision-making regarding vaccine candidates and support the discussion with partners for the development and introduction of strategic inputs capable of contributing to the numerous fronts of the Institute's activities in the context of COVID-19. The opening of the first webinar was made by Bio-Manguinhos/Fiocruz's Vice Director of Technological

The team found data from AdisInsight highly valuable for answering their research question.

"We would recommend AdisInsight because of the breadth and quality of data, and easiness to design a data prep process. As far as we observed, data and information are available after technical analysis from your research team, indication to original sources of curated data and information are also provided."

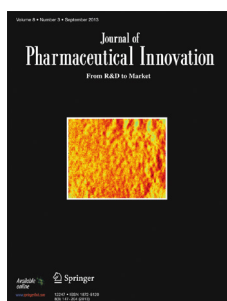
- Beatriz Fialho, Head of Competitive Intelligence

Development, Sotiris Missailidis, also moderator of the panel with the support of the Knowledge Management analysts team at Bio-Manguinhos/Fiocruz.

The live sessions were divided into the following workshops:

- "Global challenges of the SARS-CoV-2 pandemic for RD&I", presented by Beatriz Fialho, Head of Competitive Intelligence
- "Technological prospection as an institutional strategy for the development of immunobiologicals", presented by Diana Freire, AICOM Foresight Analyst Development of Bio-Manguinhos;
- "Patent prospection of technologies to address the SARS-CoV-2 pandemic", presented by NIT-Bio Intellectual Property Analyst
- "Intellectual Property and Technology Transfer Office of Bio-Manguinhos" and "The role of technology prospecting in the identification of partnership opportunities", presented by Hugo Defendi, Marketing and New Business Division of Bio-Manguinhos

The results from this research have been published in the "[Journal of Pharmaceutical Innovation](#)", published by Springer and a book chapter of "A primeira vacina 100% brasileira contra a Covid-19: a conquista de Bio-Manguinhos/Fiocruz", published in-house by Bio-Manguinhos/Fiocruz.



Bio-Manguinhos has also been a speaker at the 6th [International Symposium on Immunobiologicals](#) that took place from 3rd to 5th May 2022.

The results from this research have also been communicated at the following events:

- The Landscape of Neutralizing Monoclonal Antibodies (nAbs) for Treatment and Prevention of COVID-19
Conference: Festival of Biologicals, 2024
Venue: Messe Basel MCH Swiss Exhibition, Basel, Switzerland
Lead author: Aline Almeida
- The Landscape of Neutralizing Monoclonal Antibodies (nAbs) for Treatment and Prevention of COVID-19 After 2 Years of the Pandemic
Conference: PepTalk - The Protein Science Week, 2023
Venue: Hilton Bayfront / San Diego, California, EUA. [note: the above presentation was granted a Best Poster Award do PepTalk2023]
Lead author: Aline Almeida
- Technology Foresight for the Identification of New Targets, Opportunities, and Partnerships for Vaccines and Biotherapeutics in Plant-Based Platforms
Conference: PepTalk - The Protein Science Week, 2023
Venue: Hilton Bayfront / San Diego, California, EUA. [note: the above presentation was selected for Oral Poster Presentation]
Lead author: Diana Freire
- COVID-19 Vaccines: evaluation of the technology landscape in the 3-year pandemic.
Conference: ISV Annual Congress, 2023
Venue: SwissTech Convention Center in Lausanne, Switzerland
Lead author: Marisol Simões
- Technology foresight for identification of opportunities and partnerships in COVID-19 vaccines, biotherapeutics and diagnostics test.
Conference: [VInternational Symposium on Immunobiologicals, 2021](#)
Venue: Bio-Manguinhos, Rio de Janeiro, Brasil
Lead author: Diana Freire
- Technology foresight for the identification of new targets, opportunities and partnerships in plant-based platforms.
Conference: [IV International Symposium on Immunobiologicals, 2019](#)
Venue: Bio-Manguinhos, Rio de Janeiro, Brasil
Lead author: Diana Freire

The Bio-Manguinhos/Fiocruz Team:

Beatriz de Castro Fialho

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Beatriz de Castro Fialho has a PhD in Innovation Management from UFRJ (2005), a master's degree in Production Engineering from UFRJ (1999) and a bachelor's degree in Economic Sciences from UFRJ (1997). She has experience in the field of innovation economics, working mainly on the following topics: technological innovation, project management; technological change, evolutionary economics, pharmaceutical industry, strategic planning, budgeting and feasibility studies, and RD&I portfolio management, and competitive intelligence.

She joined Bio-Manguinhos in 2005, passing through several departments, having been responsible for coordinating the Institute's strategic and budgetary planning, has been an Advisor to the Deputy Directorate of Technological Development since 2012, and was Manager of the Implementation Project of the Platforms Technological Center Vegetables from Bio-Manguinhos/Fiocruz. She is currently Competitive Intelligence Officer at Bio-Manguinhos.



Monique Menegaci Barbosa

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Monique Menegaci Barbosa is a statistician certified as a Competitive Intelligence Professional, with an MBA in Economic and Financial Engineering, with more than 10 years of experience in strategic management processes, a high level of knowledge in data analysis using various software: Office Package, Power BI, Vantage Point, SPSS and Statistics.

She worked as a planning analyst for the Planning Advisory Board of the Institute of Technology in Immunobiologicals - Bio-Manguinhos/Oswaldo Cruz Foundation, developing methodologies that involve the knowledge areas of technological innovation management and portfolio management. Currently, she works at the Bio-Manguinhos Competitive Intelligence Advisory, where she is responsible for topics related to technological prospecting, data science and IC functions that interface with strategic planning and decision-making activities.



Livia Rubatino de Faria

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Livia Rubatino de Faria has a master's Degree in Immunobiological Technology (Bio-Manguinhos/Fiocruz). She is a specialist in Legislation and Sanitary Surveillance (UFRJ). Currently, she works as Intellectual Property Analyst at the Bio-Manguinhos Technological Innovation Center (NIT-Bio).

She has been working at Bio-Manguinhos since 2013 and at NITBIO since 2015 in the following areas: patents, scientific disclosure, and genetic heritage. Since 2018, she has been the NITBIO representative on the Bio-Manguinhos Foresight Working Group, currently coordinated by the Competitive Intelligence Advisory Board.



**Priscila do Nascimento Silva**

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Priscila do Nascimento Silva has a bachelor's degree in library science from the State University of Rio de Janeiro, specialising in information databases. She has worked at the Bio-Manguinhos Knowledge Management Section since 2017, promoting actions to strengthen and promote scientific production and innovation in the unit, managing the Bio-Manguinhos community in the Fiocruz Institutional Repository, and is the unit's representative in the Open Science Center of the foundation, in addition to participating in the Southeast Network of Digital Repositories. She also assists in technological foresight activities, supporting the Competitive Intelligence team when necessary.

**Diana Praia Borges Freire**

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Diana Praia Borges Freire has a master's degree in Immunobiological Technology (2013), a postgraduate degree in Pharmaceutical Industrial Technology (2010), a bachelor's degree in Pharmaceutical Sciences (2009) and training as a Science Laboratory Technician (2004). After 10 years working with quality control for vaccines, biopharmaceuticals, and diagnostic kits (2007-2017), she has been expanding her experience in technology foresight, data analysis, analytical bases, plant platforms and good manufacturing practices since 2017. She is a Foresight Analyst at the Bio-Manguinhos Competitive Intelligence Office and a teacher at the Oswaldo Cruz Foundation's biotechnology technical course.

**Marisol Simões**

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Marisol Simões graduated in Biological Sciences: Microbiology and Immunology from the Federal University of Rio de Janeiro - UFRJ (2009), she has a Professional Master's Degree in Immunobiological Technology from Bio-Manguinhos/Fiocruz (2011) and a PhD in Tropical Medicine (area: Diagnosis, Epidemiology and Control) from Instituto Oswaldo Cruz IOC/Fiocruz (2018).

She has experience in the field of R&D and innovation, in the evaluation of the humoral immune response in clinical and non-clinical studies of viral vaccines (serological tests) and molecular biology (real-time PCR). She currently works as a Foresight Analyst in the Competitive Intelligence Office of the Bio-Manguinhos/Fiocruz board, focusing on biopharmaceutical and vaccine technological platforms.

**Aline Oliveira**

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Aline Oliveira graduated in Biological Sciences from the State University of Rio de Janeiro (2004), she has a master's degree (2007) and a PhD (2011) in Oncology from the National Cancer Institute. She works as Foresight Analyst in the Competitive Intelligence Office (AICOM) of Bio-Manguinhos at Fiocruz in strategic foresight and other competitive intelligence issues. Oliveira recently won an award for best poster at an International Conference (PepTalk 2023) for her prospecting work at Bio-Manguinhos.

She is part of the coordination committee at Fio-Câncer, part of Fiocruz's network of translational programs. She is also a member of the Scientific Committee of the International Symposium on Immunobiologicals (ISI). She has over 15 years of experience in the biopharmaceuticals industry, mainly with technological development and competitive analysis.

In addition to talking to the Technological Foresight project leaders, we also asked an Information Manager at Bio-Manguinhos/Fiocruz about their experience of working with AdisInsight – read the Interview below.

How did the researchers approach you about sourcing database solutions for the technological prospecting projects?

Usually, users contact us directly by email requesting a specific database. Often, it is not for technological prospecting, but in regards to an information search process.

Why did you suggest using AdisInsight?

I actually present all the options available to the users. I suggested AdisInsight because of its interface and because it is intuitive in terms of searches and results, which are clear and objective, and easy to understand.

What was your previous knowledge on AdisInsight?

Before the request for a collaborator for the base trial, I did not have any knowledge about AdisInsight.

Did you get any feedback from the researchers on working with AdisInsight and if so, would you mind sharing it with us?

We have not received a great deal of feedback from collaborators, however those who use the database a lot appreciate it. Some of our collaborators have identified a gap in some of the searches they have performed, due to the indexing being used, and have had to 'clean and mine' the data obtained.

What are the benefits of AdisInsight from your point of view? (license, access, data etc) And what could be improved?

The main benefit I believe AdisInsight provides is access. It's easy to access and we can do everything from anywhere with a login and password. The information is pretty solid, but we can identify some gaps when we run the same research. There are a couple of things that need to be looked at more carefully.

Does your institution plan to continue working with AdisInsight in the future and if so why/why not?

Yes, it is a platform that meets most of our needs, and it is currently one of the most complete we have.

About AdisInsight

AdisInsight is an integrated database of drug development information. We're experts with extensive knowledge and expertise, earned over 40 years as an industry leader in providing rich, reliable, high-quality data solutions that empower subscribers to make smarter strategic decisions

AdisInsights Direct Content Access

AdisInsight helps you minimize the risks of missing out on crucial insights as they emerge through easy access to the latest drug development intelligence. We have a proven track record of established partnerships and collaborations across health regulatory, government, medical and pharmaceutical organizations, helping them achieve a single view of the drug landscape. Our philosophy is that accurate data is your most important asset. The risks of acting too quickly on incomplete or unreliable data are enormous, which is why we dedicate time to carefully validate and structure the data you rely on to drive strategic decision making.

Data you can trust

We are transparent about our data sources, how we validate and treat data, and how it's delivered to you. Insights are gathered by a team of experts from a wide range of trustworthy sources, providing comprehensive coverage with accuracy. We make it easy to analyze structured data.

Human validation

AdisInsight data is vetted, validated, and given context by a team of subject matter experts. All of our team members have degrees in Life Sciences. This additional layer of review gives you unparalleled value by helping you work smarter, faster, and more efficiently. We make it easy to analyze structured data and access reliable drug insights. We use ontologies from trusted, authoritative sources which allow you to understand context and relevance.

One window, limitless opportunities

AdisInsight allows you to explore commercial opportunities, competitor insights, investment possibilities, and drug development opportunities with a single at-a-glance view of the drug landscape. It is your go-to source of insights and updates for drug development that allows you to effortlessly and efficiently find the drug data you need for a multitude of use cases.