The end of patent extensions and the Productive Development Partnerships: effects on access to medicines in Brazil

O fim da extensão das patentes e as Parcerias para Desenvolvimento Produtivo: reflexos no acesso a medicamentos no Brasil

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Abstract

The COVID-19 pandemic has shed light on the negative impact of intellectual property on health and has given new relevance to the Direct Action of Unconstitutionality 5529/DF, which was ruled by the Supreme Court in 2021, resulting in the extinction of automatic patent extensions in Brazil. This documentary case study analyzes the effects of the judicial decision on patent applications and patents of interest for Productive Development Partnerships (PDP), investigating the progress of 90 patent applications related to 15 PDPs drugs of interest until Decembre 31, 2020. Variables for comparing the drug patent scenario with that of the PDPs were researched on the websites of the National Institute of Industrial Property, the Ministry of Health, ANVISA, and the Brazilian Medicines Market Regulation Chamber. Of 88 valid applications, 28 patents were granted, 17 of which had been extended to more than 20 years (24 years and 09 months average). The court decision resulted in a loss of over 68 years of monopoly, potentially opening alternatives for generic production. This resumption of the PDP policy should incorporate strategies to overcome patent barriers.

Keywords: Access to Essential Medicines and Health Technologies; Intellectual Property of Pharmaceutic Products and Process; Health Economic-Industrial Complex; Health Policy.

Resumo

A covid-19 jogou luz sobre o impacto negativo da propriedade intelectual na saúde e deu nova relevância à Ação Direta de Inconstitucionalidade 5529/DF, que, acatada pelo Supremo Tribunal Federal em 2021, culminou na extinção da extensão automática de patentes no Brasil. Este estudo busca analisar o efeito do julgamento histórico da ADI 5529/DF sobre pedidos de patente e as patentes de interesse das Parcerias para Desenvolvimento Produtivo (PDP). Trata-se de um estudo com base em uma pesquisa documental de análise do andamento, até 31 de dezembro de 2020, de 90 pedidos de patente relacionados a 15 medicamentos objetos de PDP. Nos sites do Instituto Nacional de Propriedade Industrial, do Ministério da Saúde, da Anvisa e da Câmara de Regulação do Mercado de Medicamentos, foram pesquisadas variáveis para comparar o cenário patentário dos medicamentos com o das PDP. De 88 pedidos válidos, 28 patentes foram concedidas, das quais dezessete foram estendidas para mais de vinte anos (média de 24 anos e nove meses). A decisão do STF resultou em mais de 68 anos de monopólio perdidos, potencialmente desanuviando alternativas para a produção de genéricos no país. Neste momento de retomada das PDP, estratégias para a superação de barreiras patentárias deveriam ser incorporadas à política.

Palavras-chave: Acesso a Medicamentos Essenciais e Tecnologias em Saúde; Propriedade Intelectual de Produtos e Processos Farmacêuticos; Complexo Econômico-Industrial da Saúde; Política de Saúde.

Introduction

The global race for vaccines, medicines, ventilators, and other essential technologies to tackle the COVID-19 pandemic (Bermudez, 2022) has shed light on what health activists have been denouncing for decades: the monopoly over health technologies has generated a global access crisis, constituting a barrier to the realization of the right to health (Chaves; Vieira; Reis, 2008; Coelho et al., 2021).

The record speed in the development of vaccines against COVID-19 has brought hope to all of humanity, but the inequality in their distribution has been staggering (Falcão; Lopes, 2021; Bermudez, 2022). By September 2021, 80% of the 5.5 billion vaccine doses that had been administered were concentrated in high- and upper-middle-income countries (WHO, 2021). This pattern was repeated for other technologies: remdesivir was released to the governments of rich countries for 2,340 dollars per treatment. Despite the high price, in June 2020, the United States bought the entire stock of this drug for the following three months, which shows that we are living a biomedical apartheid (Bermudez, 2022).

Intellectual property (IP) confers a monopoly on health technologies and, consequently, the prerogative for decisions on their production, sale, and pricing to be in the hands of a few (Falcão; Lopes, 2021; Bermudez, 2022). Given the limited financial capacity of countries, the increasingly high price of health technologies was already threatening the access to these drugs and the sustainability of health systems even before the pandemic (Bermudez, 2022; Coelho et al., 2021), which is when the problem intensified. Several countries in the global south have become dependent on donations and financial loans to immunize their populations. At the same time, nine people became billionaires in 2021 from profits from COVID-19 vaccines, which intensifies questions about the abusive earnings of pharmaceutical corporations (Oxfam Brasil, 2021).

In Brazil, the Unified Health System (SUS) has long suffered the strong impact of the high price of health technologies (Bermudez, 2022; Coelho et al., 2021). Spending on Pharmaceutical Services increased by 75% from 2010 to 2019—in contrast to the 40% increase in the overall budget

of the Brazilian Ministry of Health (MoH). In 2019, R$1.2 billion was spent on importing just two vaccines (Junqueira, 2020b). However, in 2021 and 2022, more than R$26 billion was spent on the acquisition of COVID-19 vaccines (Brasil, 2023). It is important to note that this increase in health spending took place at a time when the SUS was being de-funded, which aggravated the challenges facing Brazilian health policy (Bermudez, 2022).

Just 10 countries account for almost 90% of the world's health patents, and the major companies in the health production complex are mostly from countries in the Global North. As a result, the country relies heavily on imports to meet the needs of the SUS, which threatens its sustainability (Gadelha; Temporão, 2018). In view of the artificial global shortage of vaccines against COVID-19, it is worth pointing out that it was the two vaccines produced in partnership with two official pharmaceutical laboratories (OPL), the Butantan Institute and the Immunobiological Technology Institute (Bio-Manguinhos/Fiocruz), that made broad access to immunization possible (Bermudez, 2022; Falcão; Lopes, 2021). This has highlighted the indispensability of state policies for the local production of health technologies in order to effectively guarantee health sovereignty (Bermudez, 2022).

This need had already been recognized in Brazil. In order to reduce this external technological dependence, the Productive Development Partnerships (PDP) were conceived in 2008 as the main strategic instrument for strengthening the *Complexo Econômico-Industrial da Saúde* (CEIS - Brazilian Health Economic-Industrial Complex). The main objective of the PDPs, which are coordinated by the Ministry of Health, is to establish partnerships between OPLs and private, national, and/or international laboratories for the local production and transfer of strategic technologies to the SUS. The main incentive of these partnerships, which can run for up to 10 years, would be the guarantee of the drug being purchased by SUS for a defined period:

> The basic PDP model involves the use of purchases—carried out centrally by the Ministry of Health—of products (usually high-cost and more technologically complex) that were previously purchased on the market (with a large share of imports), to stimulate local production. (Gadelha; Temporão, 2018, p. 1897; our translation)

The operationalization of the PDP began in 2009 (Gadelha; Temporão, 2018), and it is estimated that more than R$7 billion have been saved in public coffers from 2011 to 2018 as a result of the purchase of drugs via the PDP. However, especially since 2019, this policy has been weakened, with the suspension and extinction of partnerships and a reduction in investments and purchases of the drugs produced. According to Junqueira (2020a), in 2019 there was a drop of almost 52% in the amount spent by the Ministry of Health on PDP drug purchases compared to 2018.

In addition to the lack of government interest, IP itself can be a barrier to public purchases of drugs resulting from PDPs (Campos, 2019). The case of the most widely used drug in Brazil for the treatment of HIV/AIDS illustrates this situation: in 2020, a patent on dolutegravir (DTG) was granted and its owner companies took legal action to prevent the SUS from purchasing the generic of the PDP signed between the Pharmaceutical Laboratory of the State of Pernambuco Governador Miguel Arraes (LAFEPE) and the Brazilian company Blanver Farmoquímica e Farmacêutica S.A. (Fonseca et al., 2023). In view of the risk of shortages of the drug, which is used by more than 460 Brazilians, the National Health Council recommended compulsory licensing of the dolutegravir patent to the Ministry of Health (Brasil, 2022).

Compulsory licensing is one of the flexibilities introduced in the Agreement on Trade-Related Aspects of Intellectual Property Rights (the TRIPS Agreement) and protects the health and public interest of countries regarding IP. The debate about its use intensified during the pandemic, when several countries were looking for alternatives to deal with the shortage of essential health technologies. In Brazil, Law No. 9,279/1996—the *Lei de Propriedade Industrial* (LPI - Industrial Property Law)—already provided for the mechanism, whose use in health emergencies was facilitated by Law No. 14,200/2021, approved by a significant majority of the National Congress (Bermudez, 2022).

The unprecedented prominence given to the global and national debate on the negative effects of IP during the pandemic was also reflected in the Direct Action of Unconstitutionality (ADI)

5529/DF, initiated in 2016 and judged in 2021. The Brazilian Federal Supreme Court (STF) upheld the unconstitutionality of the sole paragraph of article 40 of the LPI, which created a mechanism for automatically extending the term of patents in Brazil. The extension, beyond the 20 years adopted by the TRIPS Agreement, generated major losses for the SUS in terms of the acquisition of medicines, due to the delay in the entry of generics into the market (Brasil, 2021b; GTPI, 2021).

This decision by the STF immediately impacted 3,435 pharmaceutical patents (GTPI, 2021), including that of dolutegravir, which had its validity reduced by four years. The extinction of the mechanism may also have reduced patent barriers to the acquisition of other drugs via the PDP and even to the progress of planned phases. The concern of the Ministry of Health regarding these barriers was evidenced in letter No. 1313/2017/SCTIE/MS, sent in 2017 to the National Institute of Industrial Property (INPI). In the document, the Ministry of Health analyzed the patent scenario of 15 drugs that are the object of the PDP and requested prioritized examination for patent applications related to them, in order to avoid the perpetuation of the monopoly (Brasil, 2017).

With the aim of contributing to the debate on the negative impact of IP on local production and access to health technologies in Brazil, this study seeks to analyze the effect of the landmark ADI 5529/DF on: 1) the patent applications and patents raised in letter No. 1313/2017/SCTIE/MS; and 2) the PDPs that may be affected by them.

Methodology

This is a case study based on documentary research that sought to analyze, until December 31, 2020, the progress of 90 patent applications related to 15 drugs of interest to the PDP, listed in Official Letter No. 1313/2017/SCTIE/MS, received on June 20, 2017, by the INPI. All the patent applications raised in technical note no. 383/2016/DECIIS/SCTIE/MS, present in the letter, which sought to present the patent scenario for each of the drugs, were analyzed. Table 1 lists the 15 drugs and 90 patent applications studied. The active ingredients and therapeutic classes of the drugs are presented according to their respective health registrations.

Table 1 - Drugs and patent applications listed in Technical Note No. 383/2016/DECIIS/SCTIE/MS, of 10/06/2016.

Drugs (active ingredient)	Therapeutic Class	Patent applications listed in the technical note
glatiramer acetate	immunomodulator	PI 0515033-7; PI 9507758-8
adalimumab	anti-inflammatory; antirheumatic	PI 0315597-8; PI 0415373-1; PI 0520880-7; PI 0512554-5; PI 0615026-8; PI 0618085-0; PI 0717335-0; BR 11 2013 029367 0; PI 0819714-8; PI 1014446-3; BR 11 2013 011699 4; PI 0920027-4; PI 0920572-1; PI 1012162-5; BR 11 2013 006403 0; BR 11 2013 008738 2; BR 11 2015 004467 0; BR 11 2012 014710 2; BR 11 2014 008730 0; BR 11 2014 021644 4; PI 9707379-2; PI 9715219-6; PI 0509326-0; PI 0206289-5; PI 0709726-3; PI 9715284-6; PI 0312785-0; PI 0313492-0; PI 0512874-9; PI 0713802-4; PI 0716762-8; PI 101446-3; PI 102162-5
bevacizumab	antineoplastic	PI 0307702-0; PI 0513601-6; PI 0516299-8; PI 0720552-0; PI 0817182-3; PI 0916138-4; BR1120120130935; PI 0313492-0; PI 9816306-0; PI 9816350-7; PI 9809387-8; PI 0411200-8; PI 0412798-6
budesonide, formoterol fumarate dihydrate	antiasthmatic	PI 0307193-6

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Table 1 - Continuation.

Drugs (active ingredient)	Therapeutic Class	Patent applications listed in the technical note
sevelamer hydrochloride	other products not included in a specific therapeutic class	PI 0015061-4
clozapine	neuroleptic	PI 9811803-0
pramipexole dihydrochloride	antiparkinsonian	PI 0513847-7; PI 0520875-0; PI 0513846-9; PI 0312960-8; PP 1100678-1
everolimus	immunosuppressive agent	PI 0618808-7; PI 0212922-1; PI 9609537-7 PI 9915986-4; PP 1100353-7
infliximab	anti-inflammatory	PI 0113110-9
lopinavir, ritonavir	antiviral (inhibits viral replication)	lopinavir, ritonavir: PI 0413882-1
		lopinavir: PP 1100661-7; PP 1100397-9; PP 1101190-4; PI 0011864-8
		ritonavir: PI 9714310-3; PI 9715203-0
imatinib mesylate	antineoplastic	PI 0309528-2; PI 0307529-0; PI 0608605-5; PI 0812442-6; PI 9810920-0; PI 9816198-9; PI 9816299-3; PI 0114870-2
raltegravir potassium	antiviral	PI 0213522-1; PI 0518760-5
sirolimus	immunosuppressive agent	PI 0412404-9; PP 1100818-0; PP 1100753-2; PP 1100594-7; PI 9403946-1; PI 9403948-8
atazanavir sulfate	antiviral (inhibits viral replication)	PI 0509595-6; PI 9701877-5; PI 9814736-6; PI 0413882-1
trastuzumab	antineoplastic agent; monoclonal antibody	PI 0415448-7; PI 0410260-6

Source: Prepared by the authors, based on Official Letter No. 1313/2017/SCTIE/MS and the Brazilian Health Regulatory Agency (ANVISA), 2021.

In order to analyze the procedural progress and the impact of the extinction of the sole paragraph of article 40 of the LPI on patent applications, a search was carried out for each of these applications on the INPI website and the following variables of interest were verified: application date; applicant; status of the application on December 31, 2020; and validity, in years, of the patent letter. During the investigation, it was also decided to assess the following possibilities: whether the opinion of the Brazilian Health Regulatory Agency (ANVISA) had been submitted and whether there had been any legal action related to the process. For granted patents, the time added to the 20-year monopoly period was calculated according to the sole paragraph of article 40 of the LPI.

Notably, the Technical Note No. 383/2016/DECIIS/SCTIE/MS was based on a previous study by the Brazilian Association of Generic and Biosimilar Medicines Industries, which aimed to identify possible patent-based barriers to the production of generics via PDP. However, due to the known difficulty in identifying patent applications related to a specific technology, this list may not be sufficient to understand the patent scenario of medications, which is an important limitation of the study. To complement the analysis of the scenario, the existence of competition in the marketing of medicines was verified in the list of maximum prices for public purchases of the *Câmara de Regulação do Mercado de Medicamentos* (CMED - Drug Market Regulation Chamber), updated on December 10, 2019.

In order to analyze the impact of the sole paragraph of article 40 of the LPI on PDPs, the following variables of interest were checked on the website of the Ministry of Health in relation to the PDPs in force, suspended or terminated on September 21, 2020–last updated

in 2020—whose product was one of the medicines studied: public institution; private entity that owns or develops the technology of the product; private entity supplying the active pharmaceutical ingredient (in the case of synthetic products); stage of execution of the PDP; year of submission of the Term of Commitment; percentage achieved of the demand for the drug. For each of the drugs, the presence of a registration within the ANVISA website was checked.

The patent situation of the drugs was then compared with the situation of the PDPs. Lastly, with the support of information contained in Technical Note No. 383/2016/DECIIS/SCTIE/MS and in the literature, the impact of the ADI 5529/DF judgement in relation to the PDPs studied was discussed.

Results

Of the 90 patent applications listed in the technical note, two (PI 101446-3 and PI 102162-5, referring to the drug adalimumab) were not found.

As of December 31, 2020, of the 88 valid patent applications, 36 had been rejected, 17 had been dropped (mostly due to non-payment of fees by applicants), four were awaiting appeal against rejection by the INPI, and three had been withdrawn by applicants. Of the 88 applications, 28 patents had been granted. Of these, 15 had been terminated, including four mailbox patents and seven pipeline patents—which cannot be extended under the sole paragraph of article 40 of the LPI. Another two patents were "*sub judice*," with a judicial request for nullity, and one had been judicially annulled. The plaintiffs in these three legal challenges were national producers of generic medicines.

Of the 88 patent applications, 48 had received an opinion from the Brazilian Health Regulatory Agency—a mechanism called prior consent, provided for until August 27, 2021, in the LPI (Brasil, 1996): "Art. 229-C. The granting of patents for pharmaceutical products and processes will depend on prior consent of the Brazilian Health Regulatory Agency (ANVISA). (Included by Law No. 10.196, of 2001)." It is important to note that in 2017 there was a change to the mechanism: it was decided that ANVISA should only deal with the health risk of patent applications, and no longer with patentability criteria. From then on, the Agency's opinion on this attribute came to be seen as a subsidy to the examinations carried out by the INPI and was stripped of the power to reject patent applications (Brasil, 2021a). Of the 48 applications that received opinions from ANVISA, 18 were not granted (i.e. had an opinion contrary to the granting of the patent) before the 2017 change, but 14 opinions were reversed by court decisions and one by the entry of new documents in the process. After 2017, ANVISA approved 22 applications as not causing risks to health, presenting a subsidy for the patentability examination by the INPI with an opinion against granting the patent in 18 cases. On August 27, 21, Law No. 14,195/2021 established the end of the prior consent by ANVISA and extinguished the flow of patents between the Agency and the INPI (Brasil, 2021a). Of the 88 applications, 24 resulted in legal action, 15 of them against the opinion of ANVISA.

At the end of the study, of the 17 regular patents granted (excluding mailbox and pipeline patents), 13 (76.5%) had their monopoly period extended under the sole paragraph of article 40 of the LPI. The mean monopoly period stipulated for these 17 patents, at the time they were granted, was 24 years and 9 months. Table 2 shows details of the patents studied, including the years of monopoly lost as a result of the ADI 5529/DF judgment.

Regarding PDPs, we found that 11 of the 15 drugs studied were the subject of 13 current PDPs and nine were suspended in September 2020. Of these 22 PDPs, 13 were in phase II of development; 5 were in phase III; and 4 were in phase IV, which is the most advanced. The 22 PDPs involved nine OPLs and 15 private partners (nine national ones and six international ones). The years in which the Term of Commitment of the PDPs was submitted varied, with the first being submitted in 2009, the last in 2018 and the majority in 2017. The other four drugs were related to five PDPs that were terminated in 2014, 2015, 2017, and 2018. Of the 15 drugs, five had only one seller on list of the CMED: glatiramer acetate, adalimumab, bevacizumab, raltegravir potassium, and sirolimus.

Table 3 details the main findings linked to the comparison of the situation of the PDPs in force and suspended in 2020 with the situation of patent applications, after the judgment of ADI 5529/DF.

Table 2 – Details of the patents studied and impact (in years of monopoly lost) of the abolition of the sole paragraph of Art. 40 of the Industrial Property Law.

Medication	Patent holder	Patent application number (*mailbox or pipeline)	Application date	Patent grant date	Expiration date of the patent when granted	Date of entry into the public domain	Time between application and maturity (years, months)	Time between application and public domain	Patent expiration date after ADI 5529/DF	Monopoly time lost after ADI 5529/DF (years, months)
GLATIRAMER ACETATE	YEDA RESEARCH AND DEVELOPMENT CO., LTD.(IL)	**PI 9507758-8 (sub judice)*	05/23/1995	11/26/2019	05/23/2015	05/23/2015	20.0	20.0	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
ADALIMUMAB	ABBVIE BIOTECHNOLOGY LTD.(BM)	PI 0512554-5	06/23/2005	02/06/2018	02/05/2028	08/06/2019	22.7	14.1	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
ADALIMUMAB	ABBVIE BIOTECHNOLOGY LTD.(BM)	BR 112013011699 4	11/11/2011	04/24/2019	11/11/2031	11/11/2031	20.0	20.0	11/11/2031	0
ADALIMUMAB	ABBVIE BAHAMAS LTD. (US)	BR 112013008738 2	10/11/2011	12/19/2017	10/11/2031	10/11/2031	20.0	20.0	10/11/2031	0
ADALIMUMAB	ABBVIE BIOTECHNOLOGY LTD.(BM)	**PI 9707379-2*	02/10/1997	11/03/2009	10/19/2017	10/19/2017	20.8	20.8	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
ADALIMUMAB	ABBVIE BIOTECHNOLOGY LTD.(BM)	**PI 9715219-6*	02/10/1997	10/23/2010	10/19/2017	10/19/2017	20.8	20.8	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
BEVACIZUMAB	Chugai Seiyaku Kabushiki Kaisha (JP)	PI 0307702-0	02/14/2003	02/06/2018	02/06/2028	02/06/2028	24.11	24.11	02/14/2023	4.11

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Table 2 – Continuation.

Medication	Patent holder	Patent application number (*mailbox or pipeline)	Application date	Patent grant date	Expiration date of the patent when granted	Date of entry into the public domain	Time between application and maturity (years, months)	Time between application and public domain	Patent expiration date after ADI 5529/DF	Monopoly time lost after ADI 5529/DF (years, months)
BEVACIZUMAB	Genentech, Inc. (US)	PI 0516299-8	10/19/2005	10/06/2020	10/06/2030	10/06/2030	24.11	24.11	10/19/2025	4.11
BEVACIZUMAB	Genentech, Inc. (US)	PI 9816350-7	04/03/1998	03/10/2020	03/10/2030	03/10/2030	31.11	31.11	04/03/2018	11.11
BEVACIZUMAB	GENENTECH, INC. (US)	PI 9809387-8 (*sub judice*)	04/03/1998	11/22/2016	11/22/26	11/22/26	28.7	28.7	04/03/18	8.7
SEVELAMER HYDROCHLORIDE	Genzyme Corporation (US)	PI 0015061-4	10/13/2000	03/22/2016	03/21/2026	03/21/2026	25.5	25.5	10/13/2020	5.5
CLOZAPINE	Ethyphann (FR)	PI 9811803-0	07/21/1998	07/18/2017	07/17/2027	07/17/2027	28.11	28.11	07/21/2018	8.11
PRAMIPEXOLE DIHYDROCHLORIDE	Dr. Karl Thomae GmbH (DE)	*PP 1100678-1	05/08/1997	10/13/1999	12/22/2004	12/22/2004	7.7	7.7	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
EVEROLIMUS	Novartis AG (CH)	PI 0212922-1	09/27/2002	03/13/2018	03/12/2018	11/02/2019	25.5	17.1	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
EVEROLIMUS	Novartis AG (Novartis SA) (Novartis INC.) (CH)	*PP 1100353-7	04/24/1997	06/06/2000	10/09/2012	09/24/2013	15.5	16.5	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
INFLIXIMAB	JOHNSON & JOHNSON (US)	PI 0113110-9	08/07/2001	03/20/2018	03/19/2028	03/19/2028	26.7	26.7	08/07/2021	6.7

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Table 2 – Continuation.

Medication	Patent holder	Patent application number (*mailbox or pipeline)	Application date	Patent grant date	Expiration date of the patent when granted	Date of entry into the public domain	Time between application and maturity (years, months)	Time between application and public domain	Patent expiration date after ADI 5529/DF	Monopoly time lost after ADI 5529/DF (years, months)
LOPINAVIR	ABBVIE INC. (US)	**PP 1100661-7*	05/07/1997	04/11/2000	03/20/2017	03/20/2017	19.10	19.10	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
LOPINAVIR	ABBVIE INC. (US)	**PP 1100397-9*	04/30/1997	04/11/2000	11/21/2016	11/21/2016	19.6	19.6	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
IMATINIB MESYLATE	Novartis AG (CH)	PI 0307529-0	02/06/2003	01/30/2018	01/29/2028	03/14/2020	24.11	17.1	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
IMATINIB MESYLATE	Novartis AG (CH)	PI 0114870-2 (*sub judice*)	10/26/2001	06/16/2020	06/15/2030	06/15/2030	28.7	28.7	10/26/2021	8.7
RALTEGRAVIR POTASSIUM	Istituto Di Ricerche Di Biologia Molecolare P. Angeletti S.P.A. (IT)	PI 0213522-1	10/21/2002	06/13/2017	06/12/2027	06/12/2027	24.7	24.7	10/21/2022	4.7
RITONAVIR	ABBVIE INC (US)	PI 9714310-3	11/12/1997	02/18/2003	11/12/2017	05/29/2018	20.0	20.6	*Not applicable (patent annulled)*	*Not applicable (patent annulled)*

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RITONAVIR	ABBVIE INC. (US)	PI 9715203-0	11/12/1997	03/05/2003	11/12/2017	11/12/2017	20.0	20.0	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
SIROLIMUS	Wyeth (US)	**PP 1100818-0*	05/12/1997	07/13/1999	09/30/2013	01/28/2017	16.4	19.8	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
SIROLIMUS	Wyeth (US)	**PP 1100753-2*	05/12/1997	07/13/1999	09/30/2013	09/30/2013	16.4	16.4	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
SIROLIMUS	Solvay Pharmaceuticals GmbH (DE)	**PP 1100594-7*	05/13/1997	06/15/1999	09/18/2002	09/18/2002	5.4	5.4	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
ATATAZANAVIR SULFATE	Novartis AG (Novartis SA) (Novartis Inc.) (CH)	**PI 9701877-5*	04/22/1997	09/28/2004	04/22/2017	04/22/2017	20.0	20.0	*Not applicable (patent terminated)*	*Not applicable (patent terminated)*
ATATAZANAVIR SULFATE	Bristol-Myers Squibb Company (US)	PI 0509595-6	05/03/2005	05/14/2019	05/13/2029	05/13/2029	24.0	24.0	05/03/2025	4

Source: Prepared by the authors based on the National Institute of Industrial Property (INPI), 2021."/tabela"

Table 3 - Comparison of the situation of the 22 PDPs suspended and in force in 09/2020, with the patent status of the medicines, after the extinction of the sole paragraph of Art. 40 of the LPI.

Drug	PDP phase in 09/2020	% of demand to be achieved	Official Pharmaceutical Laboratory	National private partner	International private partner	Private entity – active pharmaceutical ingredient (API)	Is there a generic registered with ANVISA?	Patent scenario:	Observation
GLATIRAMER ACETATE	II	100	FURP	Cristália Produtos Químicos Farmacêuticos Ltda.	-	Cristália Produtos Químicos Farmacêuticos Ltda.	No	There is a mailbox patent whose termination is being challenged in court. As of December 31, 2020, the analysis of PI 0515033-7 had not been completed.	The analysis of PI 0515033-7 had not been completed even after prioritized examination was granted in 2017. In 2015, Cristália submitted a subsidy for the examination, indicating its interest in the request to carry out local production. If the rejection were reversed and a patent was granted, it would be in force until 2025, six years less than before ADI 5529.
ADALIMUMAB	II	40	Bio-manguinhos	Bionovis S.A – Companhia Brasileira de Biotecnologia Farmacêutica	-	Bionovis S.A – Companhia Brasileira de Biotecnologia Farmacêutica	No	There are two terminated mailbox product patents. But there are two patents, apparently process patents, in force until 2031.	The mailbox patents were originally to run until 2019 and 2020, but the INPI questioned their extension under the sole paragraph of article 40 on the grounds that it was not a regular patent. Even at an early stage, the announcement of the adalimumab PDP resulted in extrajudicial notices being sent by Abbvie in 2015 and 2016 to those involved in the PDP. One of the patents in force had its application refusal by ANVISA reversed by a court order.
	II (suspended)	10	Butantan	Libbs Farmacêutica Ltda.	-	Libbs Farmacêutica Ltda.	No		
	II	20	Butantan	Libbs Farmacêutica Ltda.	-	Libbs Farmacêutica Ltda.	No		
	II (suspended)	30	TECPAR	Orygen Biotecnologia S/A	Pfizer Incorporated	Orygen Biotecnologia S/A	No		

continues...

Table 3 - Continuation.

Drug	PDP phase in 09/2020	% of demand to be achieved	Official Pharmaceutical Laboratory	National private partner	International private partner	Private entity – active pharmaceutical ingredient (API)	Is there a generic registered with ANVISA?	Patent scenario:	Observation
BEVACIZUMAB	II (suspended)	25	Bio-manguinhos	Bionovis S.A – Companhia Brasileira de Biotecnologia Farmacêutica	-	Bionovis S.A – Companhia Brasileira de Biotecnologia Farmacêutica	No	Two patents that apparently protect the drug were immediately terminated after the judgment of ADI 5529/DF. There are two other patents in force, apparently process patents, which had their validity period reduced by almost 5 years each, but remain in force until 2023 and 2025. There is also an unfinished application.	The terminated product patents would have been in force until 2026 and 2031 if ADI 5529/DF had not been judged. Patent 9809387-8 had its application refusal by ANVISA reversed by a court order, and its granting was being challenged in court by Libbs, which requested for the patent to be invalidated. The unfinished application, apparently in process, was granted prioritized examination in 2019 and is awaiting analysis of the appeal against the rejection.
	II	25	Butantan	Libbs Farmacêutica Ltda.	-	Libbs Farmacêutica Ltda.	No		
	II (suspended)	50	TECPAR	Orygen Biotecnologia S/A	Pfizer Incorporated	Orygen Biotecnologia S/A	No		

continues...

Table 3 - Continuation.

Drug	PDP phase in 09/2020	% of demand to be achieved	Official Pharmaceutical Laboratory	National private partner	International private partner	Private entity – active pharmaceutical ingredient (API)	Is there a generic registered with ANVISA?	Patent scenario:	Observation
SEVELAMER HYDROCHLORIDE	III	50	Farmanguinhos	Cristália Produtos Químicos Farmacêuticos Ltda.	-	ITF Chemical Ltda.	Yes	There seems to be no patent protecting the drug in Brazil. A process patent was terminated by ADI 5529/DF.	The process patent would have been in force for 25 years and 5 months if ADI 5529/DF had not been judged.
	IV (suspended)	50	Bahiafarma	Cristália Produtos Químicos Farmacêuticos Ltda.	-	ITF Chemical Ltda.	Yes		
CLOZAPINE	IV	100	LAFEPE	Cristália Produtos Químicos Farmacêuticos Ltda.	-	Cristália Produtos Químicos Farmacêuticos Ltda.	Yes	There seems to be no patent protecting the drug. A patent, apparently a process patent, was terminated by ADI 5529/DF.	The process patent was granted by reversing a previous rejection by the INPI and was meant to be in force for 28 years and 11 months, prior to the judgment of ADI 5529/DF.

continues...

Table 3 - Continuation.

Drug	PDP phase in 09/2020	% of demand to be achieved	Official Pharmaceutical Laboratory	National private partner	International private partner	Private entity – active pharmaceutical ingredient (API)	Is there a generic registered with ANVISA?	Patent scenario:	Observation
PRAMIPEXOLE DIHYDROCHLORIDE	III	50	Farmanguinhos	Nortec Química S/A	Boehringer Ingelheim do Brasil Química e Farmacêutica Ltda.	Nortec Química S/A	Yes	There seems to be no patent protecting the drug. A pipeline product patent was terminated in 2004. Other applications were rejected or archived.	The holder of the *pipeline patent* tried to extend its term in court. All the other applications received an opinion from ANVISA against the granting of the patent. Eurofarma submitted a subsidy for the examination of several applications.
EVEROLIMUS	II (suspended)	50	Farmanguinhos	-	-	-	No	There seems to be no patent in force protecting the drug. Pipeline product patent terminated in 2013. Process patent terminated in 2019.	The rejection of another patent application was challenged in court, but Novartis lost. The company was a partner in the PDP, whose term of commitment was signed in 2012, but went out of business in 2015. The terms of commitment of the PDPs with Farmanguinhos and NUPLAM are from 2018.
	II	50	NUPLAM	EMS S/A		Nortec Química S/A	No		

continues...

Table 3 - Continuation.

Drug	PDP phase in 09/2020	% of demand to be achieved	Official Pharmaceutical Laboratory	National private partner	International private partner	Private entity – active pharmaceutical ingredient (API)	Is there a generic registered with ANVISA?	Patent scenario:	Observation
INFLIXIMAB	II (suspended)	50	TECPAR	Orygen Biotecnologia S/A	Pfizer Incorporated	Orygen Biotecnologia S/A	No	There seems to be no patent protecting the drug. A patent lost 6 years and 7 months of validity after the judgment of ADI 5529/DF and was terminated in August 2021.	The patent was granted contrary to the subsidy for examination by ANVISA. EMS submitted various subsidies for the technical examination of the patent application.
	III	50	Bio-manguinhos	Bionovis S.A. - Companhia Brasileira de Biotecnologia Farmacêutica	Janssen-Cilag Farmacêutica Ltda.	Bionovis S.A. - Companhia Brasileira de Biotecnologia Farmacêutica	Yes		
IMATINIB MESYLATE	IV	50	Farmanguinhos	Cristália Produtos Químicos Farmacêuticos Ltda.	-	Cristália Produtos Químicos Farmacêuticos Ltda.	Yes	Pipeline patent PP 1100739-7 (not included in the study), which protects the drug, terminated since 2012. A patent that could apparently affect the production of generics had its validity reduced by 8 years and 7 months after the judgment of ADI 5529/DF and was terminated in October 2021.	The patent that was terminated in October 2021 was "*sub judice,*" and its nullity was demanded in court by several generic pharmaceutical companies. An opinion from ANVISA was submitted as a subsidy to the examination by the INPI and went against the granting of the patent.
	IV	50	IVB	Laborvida EMS S/A	-	Globe Química S/A	Yes		

continues...

Table 3 - Continuation.

Drug	PDP phase in 09/2020	% of demand to be achieved	Official Pharmaceutical Laboratory	National private partner	International private partner	Private entity – active pharmaceutical ingredient (API)	Is there a generic registered with ANVISA?	Patent scenario:	Observation
ATATAZANAVIR SULFATE	III	100	Farmanguinhos	Nortec Química S/A	Bristol-Myers Squibb Company (BMS)	Nortec Química S/A	Yes	The patent protecting the product was terminated in 2017. A granted process patent had its validity reduced by 4 years by ADI 5529/DF, but will remain in force until 2025.	The process patent was granted contrary to the subsidy for examination by ANVISA. The terminated product patent belonged to Novartis and was licensed to Bristol-Myers Squibb, which holds the current process patent. To establish the PDP, a voluntary license agreement was signed with BMS in 2011.
TRASTUZUMAB	II	40	Bio-manguinhos	Bionovis S.A. – Companhia Brasileira de Biotecnologia Farmacêutica	-	Bionovis S.A. – Companhia Brasileira de Biotecnologia Farmacêutica	Yes	There seems to be no patent protecting the drug. A *pipeline* patent (PP1101137-8, not included in the technical note) was terminated in 2014.	The applications were rejected, in accordance with the examination subsidy presented by ANVISA. Several other applications were mentioned in other studies, but there is no clarity on the main patent that protected the product. Roche has been a partner in the PDP since 2017, which may indicate the use of the PDP as a monopoly extension. Moreover, there was an investigation by the TCU and the MPF into the overpricing of the generic produced by TECPAR.
	II (suspended)	20	Butantan	Libbs Farmacêutica Ltda.	-	Libbs Farmacêutica Ltda.	No		
	III (suspended)	40	TECPAR	Axis Biotec Empreendimentos e Participações Ltda	F. Hoffmann-La Roche Ltd.	Axis Biotec Empreendimentos e Participações Ltda	Yes		

Source: Prepared by the authors based on the National Institute of Industrial Property (INPI), 2021; the Ministry of Health (MoH), 2021; and the Brazilian Health Regulatory Agency (ANVISA), 2021.

Discussion

The results of this study indicate that the patents analyzed were significantly affected by the abolition of the sole paragraph of article 40 of the LPI. Prior to the judgment of ADI 5529/DF by the STF, which ended on May 12, 2021, the mean duration of the 17 regular patents investigated in this study was 24 years and 9 months, with one of them reaching almost 32 years of validity. After the court ruled that the mechanism was unconstitutional, the patents in force lost a total of over 68 years of monopoly. As can be seen in Table 2, four patents related to the drugs bevacizumab, sevelamer hydrochloride, and clozapine were immediately terminated after the judgment.

The automatic extension of patents instituted by the sole paragraph of article 40 of the LPI was introduced into Brazilian law as a TRIPS-plus mechanism—that is, one that goes beyond the standard of protection required by the TRIPS Agreement (Paranhos; Mercadante; Hasenclever, 2020). The mechanism in question automatically guaranteed patent holders 10 years of monopoly from the date of grant—and not 20 years from the filing of the application, as is done internationally. Thus, if an application took 13 years to be examined and the patent was granted, it would gain another 10 years of validity, adding up to 23 years of monopoly for its holder. Jannuzzi and Vasconcellos (2017) indicated that this extension should be exceptional, but it has become commonplace, occurring for practically 100% of the patents granted for medicines after 1992—mostly filed by foreign companies. In this study, it was discovered that even after the request to prioritize examination by the MS, 76.5% of the regular patents granted had their monopoly period extended.

At first, extending the validity of a patent may seem like fair compensation, given the long examination time for applications, which is on average 13 years for the pharmaceutical sector. However, the LPI guarantees that, once a patent is granted, its holder can be compensated if the technology was exploited by third parties during the period of examination of the application (Article 44). Although there is no legal monopoly until the final decision on the application, there is a **de facto** monopoly, since failure to complete the examination of a patent application creates legal uncertainty for a third party to exploit the technology that may—or may not—be patented. Thus, there is no loss for the applicant because of the long analysis time due to the backlog (Brasil, 2021b; Coelho et al., 2021; Jannuzzi; Vasconcellos, 2017).

A common practice of pharmaceutical corporations, which ends up contributing to the backlog, is evergreening—in reference to "evergreen" patents. This is a strategy for extending a monopoly by filing several patent applications for the same drug. An initial patent application, which protects the active ingredient, is commonly followed by several other "secondary" applications, which can include "claims such as formulations, combinations, dosages, polymorphs, prodrugs, method of treatment and use (including second medical use)" (Chaves et al., 2018; our translation).

In a study that analyzed 447 patent applications related to 20 antiretrovirals, 25% of the applications were abandoned; these data were used as an indication of "the low importance of the patent and its use, to generate uncertainty and block competition" (Chaves et al., 2018; our translation). In this study, more than 22% of the applications raised in Technical Note 383/2016/DECIIS/SCTIE/MS were dropped or withdrawn due to lack of interest on the part of the applicant. Even so, the list of patent applications studied was insufficient to understand the drug patent scenario. A technical note from the Administrative Council for Economic Defense (Cade) states, for example, that the INPI has identified approximately 170 patent applications for the active ingredient ritonavir alone (Brasil, 2019). Additionally, there is also the difficulty of relating a patent application to a specific technology. In an article about the high price of trastuzumab, for example, Junqueira (2019) pointed out that even the INPI could not say which was the main patent protecting the drug.

This complex scenario creates legal uncertainty regarding the possibility of producing generic drugs. In many cases, this uncertainty is exacerbated by legal challenges to the termination of patents or the rejection of applications. Table 2 shows that the termination of the mailbox patent for glatiramer acetate, filed in 1995, is still being challenged in court. In this sense,

it is important to comment on another important recent court decision, influenced by the ADI 5529/DF judgment: the Brazilian Supreme Court of Justice (STJ) defined that mailbox patents cannot be extended (STJ..., 2022). If they were, the patents PI 9507758-8, PI 9707379-2, and PI 9715219-6 in Table 2 would still be in force. Consequently, they would also be impacted and terminated by ADI 5529/DF.

Mailbox patents are those that were filed in the transition period between the TRIPS agreement and the national laws adapted to it. In Brazil, for example, biotechnological patents were not protected. Thus, the mailbox consisted of a mechanism that made it possible to file biotechnology patent applications from January 1, 1995, to May 14, 1997, so that they could be examined after the transition period between legislations (Paranhos; Mercadante; Hasenclever, 2020).

Pipeline patents are, similar to the automatic extension of patents, a TRIPS-plus mechanism introduced into Brazilian law. Without undergoing technical examination, patents granted outside Brazil, before the LPI, were automatically granted within the country. Coelho et al. (2021, p. 4; our translation) indicated that the mechanism "guaranteed protection to products that were already in the public domain, going against the principle of novelty—a fundamental precept in the IP sphere—and resulting in 1,201 patent applications, most of them for the protection of pharmaceuticals." Like patent extensions, the pipeline mechanism has had its constitutionality questioned since 2009 by ADI 4234/DF, which has not yet been judged. In this study, seven pipeline patents were identified among the 28 granted.

The multinational pharmaceutical industry was the main interested party in the early adaptation of the LPI to TRIPS and the introduction of these TRIPS-plus mechanisms, which made it difficult not only to maintain and expand the policy of universal access to medicines (Chaves; Vieira; Reis, 2008), but also to "prematurely interrupt the process of local production of medicines" (Paranhos; Mercadante; Hasenclever, 2020, p. 2; our translation). In this sense, it is important to note that ADI 5529/DF was strongly resisted by multinational pharmaceutical corporations, which have been trying, in court and on a case-by-case basis, to reverse the termination of the extension of their patents (Formenti, 2022).

However, the disputes of interest regarding the negotiation of TRIPS resulted in the introduction of flexibilities in the agreement for protection, especially of public health and interest (Chaves; Vieira; Reis, 2008). Although not all of them have been incorporated into the LPI, in this study, we realized the importance of some of them in Brazil.

A flexibility mechanism widely used in the cases studied is patent opposition, which consists of the possibility for third parties to give their opinion on the examination of the application before (pre-grant opposition) or after the patent is granted (post-grant opposition) (Correa, 2021). Table 3 shows that several generic companies have submitted pre-grant opposition by the INPI, just as ANVISA has done on several occasions.

It is worth noting that the participation of this agency in the examination of patents in Brazil, made using the mechanism called "prior consent," was also guaranteed by the flexibilities of TRIPS. Chaves, Vieira and Reis (2008, p. 178) indicated that the incorporation into the LPI of flexibility for the health sector to act in the granting of patents resulted from the Brazilian legislator's understanding that "a matter of such importance deserves the most careful and technically competent examination that the Brazilian state can provide" (our translation). The results of this study also indicate the importance of the participation of ANVISA in the examination of patents: of the 88 applications, 48 received comments from ANVISA.

The results also indicate the dissatisfaction of patent applicants with the additional barrier that ANVISA represented to patent monopolies: of the 18 applications not granted before 2017, 14 decisions were reversed by court order. The frequent judicial reversal of applications not granted by ANVISA may have contributed to the extinction of the mechanism by Law No. 14,195/2021, which led it to return 1,284 patent applications to the INPI (Brasil, 2021). This means the loss of an important TRIPS flexibility for the protection of Brazilian public health.

The Bolar exemption is another very important flexibility for this case study. It allows the knowledge protected by a patent to be exploited by third parties, as long as there is no commercialization. This makes it possible, for example, for generics to be registered before a patent expires, allowing generic versions to

be sold the day after the patent expires (Correa, 2021). Due to the Bolar exemption, PDPs in phases I and II, prior to commercialization, cannot be characterized as patent infringements (Brasil, 2017). Despite this, in the context of the PDPs studied, Abbvie gave extrajudicial notice to those involved in the adalimumab PDPs when they were announced.

Campos (2019, p. 90; our translation) explained that "infringement only occurs when production and supply of the drug begins" and that "in phases III and IV, PDPs have the possibility of committing patent infringements." To resolve this issue, a voluntary license can be negotiated. This type of agreement consists of the owner authorizing his patent to be exploited by a third party. This is the case of the atazanavir sulphate PDP studied. The partnership agreement was signed in 2011, but the mailbox patent that apparently protected the product was only terminated in 2017. The voluntary license thus allowed a generic version to be produced and marketed by PDP.

However, Chaves et al. (2018) warned that voluntary licenses may not be the best strategy to ensure significant reductions in generic prices. In addition, Oliveira Júnior et al. (2016, p. 46) indicated that, due to the purchase commitment signed in PDPs, voluntary licenses can be used by patent holders as a strategy to extend their monopoly via PDP:

> In 2017, the year in which the PDP would be concluded, the current patent for atazanavir expires [...]. With the extension of the PDP, because of the delays in the initial schedule, the monopoly situation, which could end with the expiry of the patent, will be maintained while the partnership is still underway. (Oliveira Júnior et al., 2016, p. 46; our translation)

Table 3 shows two other PDPs signed with the producers of the reference drugs for the active ingredients infliximab and pramipexole, raising suspicions about the extent of their monopolies.

Oliveira Júnior et al. (2018) also warned that secondary patents may be granted during the term of PDPs and that, if they are not included in a voluntary license, the purchase of generics via PDP may be blocked.

Table 3 shows that most PDPs are signed without the presence of the holder of the primary patents of a drug. One alternative for overcoming patent barriers without depending on the authorization of the patent holder is compulsory licensing. This TRIPS flexibility consists of authorizing third parties to "manufacture, use, sell or import a product under patent protection" (Chaves; Vieira; Reis, 2008, p. 177; our translation). The term "patent breaking" has been popularly used to refer to this mechanism. Activists in the movement for access to medicines have, however, tried to replace the popular term with "monopoly breaking," since the patent continues to be recognized and its owner continues to receive royalties (Bermudez, 2022).

Despite its incorporation into TRIPS and LPI, compulsory licensing has only been used once in Brazil, in 2007. After several attempts to reduce the price of efavirenz—a drug protected by a pipeline patent—the Brazilian government issued a compulsory license, importing generics from India at a third of the price offered by Merck until Farmanguinhos could produce the drug in Brazil (Chaves; Vieira; Reis, 2008).

It is interesting to note that the compulsory licensing of efavirenz is considered by Gadelha and Temporão (2018, p. 1897) as a first experience of the PDP model: "in fact, this was, unintentionally, a pilot experience of the policy developed, leading to the establishment of an articulation between Fiocruz and national drug producers in the country, capable of reproducing and transferring the technology of the product" (our translation). Despite this, the mechanism has not been used again or to tackle patent barriers to the purchase via PDP of generics that are already available, as in the case of dolutegravir.

In the case of the PDPs investigated in this study, the analysis in Table 3, together with the verification of the existence of marketing of medicines by more than one producer on the CMED list, seems to indicate that, for the majority of PDPs in effect or suspended in 2020, there was no significant patent barrier to the production or purchase of generics. But several secondary patents that could hinder drug production processes have had their validity reduced by ADI 5529/DF.

On the other hand, the sales monopoly found on CMED list for the drugs glatiramer acetate, adalimumab, and bevacizumab, in addition to the scenario of legal uncertainty in relation to IP presented

in Table 3, raises suspicions about the existence of patent barriers to the progress of phase II partnerships. In the case of pramipexole, legal uncertainty could arise due to a court challenge to the termination of a mailbox product patent. In this sense, the STJ's decision on the 20-year validity of mailbox patents, in 2022, influenced by ADI 5529/DF, would, in theory, solve the problem. In addition, the process of analyzing a secondary patent application had not ended; the subsidy to the examination presented by Cristália may indicate that these are claims with the potential to hinder the production of generics. No evidence was found of public purchases of generics of the drug after 2021.

Similarly, the case of adalimumab also seems to have been indirectly impacted by ADI 5529/DF. Two mailbox product patents were originally scheduled to remain in force until 2019 and 2020. The STJ's 2022 decision would also resolve the legal uncertainty. In August 2022, Bio-Manguinhos did in fact start selling a biosimilar of the product to the SUS (Lisboa, 2022).

The protection of the drug bevacizumab may have been directly impacted by the ADI 5529/DF judgement, since two patents, apparently for the same product, were immediately terminated. However, all PDPs for the drug were suspended in 2020 and no evidence was found of their reactivation or of public purchases of generics of the drug after 2021.

A more in-depth study of each of these three cases could contribute to a better understanding of the possible patent barriers to the progress of partnerships. In addition, the verification of the granting of patents and the monopoly on the marketing of the drugs raltegravir and sirolimus, together with the termination of the partnerships signed for their production, may indicate two other interesting cases to be investigated in relation to the possible impacts of IP on the PDP policy.

Final considerations

The abolition of the sole paragraph of article 40 of the LPI resulted in a significant reduction in the validity period of the patents studied. The STJ's 2022 decision on the validity of mailbox patents, influenced by the ADI 5529/DF judgment, also contributed to reducing legal uncertainty in IP matters.

However, the practice of evergreening, as well as the difficulty of relating patent applications to specific technologies, prevents a clear conclusion regarding the real impacts of ADI 5529/DF on the PDPs investigated. The construction and dissemination by the Ministry of Health of the patent scenario of the medicines that are the subject of PDPs would facilitate this type of analysis and contribute to greater transparency of the policy (Oliveira Júnior et al., 2016).

Extinguishing or reducing the validity of several secondary patents related to medicines that are the subject of PDPs potentially opens up alternatives for better production processes and formulations. The reduction in legal uncertainty regarding the patent protection of adalimumab may have contributed to the progress of the PDP with Fiocruz, which began supplying the drug to SUS in August 2022. In addition, the cases of glatiramer acetate, bevacizumab, raltegravir potassium, and sirolimus seem interesting enough to be investigated in greater depth.

At this time of the relaunch of the Health Industrial Complex Executive Group (Gecis) and the resumption of the PDP policy, an effort to articulate it with the mechanisms for the protection of public health in the face of IP is essential. In this regard, we highlight the importance of reversing the abolition of ANVISA's prior consent and the use of compulsory licensing.

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Authors' contributions

Lopes conceived the study, collected the data, carried out the analysis and wrote the article. Borde and Andrade reviewed the article.

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