

Lethal Monopolies

How pharmaceutical corporations game the patent system

A Case Study

PATENT



International agreements adopted by the World Trade Organization have standardised the practice of protecting inventions with a 20-year-long market monopoly in the form of a patent. This standard was introduced with the aim of providing patent holders with an opportunity to earn back investments in the research, development and testing of the product, with the hope of stimulating innovation. But in practice, patent holders are rarely the original inventors of an invention.

In the absence of any competition, corporations can use their monopoly to charge as high a price as the market will bear for their product, in order to maximise their profits. In the case of patents on medicines, this can have a detrimental impact. High drug prices can make medicines unaffordable for people who rely on them for their very survival. It is therefore critically important that patents on medicines be carefully considered before being granted.

Here we document how the European Patent Office (EPO) has been overly lenient in granting patents to pharmaceutical corporations. We showcase the example of a patent on a medicine that does not meet the criteria of the European Patent Convention for a patent grant.

Sofosbuvir, an effective treatment for hepatitis C, priced out of reach...

Hepatitis C is a viral disease that affects the liver, and left untreated can eventually develop into fatal liver cancer or cirrhosis in a third or more of all people infected. Over 60 million people worldwide need treatment for hepatitis C. Many people living with hepatitis C are suffering and dying because they can't afford the medicines and diagnostics they need to cure them. National health systems, buckling under the exorbitant price of the drugs, have been forced to restrict the number of people eligible for treatment.

One of these medicines is sofosbuvir, launched by United States (US) pharmaceutical corporation Gilead Sciences in 2013 at an initial price of US\$1,000 *per pill* (€900) in the US.

The price of sofosbuvir shuts millions of people out of treatment who could be cured if the drug was more affordable.

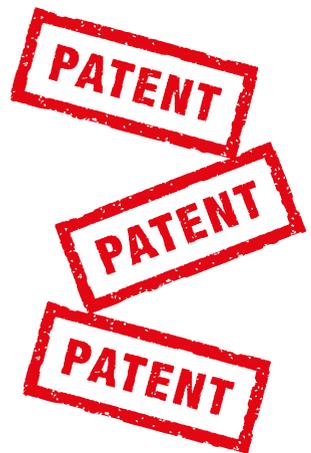


...because of a monopoly propped up by unmerited patents

The EPO granted patent EP2604620 to Gilead in 2016. This patent gives Gilead a monopoly on the drug that potentially blocks the availability of more affordable generic versions of sofosbuvir until at least 2024.

But this patent is unmerited because it doesn't meet the rules on patentability. This patent should *not* have been granted to Gilead in the first place and must now be revoked.

MSF and other civil society organisations have therefore filed a legal opposition to this patent with the intent to get the patent revoked.



Beyond sofosbuvir:

how pharma games the system to keep profits high

Beyond the case of sofosbuvir, we see a broader structural problem of how pharmaceutical companies have learned to ‘game the system’ using a variety of ‘tricks of the trade’ in order to enforce their monopolies and keep drug prices sky-high.

Here we spotlight the flaws in Gilead’s patent to illustrate how corporations game the patent system in order to maximise their profits.

Gaming the patent system

Trick 1: File a patent, even if your discovery does not work



An invention is only considered worthy of a patent under the European Patent Convention¹ when it provides an “effective solution to a technical problem.” So the simple ‘discovery’

of a new substance by itself, or a new property of a known material that is without any practical use, is not patentable. It must be possible to make use of it.

An invention is only considered worthy of a patent under the European Patent Convention when it provides an “effective solution to a technical problem.”

Patent EP2604620 relates to an active metabolite of sofosbuvir that can prevent the hepatitis C virus (HCV) from multiplying – it is an ‘HCV replication inhibitor’. Yet for biochemical reasons, this molecule is not capable of entering the human cell where the virus resides. So if a person infected with HCV were to receive the patented molecule, it would not cure them.

Thus, while the molecule described in this patent shows potential to treat hepatitis C, it cannot be considered a ‘*solution*’ to the problem—as defined by EPO rules—for hepatitis C infection, as it cannot penetrate the infected cells and resolve the ‘problem’ of HCV found there. The patented molecule is therefore not a ‘patentable invention’ but merely a ‘discovery’, which is not patentable.²

For this reason alone, this patent on the active metabolite of sofosbuvir should not have been granted to Gilead by the EPO.

Understanding metabolism

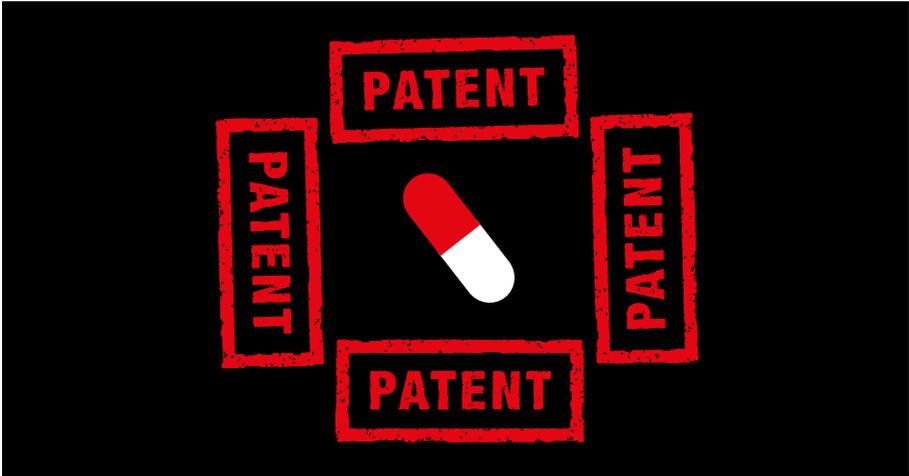
Some medicines need to be metabolised by the human body after they are taken to become active. Once the medicine is absorbed in the body, biochemical reactions can take place between it and the human body. These reactions may change the chemical structure of the drug, activating or deactivating its effects on the body. These reactions can result in molecules different than those which were administered as the medicine. These altered molecules are the **metabolites** of the original molecule.

Sofosbuvir is a medicine taken orally by people with hepatitis C. The sofosbuvir molecules are metabolised (modified by the body), resulting in the active metabolite of sofosbuvir inside the cells where HCV resides.

Patent EP2604620 granted by the EPO to Gilead concerns this active metabolite of sofosbuvir, which can only be found inside a liver cell after metabolism of sofosbuvir.

The molecule is thus the result of biochemical reactions in the human body with sofosbuvir. The active metabolite of sofosbuvir acts as a HCV replication inhibitor; it can stop the multiplication of the virus to cure the patient.

Trick 2: Build a wall of patents around your medicine



Because the molecule patented in EP2604620 (the active metabolite) cannot enter a cell and treat hepatitis C, a 'prodrug' is needed to do this job. A 'prodrug' is a modified version of the molecule capable of entering a cell. Sofosbuvir is actually a 'prodrug',³ which upon entering a cell is metabolised into its active form, which can stop HCV from replicating (HCV replication inhibitor).

Sofosbuvir as a 'prodrug' is also covered by another patent granted at the EPO.³ Yet this patent is not merited from a scientific and legal point of view. The patent on the 'prodrug' has been rejected by several patent offices worldwide already, and other challenges, including in Europe, are under way.

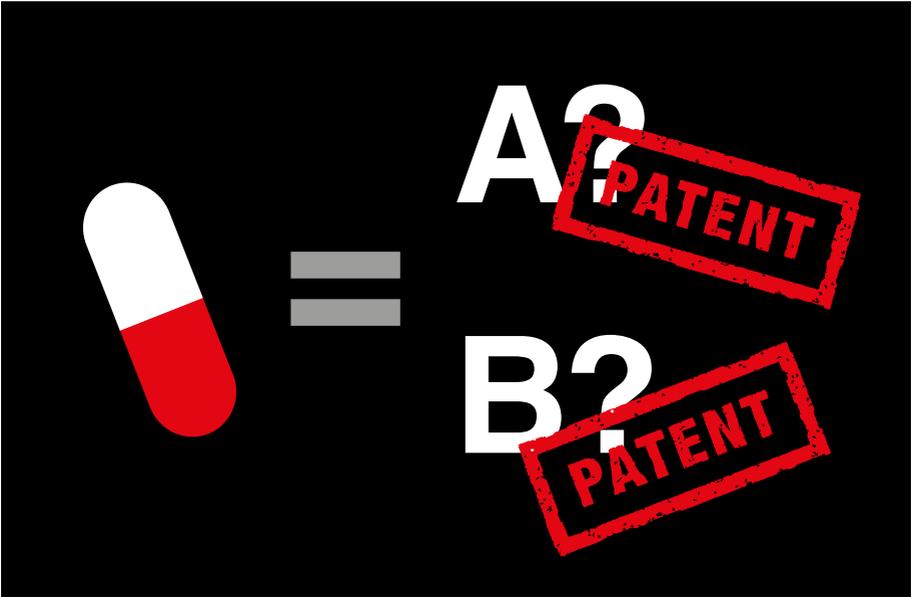
The sofosbuvir 'prodrug' and the active-metabolite patents are the most critical patents held by Gilead on sofosbuvir.

Corporations such as Gilead attempt to surround their drugs with many patents – unmerited or otherwise – to strengthen their monopoly over the drug and keep competitors out of the market. This common practice is usually referred to as creating a 'patent thicket'.

Corporations attempt to surround their drugs with many patents to strengthen their monopoly over the drug and keep competitors off the market.

These thickets deter competitors who would need to conduct detailed analyses to identify the patents in the 'thicket' blocking them from developing alternative versions. Then they would need to challenge each blocking patent individually, requiring considerable time and investment.

Trick 3: Speculate how your discovery works



In the case of the sofosbuvir patents, here's what happened: Of the active metabolites created in the cell, Gilead identified one – inhibitor C – as useful for treating HCV, and therefore included a description of inhibitor C in its sofosbuvir active-metabolite patent application EP2604620.

The EPO has granted patents to Gilead with speculative, incorrect claims from the corporation which are scientifically inaccurate.

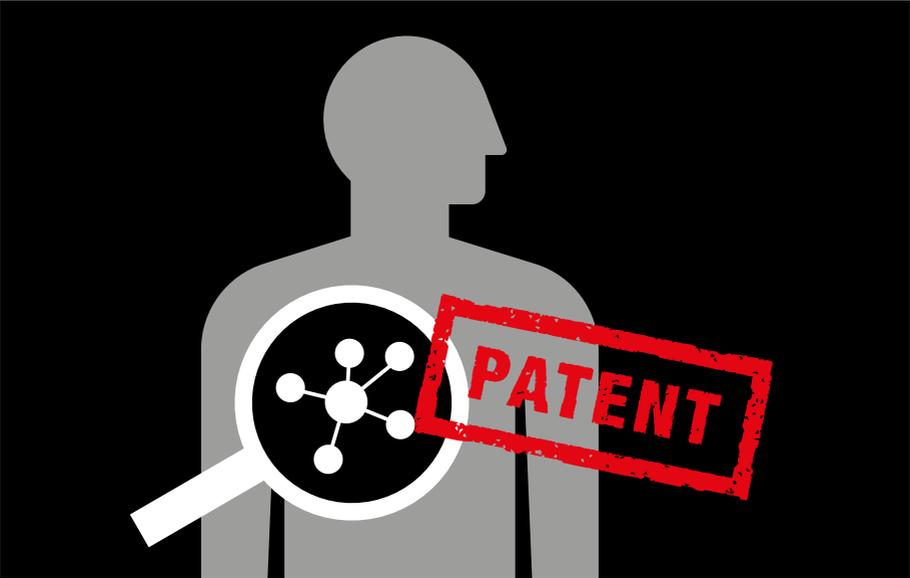
But years after this patent was filed by Gilead, researchers established it was in fact a **different** inhibitor (inhibitor U)⁴ that was most effective against the virus.

When patent EP2604620 was filed, this inhibitor was actually thought by Gilead to be inactive.

What happened next is shocking: The EPO allowed Gilead **to revise** its patent claims to include the later recognized inhibitor U. As such, the corporation secured monopoly protection beyond the original metabolite (inhibitor C) to now include the effective metabolite (inhibitor U) under patent EP260462.

The EPO has therefore granted patents to Gilead with speculative, incorrect claims from the corporation that are scientifically inaccurate. Later, corrections and adjustments were made at Gilead's request.

Trick 4: Push the boundaries of what is patentable



The metabolites⁵ of sofosbuvir covered by patent EP2604620 are the products of biochemical processes taking place in the human body only after a person takes sofosbuvir.

This means the patent provides Gilead with a monopoly on the outcome of a process that only happens *inside* a human cell.

What this means is that even if competitors could legally produce generic sofosbuvir, they would still come up against patent barriers and be prevented from marketing products that work *in the same way* at the cellular level as described by this patent EP2604620 held by Gilead.

The patent provides Gilead with a monopoly on the outcome of a process that only happens inside a human cell.

By claiming a patent on biological processes within the human cell, as Gilead does with EP2604620, the corporation is also attempting to prevent anybody else from developing and marketing a different, perhaps better, molecule that could produce the same active metabolite in the cell.

As confirmed by court decisions,⁶ a company should not be allowed to get a patent that gives it a monopoly on the result of biological processes taking place inside a human cell.

Gaming the system: a common practice by pharma

In conclusion, we see how Gilead has used its monopoly gained through unmerited patents to charge the highest price the market can bear and maximise profits, thereby keeping medicines out of reach of many people who need them.

What Gilead has done is by no means an isolated example but is common practice across the pharmaceutical sector. Disputes over monopolies on expensive handbags or smartphone technologies are one thing. But it's a different situation when lives are at stake because of monopolies held on medicines.

It is therefore all the more important that the patent claims are legally and scientifically correct.

The EPO must urgently conform to its own rules and stop handing out unmerited patents that reinforce corporations' market monopolies and hinder access to affordable medicines.

What needs to happen now

- ▶ **The EPO should not award patents on products that fail the EPO's own patentability criteria, in particular on 'discovery' versus 'invention.'**
- ▶ **The EPO must reject patents that contain false claims and scientific errors.**
- ▶ **The EPO should never extend monopoly protection to accommodate corporations that have made errors and speculative claims in their patent applications.**
- ▶ **The EPO should not grant patents that give monopolies to companies on the outcomes of biochemical processes taking place inside the human cell, shutting out future innovation and competition.**

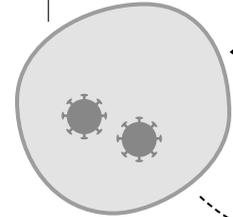
Monopoly abuse costs lives

Gilead games the system:

Overview of sofosbuvir case study

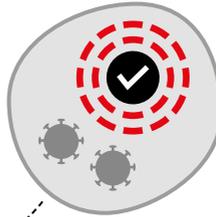
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Liver cell with hepatitis C virus



1. BASE COMPOUND

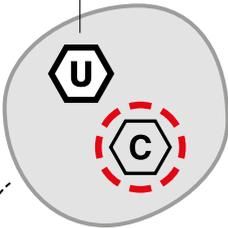
The base compound cannot gain access to liver cells, and therefore is not effective against hepatitis C. Gilead still gains a patent for it (EP2604620).



2. SOFOSBUVIR

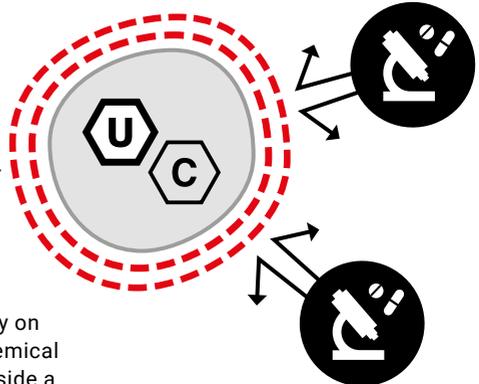
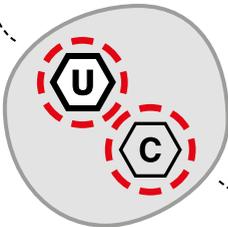
Sofosbuvir is a modified version of the base compound enabling entry to liver cells. It is surrounded by multiple patents.

Inhibitor



3. SOFOSBUVIR IS METABOLISED INTO METABOLITES C & U

Gilead identified metabolite 'C' as effective against hepatitis C. But when 'U' is revealed as an effective agent, Gilead revised its claims to include 'U' in patent.



4. MULTIPLE PATENTS BLOCK COMPETITION

Patents create a monopoly on the products of the biochemical processes taking place inside a human cell – blocking any products that work in a similar way.

Notes

- 1 <https://www.epo.org/law-practice/legal-texts/epc.html>
- 2 European Patent Convention Article 52
- 3 Patent EP2203462. This patent was opposed at the European Patent Office by Médecins du Monde (MDM) on February 10, 2015.
<https://www.medecinsdumonde.org/en/node/7209>
- 4 Metabolite U: Uridine triphosphate
- 5 Cytidine derivative 'C' & Uridine triphosphate 'U'
- 6 <http://patentmyfrench.com/salt-judgment/>

Gilead filed patent application EP2604620 on the base compound of sofosbuvir with the EPO on 21/04/2004.

MSF Access Campaign

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