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OncoQR

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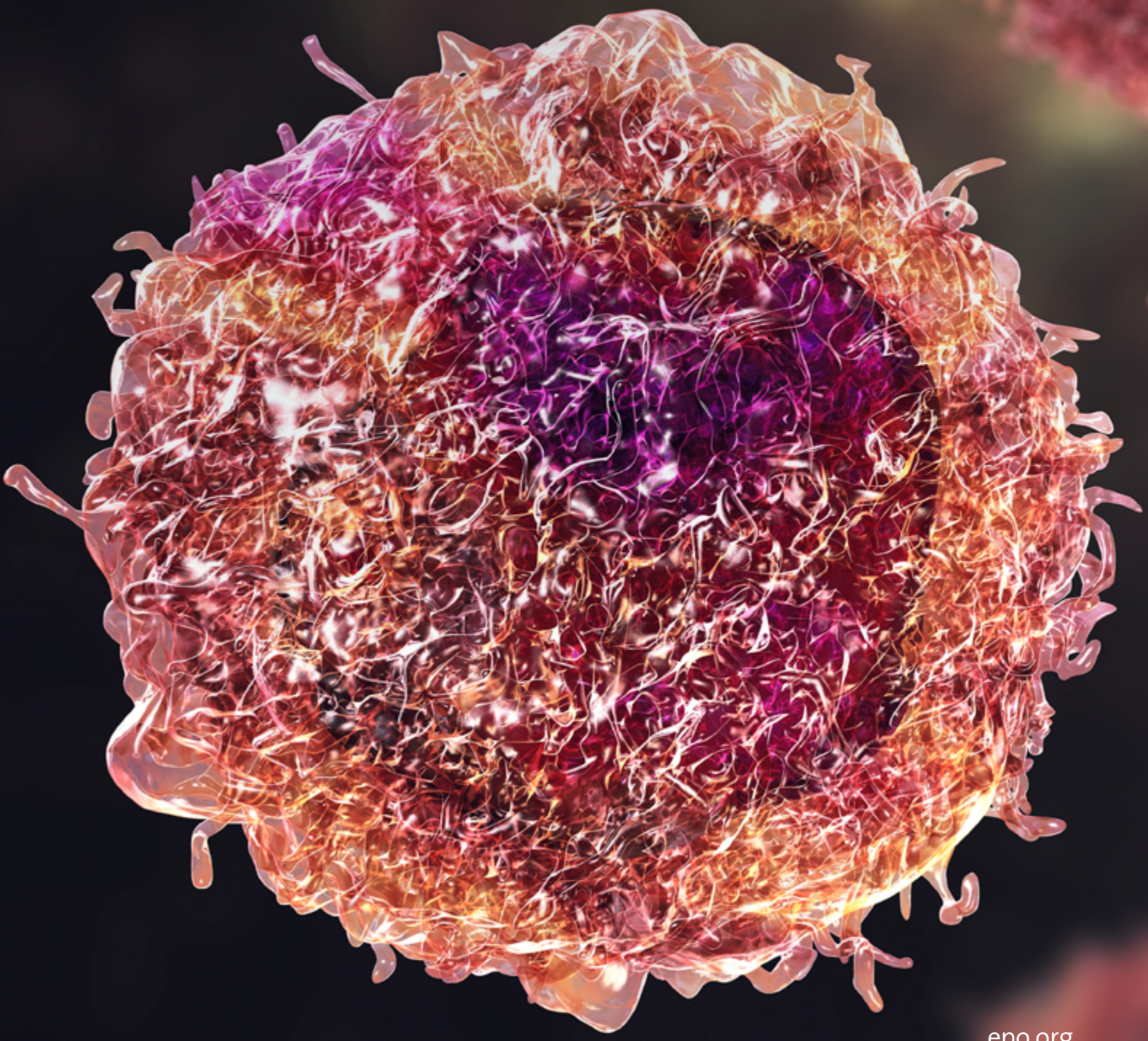

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Boosting the immune response to fight cancer

Abstract

Two entrepreneurial scientists with business experience have created a technology platform for immunology vaccines that make cancer and allergy treatment possible. For product development and technology commercialisation, they founded two startups, S-TARget therapeutics and OncoQR. Thanks to a robust patent portfolio and an IP strategy supporting their business case, they followed several commercialisation pathways, including investments in own research and development, collaborative development and technology out-licensing.

IP was essential for gaining revenues early on through licensing as well as for attracting funding. This was crucial given the long time-to-market periods that are typical in biotechnology.

Active checkpoint control immunotherapy

Cancer is the second most frequent cause of premature death due to its ability to circumvent the immune system's defences. Aside from surgery to remove the tumour mass, cancer therapy has traditionally focused on chemo- and radiotherapy. Both types of therapy target rapidly proliferating cells in order to kill them or slow their propagation. However, there are limitations to these approaches, since not all types of cancer respond to these therapies, healthy cells may get damaged and sleeping cancer cells might not be destroyed, which may lead to relapse after the treatment. This makes treatments that activate a person's immune system a particularly suitable strategy to fight cancer. Immunotherapies are promising as a means of targeted treatments that are capable of eliciting, amplifying or suppressing the immune reaction.

Geert Mudde, co-founder of OncoQR, spent much of his scientific career in cancer research aimed at the development of vaccines that build upon the current immunotherapeutic approaches but overcome their drawbacks. In 2009, he and his team developed the so-called Active Checkpoint Control Immunotherapy (ACCI), which, according to pre-clinical studies, has the potential to selectively and specifically trigger tumour-killing mechanisms naturally available in the immune system, combining a high efficacy with no observed immune system overreactions or other side effects.[1] This research resulted in the creation of the Specific Total Immune Remodulation (S-TIR) platform, as a new basis for vaccine development for cancer treatment, which is also suitable for the treatment "of allergies" and has yet to be tested regarding other diseases.

BOX 1: Immunutherapy against cancer

Over the last decade, several approaches that harness the properties of the immune system have been developed and successfully applied in cancer therapy, including therapies with antibodies:

- When cancer forms in isolated parts of the body, it sends out signals calling on the body to form new blood capillaries (a process called neo-angiogenesis) to get nutrients to grow. This process can be inhibited with antibodies that block the angiogenesis signals, thereby suffocating and starving the cancer.
- Cancer cells may start producing proteins not produced by normal cells, or they may produce them in much higher amounts. When that happens, it is possible to immunologically distinguish the cancer from normal cells and engineer antibodies that can directly attack those cells that express the protein. This approach allows for specific treatments that do not blast the whole body with systemic chemo- or radiotherapy. On the other hand, since it is rare that only the cancer cells produce this protein, a certain portion of healthy cells may be damaged, too.
- A further approach, using so-called "checkpoint antibodies", aims to disrupt the ability of cancer cells to inhibit the activity of patrolling cells (regulatory T cells, or Tregs). This approach enables them to stay alert and recruit the effector cells charged with killing the malignant cells. However, checkpoint therapy is typically systemic, which can lead to side effects.

Immunotherapy with antibodies has the generic downside that it often causes unpleasant side effects such as non-specific immune overreactions ("cytokine storms"). The problem of overreactions is less of a concern in a complementary approach: "cancer vaccination", which consists in delivering antigens to the cells of the immune system. If the body does not effectively mount an immune system reaction against one of the proteins that distinguish cancer cells from healthy ones, this approach may help support the body in that endeavour. The difficulty lies in the fact that the cancer antigens can be variant forms of normal proteins, so the immune system may have difficulties in recognising them as fully foreign and need special stimulation. This is where the work of the lead scientist Geert Mudde and his colleagues provided a valuable contribution. They developed the so-called "warhead", which delivers the immunogen to specialised immune cells and stimulates them, whereupon these cells stimulate other branches of the immune system to launch an attack against the cancer.

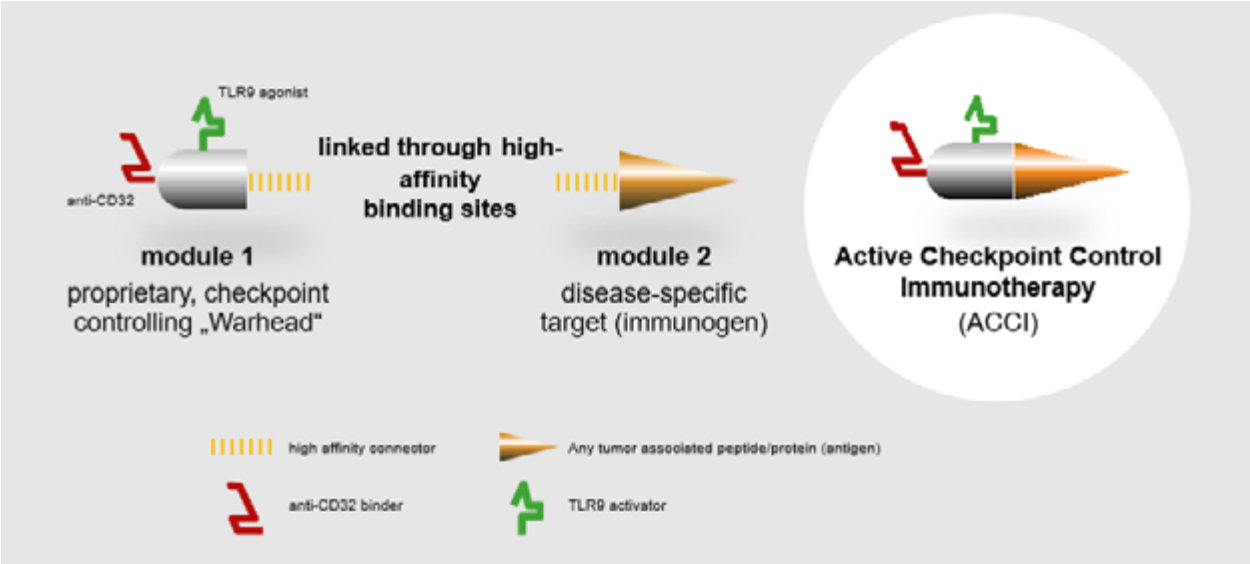
1 In pre-clinical trials in non-human primates, products developed on the basis of S-TIR have proven to activate several naturally available tumour-killing mechanisms without any observed side effects. See Therapeutic Principle | OncoQR ML

Technology and mode of action

S-TIR is a platform technology suitable for cancer treatment and comprises two modules: the generic "warhead" and a disease-specific "immunogen" with which it is connected through a specific connector. The immunogen is the protein produced by the cancer against which an immune response is desired and has the function of a vaccine. The warhead consists of a targeting moiety and a stimulating moiety. The targeting moiety brings the vaccine to special cells (plasmocytic dendritic cells, or pDCs) which will elaborate the vaccine. These elaborating pDCs then send out activating signals to B cells, to produce antibodies against the vaccine and therefore against the cancer, as well as to T cells, to send killer cells specific to the cancer, and even to other regulatory cells, which engage in processes that support the anti-tumoral activity (such as downregulation of factors on which the cancer cells rely for growth). The specific targeting of the vaccine to the pDCs makes a response more likely, and the presence of the stimulating moiety helps activate the support which the body can otherwise not provide.

This modular composition allows the warhead to be combined with different immunogens. Depending on the immunogen's composition, the technology can be used for different cancer targets but also for other purposes, such as the treatment of allergies. According to OncoQR, this special vaccine is expected to be safer, be more specific and offer a wider therapeutic window than other forms of immunotherapy. Moreover, the modular nature of the compound makes the preclinical tests easier and quicker, and the product is cheaper to produce. Right now, two lead candidates have been developed on the basis of S-TIR for the oncology field and have provided *in vivo* proof of concept in non-human primates: OQR200, targeting breast cancer, and TYG100, targeting gastro-enterological cancers such as pancreatic, stomach, colon and gastro-esophageal cancer.

Figure 1: Composition of a product based on the Specific Total Immune Remodulation (S-TIR).
Source: https://oncoqr.com/technology/mode-of-action/



BOX 2: Stages of drug development

Before obtaining regulatory approval for a drug or a vaccine, the efficacy and safety profile of candidate compounds must be thoroughly examined. The process includes pre-clinical tests in cells and animals, as well as several phases of clinical tests in humans, which require significant investment and can take several years to complete:

Phase	Tested subject	Primary objective
Pre-clinical	Cells *(in vitro)* and animals *(in vivo)*	Determining preliminary efficacy and toxicity and gaining pharmacokinetic and safety information Studies are mostly done *in vitro* (on biological molecules) or *in vivo* (on whole living organisms) and include testing on animal models, i.e. animals affected by the same disease, often genetically modified.
Clinical phase 1	Less than a hundred patients	Dose-ranging (determining the lowest dose that causes effect and the highest dose without causing harm) to test for safety
Clinical phase 2	Several hundred patients	Testing potential efficacy while gathering further data on safety and side effects
Clinical phase 3	Several hundred to several thousand patients	Gathering robust data on efficacy, safety and the overall risk-benefit relationship of the drug At this stage, the compound is usually compared to a placebo.
Clinical phase 4	Thousands of patients globally	Post-marketing surveillance: gathering detailed information on efficacy and safety, incl. long-term side effects

Source: Clinical Trials (efpia.eu)

From big pharma to biotech venture

As an immunology researcher, Geert Mudde started research on a new technology while working at the pharmaceutical company Novartis. At the time, however, the technology still needed major improvements, and when Mr Mudde left Novartis, the initial patent of Novartis was discontinued. Mr Mudde created his own biotech venture, f-star Biotechnology,[2] in 2006. He continued research in this area and was able to identify the missing elements, filing the company's first patent for S-TIR in the same year. Mr Mudde eventually left f-star but negotiated an exit deal, including the assignment of all rights to the patent and a commitment from f-star to contribute financially in case he started a new business in the biotech field.

TAKEAWAY

Options created by IP

The end of a project or business venture need not mean the end for the technology, if the researcher remains committed and maintains access to the IP.

It was around that time when a common friend brought him together with Christof Langer, a biotech engineer with prior business experience. Together, they founded S-TARget therapeutics in 2010 as equal shareholders, with the aim of bringing the S-TIR technology to the market. Geert Mudde and Christof Langer faced a specific challenge in proving their technology: for the pre-clinical *in vivo* study, after having successfully tested in mice for the ability to raise an immune response, they needed to test their technology in a clinically relevant animal model. While mice are useful as model animals in a number of immunological tests, they are not the most appropriate models when it comes to testing a new vaccine, especially if the underlying technology was intentionally built to be human-specific. The immune response of mice differs from that of humans in important ways. For this reason, if one sees a result in mice, it does not mean that the same will be true in humans or in other higher primates. In particular, when it comes to a sophisticated regulatory mechanism like S-TIR, a test in mice would not necessarily yield useful data due to the species-specific interaction between the warhead and cells from human or primate immune systems. A proof of concept of S-TARget's products in primates was needed.

2 The current name of the company is F-Star Therapeutics Inc.

"When choosing a partner for commercial collaboration, it is crucial to assess all the pros and cons and take measures to mitigate possible risks."

Christof Langer
Co-founder of S-TARget therapeutics GmbH and OncoQR ML GmbH

The S-TIR platform was actually developed for allergies as well as for oncology. The anti-allergy vaccine derived from it is supposed to induce tolerance against the antigen it carries, in this case an allergen; anti-cancer vaccines are supposed to induce immunity against a cancer-specific immunogen. While the purpose is different, the basic idea of using the "warhead" to carry the antigen (immunogen) is the same. Therefore, the co-founders decided to test the anti-allergy vaccine in an existing, highly clinically relevant non-human primate model for house dust mite-induced chronic allergic asthma. In 2013, they approached Professor Van Scott at East Carolina University in the US, whose disease models had been used by several big players in the allergy field, and tested a vaccine based on S-TIR specifically on captive-bred monkeys suffering from this disease. S-TARget's anti-allergy vaccine was designed to contain the ten most important allergens. The contractual terms with the university included provisions on costs, which in this case were borne solely by S-TARget, and a provision that would give the university a share of the profit in the event that a specific product would reach the market.

The results were very promising. The anti-allergy vaccine was able to cure the vast majority of the monkeys from the disease they had been suffering from their entire lives. Encouraged by the success, Prof. Van Scott offered to test S-TARget's first experimental oncology vaccine in his non-allergic monkeys. The oncology vaccine TYG100 induced amounts of antibodies against the cancer antigen that were above expectations. It induced antibody titres in all treated animals, exceeding the clinically relevant titres by a factor of 200 to 1 000 in the absence of any observed side effects. This success proved the efficacy of the mechanism as such, and as a result, the co-founders decided to separate the allergy from the oncology business with the aim to build two separate companies and two brands for the different areas of application. In 2013, they created the spin-off OncoQR, granting it a worldwide, exclusive licence to the S-TIR platform for use in all areas of oncology.

Protecting the platform with a patent portfolio

The business model around the S-TIR technology is based on creating a platform protected by a robust patent portfolio, which can be used for different specific applications. The basis of the technology platform is the warhead and the connector, i.e. it is the generic module of the technology, which is transformed into a complete product after being connected to a very specific immunogen developed for targeting a concrete disease. This approach allows the company to develop several products in parallel through a combination of its own R&D efforts and exclusive out-licensing to other companies on a target-specific basis, i.e. for a specific immunogen and independent of the indication or disease area. This has the advantage of diversifying the product portfolio while at the same time financing further R&D through licensing revenues (see Figure 2).

Creating a platform is a particularly good strategy in biotech, where product development requires a considerable amount of time and investment. The use of the same basic technology significantly reduces the costs associated with each new product and its time to market. It can also save costs for IP protection, since it is cheaper to patent the platform technology itself rather than different elements of each product separately. This approach enables a fast scale-up once the regulatory approval is there for the first product.

TAKEAWAY

Commercialising platform technologies

Prioritising business development around a basic biotechnology platform helps provide efficiency gains in R&D and helps reduce the costs for IP protection.

To support their business strategy consisting of the platform-based commercialisation model, the IP strategy of the co-founders was to protect the key inventions related to the generic module while keeping the costs of IP under control. The technology platform is primarily covered by three basic patents, two providing broad protection of the platform (EP1996230B1 and EP2872169B1) and one (EP3344647A1) capturing improved elements of the warhead connector (module 1 in Figure 1). Additional patents are focused on the various products for use in oncology, based on specific immunogens for different lead candidates (module 2 in Figure 1). So far, there are two product patents derived from the S-TIR platform for oncological applications: TYG100 for the treatment of pancreatic cancer (EP2999485B1) and OQR200 targeting breast cancer (EP3297658A1). Further product patents may be filed in the future for other cancer types.

TAKEAWAY

Complementarity of IP rights

Broader protection of the platform through a combination of patent portfolio and trade secrets can provide better protection against infringement and also extends the protection period.

IP management

IP related to the S-TIR platform is, in principle, managed by the two co-founders who jointly decide on IP-related issues. However, the help of a specialised patent attorney right from the start was important to be able to assess the pros and cons of different options. The patent attorney's expertise has been helpful to the co-founders not only for questions of patent prosecution but also for taking decisions on their patent and business strategy, as well as for setting up licensing agreements. The patent attorney was involved in every important IP-related decision and covered all relevant aspects by herself. Only for patent applications in certain jurisdictions did she rely on support from local patent attorneys.

The patent portfolio is complemented by trade secrets, which cover aspects for the most efficient production of the final vaccine that are not covered by the claims of the patents. This know-how, together with practical support for manufacturing for (pre-)clinical trials, is provided under a non-disclosure agreement to the licensees of the platform. The main advantage of this strategy is two-fold: protecting only the most important elements of the technology allows for savings on patenting costs; at the same time, the patents as such do not disclose sufficient information to potential infringers to allow them to manufacture the product on their own in the most efficient way.

TAKEAWAY

IP and technology licensing

Patents are important instruments for technology transfer. However, licensing agreements are generally of a higher value for both sides when they include not only patent rights but also secret know-how and further support for upscaling production.

Over the years, S-TARget and OncoQR have both benefitted from their scientific advisory board, which consists of scientific and business experts, as well as investors. This board not only supports both companies during the scientific developments but also provides guidance and advice on financial aspects.

TAKEAWAY

Advisory boards

Biotech startups may benefit from setting up an advisory board composed of renowned scientists in the field as well as investors and business experts.

"The robust patent portfolio allowed us to attract funding and create opportunities for collaboration."

Geert C. Mudde
Inventor, co-founder of S-TARget therapeutics GmbH and OncoQR ML GmbH

The route chosen for the filings is typically an international (PCT) application filed with the European Patent Office. The decisions on the three basic patents were driven by cost-optimisation as well as the aim of broadening the protection of the platform technology in the most flexible way. The second patent was of strategic importance in this respect, as it covers a broader geographical territory than the first one and also includes China. The third platform patent, which protects the improved warhead connector, was filed almost ten years later than the first patent and made it possible to extend the duration of patent protection for the technology as a whole. Finally, different product patents enable a further extension of patent protection for a specific product, regardless of the lifetime of the patents protecting the basic technology.

Applying both an open and an exclusive licensing strategy

Early on, the co-founders had already thought of different possible future scenarios and introduced a smart licensing strategy with license-back provisions that enabled them to keep control over the technology and benefit from improvements made by its licensees. Licences for S-TIR are usually granted as exclusive licences for further product development on a target-by-target basis, for any indication the licensee chooses. In addition, the licenser and all licensees of the S-TIR platform automatically obtain the right of free, non-exclusive and worldwide use in a non-competing field for any technology improvements made by other users. This system of license-back provisions effectively creates an open-innovation type of platform, where all licensees benefit from each other's contributions to improve the basic technology, as long as they are not competitors to each other. For S-TARget and OncoQR, this strategy turned out to be extremely helpful in negotiations, which could be focused on the specific field of use, while the improvements by others were automatically included in the deal. To date, it has also resulted in several technological improvements of the warhead.

TAKEAWAY

License-back provisions
A system in which licensing agreements include the right to use improvements made by other users is a great way to continuously increase the value of a platform technology as well as simplify negotiation.

Table 1: Types of licences foreseen by OncoQR and S-TARget

Types of licences for S-TIR	
Target-by-target platform licensing (commercial)	Licensing the three basic patents protecting the platform on a worldwide exclusive basis for use in combination with a specific immunogen, independent of the indication.
Product licensing (commercial)	Licensing of the complete product (warhead connected with an immunogen) for further development or commercialisation.
Research licences (non-commercial)	Licensing of the platform in combination with one or more specific targets for non-clinical use, which may show the clinical relevance of new targets and potentially lead to obtaining a commercial licence. This type of licence may result in additional evidence and data or improvement of the warhead.

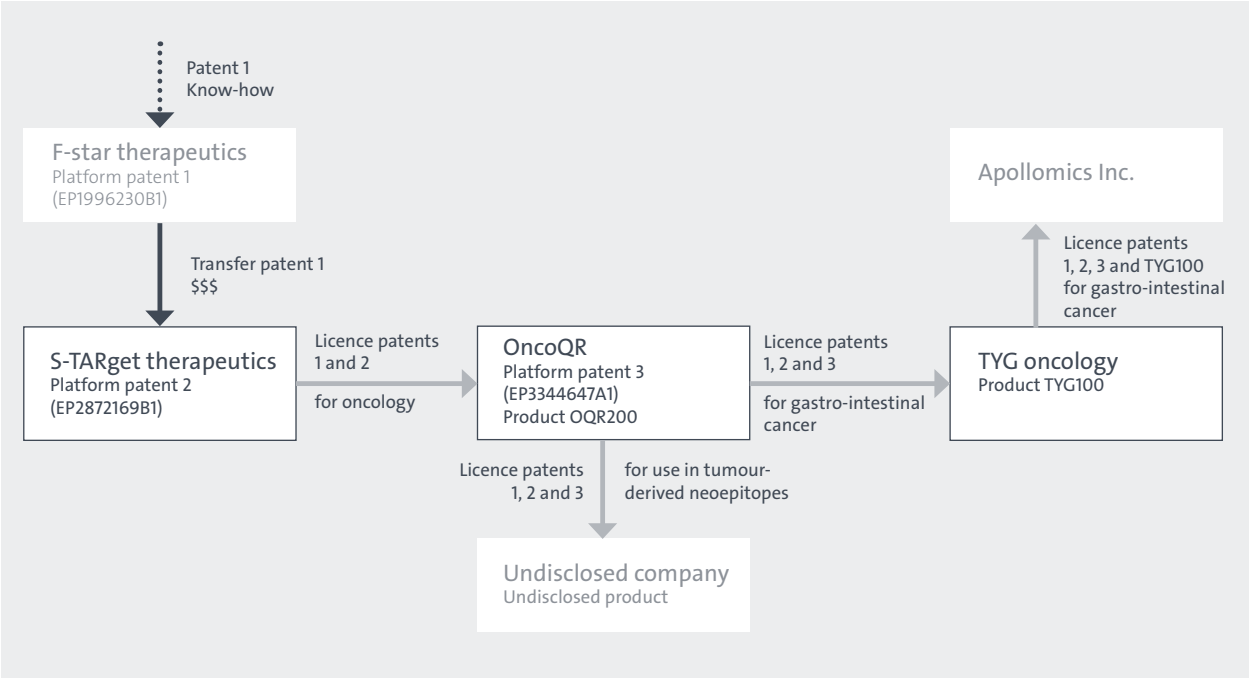
When setting up the licensing agreements aiming at product development, Mr Mudde and Mr Langer learnt an important lesson: patenting costs relevant for licensees should also be borne by the licensees. Otherwise, the co-founders might end up bearing all the costs while taking on an undue risk: that they will not be able to recover these costs in the event the licensee does not enter and succeed in the market.

TAKEAWAY

Patent costs and licensing

When setting up licensing agreements in the biotech field, it is good practice to ensure that a fair portion of the patenting costs is borne by the licensee, to mitigate the risk of losses.

Figure 2: Current main business and licensing structure



Financing

The main options for financing the R&D efforts of biotechnology startups are public grants, private funding from venture capitalists or business angels, and collaboration with a big pharmaceutical company. S-TARget was initially financed by private investment and a pre-seed grant from an Austrian funding agency. The IP developed so far, which protected its basic technology, in combination with the expertise of the two co-founders, especially their scientific and business competences, was crucial for obtaining this first pre-seed grant. Over the following years, the R&D in S-TARget and OncoQR was financed mostly by national funding programmes (approx. 25%) and revenues from out-licensing (approx. 75%). For several years (2014–2017), income was secured by revenue from an exclusive licence for use in the allergy field granted to the German company Allergopharma. The allergy business thus turned out to be an important pillar that financed further development in the oncology field. Demonstrating great foresight, the co-founders negotiated a three-fold payment structure: upfront payment, milestone payments and an anti-shelving fee.[3] This secured enough income for the company for the potential scenario in which Allergopharma would not develop the technology for market entry, which actually materialised. In addition, the rights to develop animal-specific vaccines for use in veterinary medicine have been licensed to the company Angothera.

TAKEAWAY

Payment structure in licensing contracts

Setting up licence agreements with multiple types of payments may help secure income in case of different scenarios. This creates a "portfolio of commercial possibilities" and maximises the value of the technology.

National funding programmes in different countries helped S-TARget and OncoQR to raise enough capital for the first trials. For example, in 2013, S-TARget was able to get approximately one million euros from an Austrian seed funding programme, which it used for developing the warhead, preparing the first two S-TIR vaccines and the non-human primate studies that showed the proof of concept. After the first pre-seed and seed funding, the disadvantage of further grants for the development of S-TIR was the usual requirement of granting authorities, according to which the company has to contribute a significant percentage of the grant from its own resources (co-funding). Getting next-stage funding in Europe proved to be difficult, also because the co-founders were avoiding any form of financing that would mean a dilution of their shares in the company and loss of control. Involving VCs or business angels when the technology had not reached a certain technology readiness level involved the risk of putting the co-founders in a weak negotiation position. On the other hand, in the pharma industry, where product development lasts until regulatory approval is given, R&D requires substantial monetary investment. Therefore, for a small company, it might be beneficial to involve a VC at a certain stage or engage in a strategic partnership with a larger company.

TAKEAWAY

Involving venture capitalists

There is a window of opportunity for involving VCs for startups. It should not be too early (ideally after obtaining the proof of concept), but still before other funds are used up, for the startup to strike a win-win deal.

Not being willing to lose control over their companies and following the successful licensing deal in the allergy field, the co-founders focused on negotiations with several big pharma players in the field of oncology. These companies were attracted by the promising results from pre-clinical trials. However, all negotiations with big pharma have so far remained on hold pending a proof of concept from phase 1 clinical trials. It is not unusual in this field for potential industry partners to want to see a proof from trials in humans prior to investing. The resulting challenge is thus to find the path to getting clinical phase 1 data.

3 Including an anti-shelving fee in the licence agreement usually takes the form of a minimum-royalty guarantee to the licenser, obliging the licensee to pay a minimum royalty or a default amount set out in the agreement after a specified period of time. Inclusion of such a provision protects the licenser from having their technology "shelved", i.e. not further developed or commercialised. Anti-shelving provisions can also include the possibility of the licenser retreating from the deal in case of non-development of the technology within a certain period.

The path to product commercialisation in oncology

Since the conception of the technology, the co-founders could make use of the patent system to maintain enough control to be able to transfer and out-license the intellectual assets in their business interest and create different options for bringing the technology to the market. Currently, the co-founders are pursuing three main paths towards the clinical phase 1 trials in oncology: a collaborative model partially based on out-licensing S-TIR for the product TYG100, own R&D through OncoQR for the product OQR200 and a third path based on out-licensing to an undisclosed company.

TYG100 is the first pilot product derived from S-TIR in oncology targeting gastro-enterological cancer. OncoQR established a collaborative development model with a UK-based company, which was at that time developing a similar product, although with far inferior results. While the partner could contribute with experience from clinical trials that Mr Mudde and Mr Langer did not have, in 2013, OncoQR provided the licence to S-TIR in exchange for a 50% share in the newly established company, TYG oncology Ltd. Currently, TYG is in-licensing the platform from OncoQR for use in this group of targets and further out-licensing the TYG100-related patents (product licence) to a US-based company, Apollomics Inc., which is working towards bringing the product to clinical trials. This deal represents one of the possible paths towards getting initial clinical data and subsequent regulatory approval for the technology. It also secures the manufacturing and delivery of the warhead to OncoQR for possible clinical phase 1 trials.

BOX 3: Successful R&D collaborations

When engaging in R&D collaborations, companies should aim for a win-win agreement. In some instances, it might be unavoidable to provide access to IP to the other party for free. However, in such cases, there should be a clear written and binding statement defining which assets are provided by which party, for how long, on what basis and for what purpose. At the same time, clear and unambiguous exit regulations should always apply in case the collaboration needs to be dissolved.

For the second product, OQR200, which is developed in-house by OncoQR itself, the co-founders have intentionally selected the immunogen HER2/neu, a protein involved in the proliferation of breast cancer cells, since it is probably the best-studied cancer target to date. The pre-clinical *in vivo* studies in (healthy) non-human primates were carried out by OncoQR to study the immunological reaction in the body. These tests have, for the first time, proven that, apart from polyclonal HER2/neu-specific antibody expression, large numbers of clinically relevant cytotoxic T cells could also be induced. Based on the results, all cancer-killing mechanisms of the immune system have been activated by the product in monkeys, the animal whose genome is most similar to that of humans.

In 2022, OncoQR out-licensed the platform for use in patient-specific, tumour-derived neoepitopes, which represents another pathway to commercialisation for the products derived from the S-TIR platform.

OncoQR and S-TARget still have a way to go before their disruptive immunotherapy based on the S-TIR technology platform reaches cancer patients. However, a smart IP strategy aligned with an agile business strategy has so far enabled them to create several different options paving the way for future technology commercialisation.

MAIN PLAYERS INVOLVED

Source of IP

Geert Mudde
- lead researcher and main inventor of the S-TIR technology
- co-founder of the companies f-star Biotechnology, S-TARget therapeutics and OncoQR
- actively involved in the business strategy and IP portfolio development

Christoph Langer
- co-founder of the companies S-TARget therapeutics and OncoQR
- actively involved in the business strategy and IP portfolio development

Professor Van Scott at East Carolina University
- professor of physiology
- involved in testing on non-human primates for allergy and oncology

Tech transfer catalysts

National funding agencies
- providing pre-seed and seed financing and several follow-up grants to finance pre-clinical development

IP commercialisation

S-TARget therapeutics GmbH
- founded in 2010
- out-licensing two main patents for different use cases to finance R&D in oncology

OncoQR ML GmbH
- founded in 2013
- in-house development of the product OQR200
- out-licensing the third main patent for different use cases to finance R&D in oncology
- 50% participation in TYG oncology and collaborative research for the product TYG100

TYG oncology Ltd
- founded in 2013
- collaborative research with OncoQR for the product TYG100

f-star Therapeutics Inc.
- filing the first platform patent in 2006

Allergopharma GmbH & Co. KG
Angothera GmbH
Apollomics Inc.
- licensees of S-TIR technology for uses in allergy, veterinary medicine and specific fields of oncology

OncoQR technology – timeline

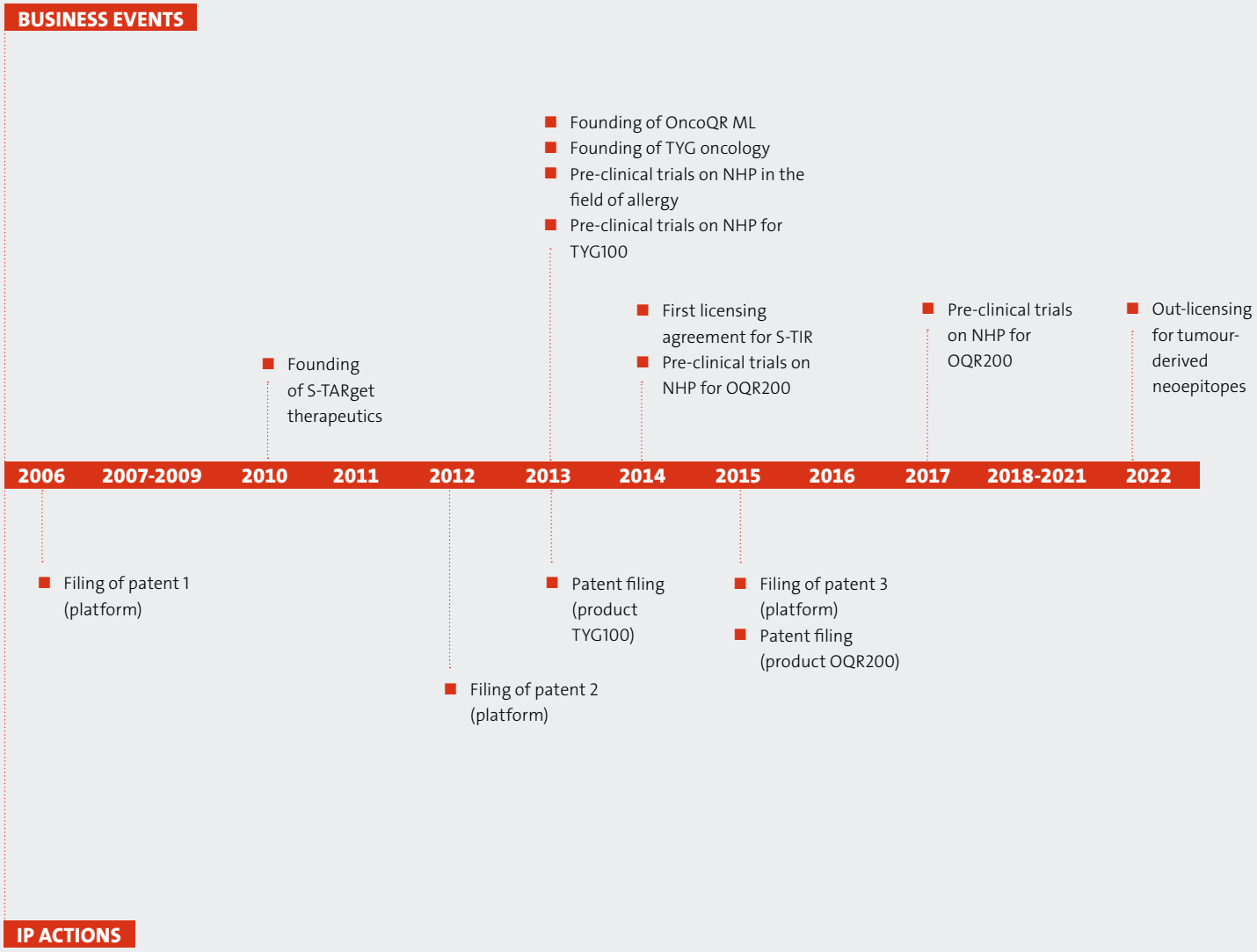


Table 2: S-TIR intellectual property portfolio

Platform patents

No.	Title	Priority	Patent number	Comment
1	Bispecific molecule binding TLR9 and CD32 and comprising a T cell epitope for treatment of allergies	3 March 2006	EP1996230B1 WO2007098934A1	S-TARget therapeutics GmbH Use in oncology exclusively licensed to OncoQR ML GmbH
2	Immunoregulatory vaccine	13 July 2012	EP2872169B1 WO2014009209A2 WO2014009209A3	S-TARget therapeutics GmbH Use in oncology exclusively licensed to OncoQR ML GmbH
3	Coiled-coil connector	1 September 2015	EP3344647A1 WO2017037158A1	OncoQR ML GmbH

Product patents

No.	Title	Priority	Patent number	Comment
4	Gastrin peptide immunogenic composition	21 May 2013	EP2999485B1 WO2014187743A1	TYG oncology Ltd
5	HER2/neu immunogenic composition	18 May 2015	EP3297658A1 WO2016184862A1	OncoQR ML GmbH

Some of the EP applications listed are still pending and no decision to grant has been taken. Granted patents may also undergo an opposition or appeal procedure, in accordance with the procedures laid down in the European Patent Convention, which could limit the scope of protection of the patent. Legal events are published in the European Patent Register and can be accessed via www.espacenet.com under legal status.

Trade marks

No.	Title	Application	Granted	European Union Trade Mark (EUTM) number
1	S-TIR (owner S-TARget therapeutics GmbH)	15 September 2014	EU, UK, IN, US	013256474

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