FLEXmag

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The news magazine of the Technoflex group

Francine Leca, the surgeon with a big heart

Plans for a European emergency medical stockpile

Retracing the history of blood transfusion

Éditorial

Olivier Chesnoy
CEO

In our last issue, we discussed the COVID-19 crisis that was beginning to spread to every country on the planet. Who would have thought that 18 months later we would still be grappling with the pandemic and hampered by the restrictions on our daily lives that continue to affect many regions of the world. Like every major crisis, the pandemic has shown us the best and worst of ourselves. Our ability to react quickly has led to the development of vaccines faster than ever before, yet the irrationality of some leaders, blinded by their ego or their beliefs, has also led to staggering spikes in death rates in their countries. Likewise, our healthcare systems in Europe have shown strength and unity, yet certain self-proclaimed gurus have also touted ineffective, dangerous treatments. The pandemic has also shown us that Europe needs to take back control of the production of drugs and healthcare equipment if it aims to avoid facing future shortages in the event of a major pandemic. More on that in our piece on the European emergency medical stockpile.

Another repercussion of the crisis has been a major drop in blood donations across the globe among both paid and volunteer donors, for the simple reason that donors have chosen or been forced into lockdown. We thought that now might be a good time to brush up on the history of the revolutionary treatment that is blood transfusion.

Lastly, in difficult times such as these, it is always worth turning to our sources of inspiration, to those who reflect the best in us. Who better, then, than Dr. Francine Leca, the founder of the Mécénat Chirurgie Cardiaque heart surgery charity that gives children access to treatments unavailable in their own countries. Turn to the "Profiles" section to read more about this inspiring pediatric surgeon.

Happy reading!

PS : And once again, well done and thank you to all of you at Technoflex. You have remained steadfast in your work since early 2020, ensuring that we continue to play our part in making sure it's business as usual in the health sector.

Flexmag, a world of connections

Quick news - Upcoming events 3

Focus 4
Retracing the history of blood transfusion

Business 8
Biocell®, high-performance EVA bags for the biotech industry

Outlook 10
Plans for a European emergency medical stockpile

Profiles 12
Francine Leca, the surgeon with a big heart

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Quick news

Technoflex scales up its production capacity!

In 2020, Technoflex added two new machines to its polypropylene bag production lines.

The two machines have been installed in the ISO 7 cleanrooms, where they will be used to produce the Dual-Mix® dual-chamber bag (a prizewinner at the CPhI Pharma Awards) and boost our production capacity of bags to meet heavily increasing demand in the pharmaceutical and blood product markets.

With this investment, Technoflex can continue to develop its international presence and better serve its customers, particularly those in North America and Asia-Pacific.

Upcoming events 2021

CPhI North America	July 26–30	Online event	CPhI north america	**Online meetings**
Healthcare Packaging Expo	September 27–29	Las Vegas, USA	Healthcare+ PACKAGING EXPO	**Stand 6924**
AABB	October 17–19	Online Event	AABB	**Online meetings**
Innopack Worldwide	November 9–11	Milan, Italy	InnoPack	**Stand 6G30**
ISBT	November 13–16	Brisbane, Australia	ISBT International Society of Blood Transfusion	*To be confirmed*
CPhI India	November 24–26	New Delhi, India	CPhI india	*To be confirmed*

Owing to the COVID-19 pandemic, this schedule is subject to change.
For an up-to-date list of the trade shows that we will be attending, go to www.technoflex.net and click on "Upcoming events".

Focus

Retracing the history of blood transfusion

Every year, more than 100 million units of blood are collected, enabling tens of millions of patients to be treated. Though today blood transfusions are carried out under optimal safety conditions, their development is the result of several centuries of research. Here we retrace the colorful history of the technique.

From the Mayas who burnt sacrificial blood as an offering to the gods to medieval doctors who performed bloodletting, blood has forever inspired wonder, beliefs, rituals, and, of course, research. Even as far back as ancient times, medical treatises spoke of injecting blood by intravenous infusion. However, it was not until the 17th century that this life-giving substance began to reveal its secrets.

From experimentation to an understanding of the circulatory system

Until that point, doctors had thought that blood was produced by the liver, a belief founded on the writings of Greek physician Galen more than 15 centuries earlier. It was William Harvey, an English physician, who in 1628 challenged this theory by demonstrating the existence of the circulatory system and revealing the role of the heart.

This discovery led to increasing research into blood and the circulatory system. The work of Christopher Wren, the English scientist, astronomer, and architect, soon paved the way for the first transfusions. In 1665, he developed the first instruments for injecting fluids into the human circulatory system.

A few years later, Dr. Jean-Baptiste Denis – the personal physician of Louis XIV – experimentally transfused animal blood into humans. However, a patient he was treating for madness died from these experiments, leading to a ban by the Parliament of Paris on blood transfusions to humans. It would be 150 years before the next transfusion experiments involving humans were to be conducted in France.

In the 19th century, the technique was revived by obstetrician James Blundell, mainly to treat some of his patients for postpartum hemorrhage. Despite his encouraging results there were still problems, the fact that blood coagulates being one of them.

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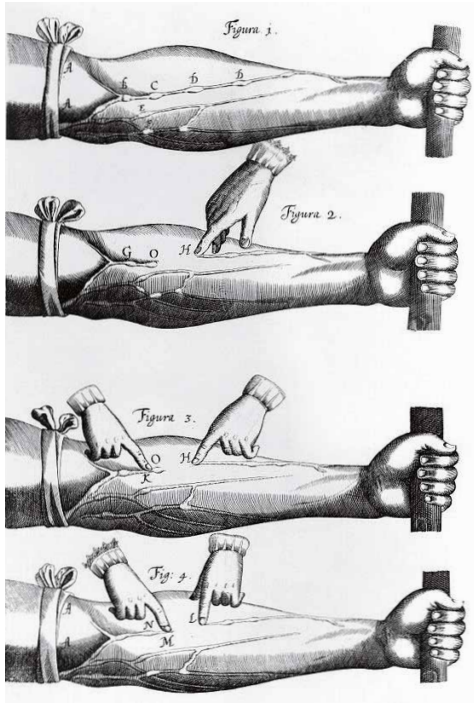

Sketches of the circulatory system described by William Harvey (1628)

First transfusions with animal blood (1667)

Arm-to-arm transfusions between humans (c. 1880)

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The first modern transfusions

After several centuries of experimentation, a discovery by Dr. Karl Landsteiner led to one of the great advances in hematology.

In 1901, the Austrian physician demonstrated the existence of the ABO system. This first step in differentiating the blood groups paved the way for modern transfusions.

As new and vastly more powerful weapons subsequently caused significant front-line casualties during the First World War, transfusions became increasingly common.

During the war, a French doctor assigned to a field ambulance by the name of Arnault Tzanck realized the importance of blood transfusion. In 1928, he set up the first transfusion center at Saint-Antoine Hospital in Paris.

Then came a whole series of further advances in the 1920s and 1930s. Conservation techniques were developed, the first blood banks were set up in the United States, and plasma fractionation techniques began to appear, saving ever more patients.

Having won the Nobel Prize for Medicine in 1930, Karl Landsteiner began working with the biologist Alexander Wiener in 1940. Their research led to the discovery of the Rh blood group system. This major step forward in determining donor/recipient compatibility played a fundamental role in making blood transfusions increasingly safer.

During the second half of the 20th century, efforts went into developing a more structured framework for blood transfusions. Public and private institutions were set up in many countries and charged with coordinating blood collection and/or ensuring each country had its own national supply.

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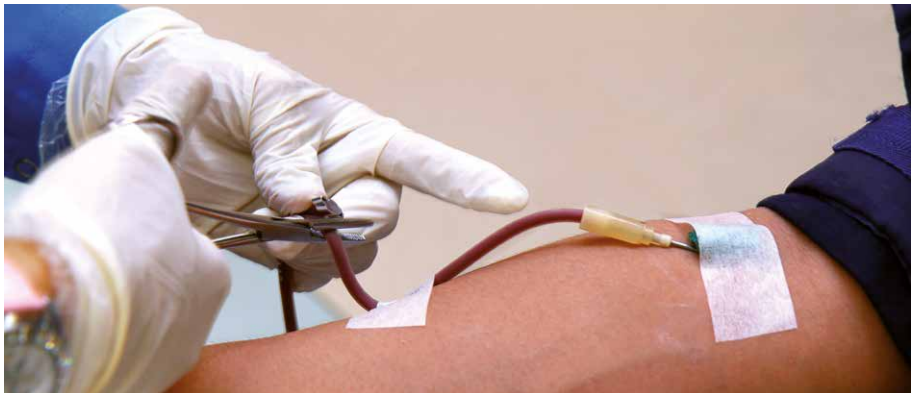

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Ethical debates arose around this time as well, for instance as to whether donors should be paid.

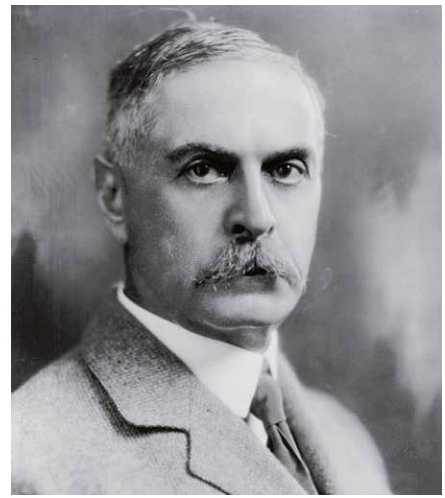
Whatever approach is adopted, one thing is certain – blood and blood product transfusions are now a major weapon in the arsenal of modern medicine. Transfusions help millions of patients worldwide every year. They benefit patients either directly when blood or plasma is transfused for hemorrhages due to accidents, burns, or postpartum complications, or indirectly when blood products are transfused for hemophilia or immunoglobulins are transfused for certain forms of cancer.

What do bags have to do with all of this?

Blood was long transfused from arm to arm, by directly connecting the veins of the donor and recipient. At the time, physicians did not know how to store blood, as it would coagulate in the glass bottles in which it was collected. However, when the anticoagulant properties of sodium citrate were discovered in 1914, it then became possible to store blood better. Yet a question remained: what should blood be stored in?

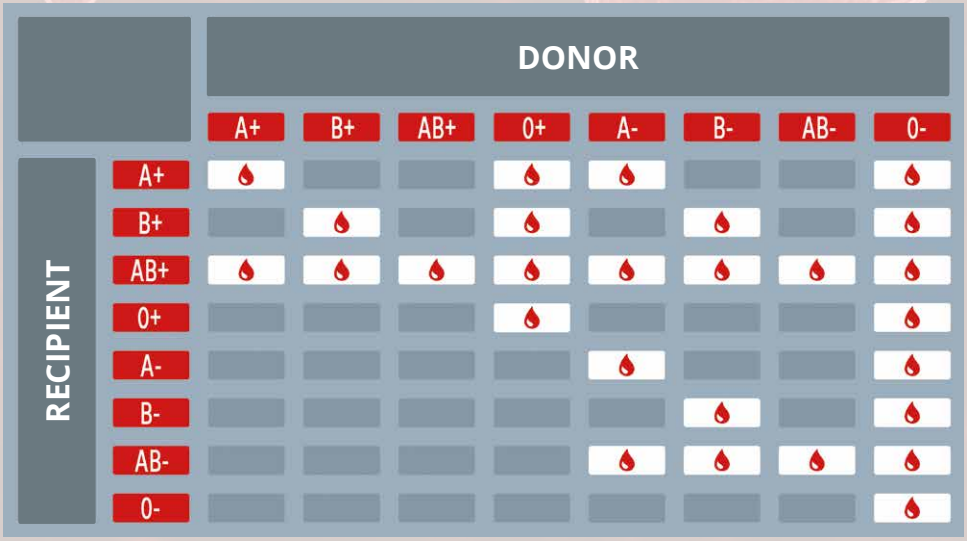
It was not until the early 1950s that the heavy and fragile glass bottles were replaced by plastic bags. Not only were these bags less fragile, but they were easier to store and transport.

Blood storage technology has been progressing ever since. Nowadays, blood is mainly stored in PVC bags, since this material ensures optimal preservation of hemoglobin.



World Blood Donor Day is celebrated every year on June 14, the birthdate of Karl Landsteiner.

Blood group compatibility table



Whenever blood is transfused, ABO blood group and Rh status are the two criteria needed to establish compatibility between the donor and recipient.

O+ and A+ are the two most common blood groups, together accounting for more than 70% of the world population. However, the proportions can significantly vary from one country to the next.

Group O- blood can be transfused to any person regardless of the recipient's blood group since it contains no ABO antigens or Rh factor. That is why people in this group are known as "universal donors". That said, universal donors can only receive blood from those in the same O- group.

People from the AB+ group, on the other hand, are known as "universal recipients" since they can receive blood from any group given that their blood contains all the antigens. However, they can only donate blood to people in their own group.

Because of these compatibility issues between the groups, blood donations, whatever the kind, are vital in healthcare.

Biocell®, high-performance EVA bags for the biotech industry

Millions of patients around the world are treated with blood products every year for immune system disorders, chronic infections, and coagulation disorders. Because these blood products are subject to the same quality, safety, and efficacy requirements as any other treatment, Technoflex developed Biocell®, a high-performance EVA bag.

The integrity of a bag is primordial from when the product is being manufactured right through to its end use in the patient. A bag can contain soiled or even contaminated product, it can leak, it can contain phthalates, or it can be made from a material that causes unwanted chemical reactions in the contents of the bag. The risks posed by non-compliant bags to the patient are numerous.

The choice of material in the design of a bag is therefore as essential as the quality of the bag's manufacture.

EvaFlex® high-performance film

With these needs in mind, Technoflex launched the Biocell® range in 2016. These bags are made with the EvaFlex® film and designed in strict accordance with American and European pharmacopeia standards.

As these Biocell® bags are made from EVA (ethylene vinyl acetate) and free from DEHP, they remain highly flexible even at temperatures below 0 °C and can be sterilized by radiation. Additionally, some bags in the range possess a barrier property for better storage of products that are sensitive to oxygen and carbon dioxide.

Testing pressure loss with filtered air

Biotech production room

With its unique appearance and physical properties, the EVA film also blocks ultraviolet rays, prolonging the shelf life of the solution in the bag.

For better patient compatibility, Technoflex also developed a high-frequency welded twist-off EvaFlex® port, thereby eliminating adhesive interfaces between the film, tube, and port.

An AQL that reflects a meticulous manufacturing process

Not only must a bag be made from the right material, but it must also be manufactured to the same high standards. That is why the Biocell® bags are manufactured in ISO 7-compliant controlled environments by specially trained personnel.

In addition to these manufacturing processes, a strict quality control protocol is followed that includes particle counting, microscopic assessment, and individual bag pressure testing for certain product ranges.

We have a strategy for testing materials for cross-contamination from their arrival at the factory through to the manufacture of the bags, enabling our Biocell® bags to achieve an acceptable quality level of 0.65 per batch tested. In the flexible bag market, few can claim to be manufacturing products of that kind of quality. As a result, since its launch the Biocell® range has met with continuing success among major stakeholders in the medical biotechnology industry.

With Biocell®, Technoflex has cemented its position as an independent leader in flexible bags and a trusted partner for biotechnology stakeholders.

Biocell® bags

Plans for a European emergency medical stockpile

Sylvie Ponlot

Recurring shortages of key drugs now affect many countries, leading to sometimes serious repercussions for the health and safety of patients. European countries are no exception, as the coronavirus pandemic has demonstrated. These observations have set alarm bells ringing across Europe, which now wants to set up an industrial-scale pharmaceutical strategy and secure the funding to make it happen.

Last August, a report on drug shortages was submitted to the European Parliament by the Committee on the Environment, Public Health, and Food Safety. It highlighted Europe's significant dependence in relation to the production of active ingredients and, therefore, the manufacture of essential drugs. The figures speak for themselves: the EU imports 40% of the drugs marketed inside its borders, while 60 to 80% of the active ingredients are made in China or India. Overwhelmingly backed by 79 votes to 1, the report describes the actions that must be taken to put a lasting end to these shortages. It advises EU member states to share existing best practices in relation to stock management, develop a common drug procurement policy, and implement coordinated joint health strategies.

Another major goal is to re-establish European pharmaceutical sovereignty to safeguard the manufacture of essential drugs. To do this, the production of many active ingredients will need to be brought back to Europe, as has already happened with the production of those used in the latest generation of bioengineered drugs (biotechnologies).

Lastly, as the COVID pandemic has made these shortages painfully obvious, the report insists on the need to establish a strategic stockpile of essential drugs that would form part of the EU's resources under its Civil Protection Mechanism.

A Key Role for RescEU

Whenever natural or man-made disasters occur, the European Civil Protection Mechanism coordinates aid and assistance between the 33 participating states. It is called into action whenever a country's ability to respond to a threat is overwhelmed by the magnitude of the situation. Since its inception in 2001, the Mechanism has been called on more than 330 times by European and non-European countries, amply proving its value. Human and non-human resources are pooled by the participating states, while the EU oversees funding and coordination.

The RescEU project was put together in December 2018 and adopted the following year. The newly created RescEU reserve enhances the existing Mechanism by adding firefighting planes and helicopters to its resources. With experts, medical evacuation planes, and stockpiles of medical equipment and field hospitals ready to be deployed, RescEU now possesses an airborne fleet that can respond rapidly to health emergencies as well as chemical, biological, radiological, or nuclear incidents wherever they occur and whatever their magnitude. All EU member states would have equal access to the European emergency stockpile of essential drugs. If incorporated into the RescEU mechanism, it would provide a clear and lasting safeguard against the risk of shortages.

Francine Leca,
the surgeon with a big heart

MECENAT CHIRURGIE CARDIAQUE
enfants du monde

Sylvie Ponlot

Francine Leca and her team operating on the heart of a child.

Born in May 1938, Francine Leca is a different kind of woman. After undergoing many years of tough training, she became not only the first woman to be a heart surgeon in France, but also a pioneer in pediatric heart surgery. She was then appointed head of the heart surgery departments at the Laennec and Necker hospitals, a position she held for 17 years. Though now retired, Francine's work continues. Despite performing her last operation in 2016, she is still saving lives through Mécénat Chirurgie Cardiaque, the heart surgery charity that she co-founded in 1996.

"You hear people speak about 'patrons of the arts'. Well, the heart of a child is a work of art as well".
Francine Leca

Heart surgery requires cutting-edge medical techniques and advanced equipment, making such procedures impossible in many countries lacking the equipment, knowledge, and funds.

In collaboration with referring physicians and/or volunteers, the charity regularly carries out humanitarian missions in disadvantaged countries. The aim is to follow up the children who have already undergone operations and assess those who may harbor heart defects. If a serious heart problem is detected, a complete medical file is put together. The children travel to France, where they are operated on in one of the nine French hospitals in the charity's network.

Each little patient is welcomed on arrival at the airport by a volunteer host family. Around 350 French families welcome these children into their homes for between six and eight weeks, after which the children return home cured. At least 250 children from 70 countries were treated in 2019 by the charity, making it an entire network in its own right.

A recipient of the French Legion of Honor and French National Order of Merit, and having more recently been elevated to the rank of Grand Officer of the Legion of Honor, Francine has so far saved more than 3700 children with heart defects.

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