Transferred Technologies

Technology transfers foster a long lasting relationship

between the institute and its industrial partners

Blood Bag

First technology transferred by the Institute

Blood and blood products for transfusion are stored in disposable plastic (PVC) bags, which replaced reusable glass bottles. Being more convenient for use and energy efficient while cooling, plastic bags changed the way in which blood components could be separated and used.

Transferred through NRDC to :

- *Peninsula Polymers Limited (Currently Terumo Penpol), Thiruvananthapuram (1984) www.terumopenpol.com*
- *Hindustan Latex Limited (Currently HLL Lifecare Ltd), Thiruvananthapuram (1991) www.lifecarehll.com*
- *Electro Medical & Allied Industries Limited, Kolkatta (1993)*
- *J.MITRA Industries Limited, New Delhi (1995)*

First Indian presence in the manufacture of blood bags. Around 50 million blood bags manufactured through the technology partners. Exported to around 80 countries. Terumo Penpol is the largest manufacturer of blood bags in Asia.

Mechanical Heart Valve

First Generation

Natural heart valves perform the function of maintaining unidirectional blood flow. They become dysfunctional for a variety of reasons like rheumatic heart disease, ageing etc. Most of these may require complete surgical replacement with artificial devices. Superior haemodynamics, structural integrity, low profile and silent operation have been built into the design. The valve frame is made of a chrome cobalt alloy, the occluder (tilting disc) is made of implant tested surgical grade UHMWPE (Ultra High Molecular Weight Poly Ethylene) and the sewing ring is made of polyester

Transferred to :

- *TTK Pharma Ltd,(1991) (Currently TTK Healthcare Ltd) www.ttkhealthcare.com*

An innovation which combined quality with affordability. 25 years of clinical existence. One lakh implantations in patients across 400 centres in India and abroad.

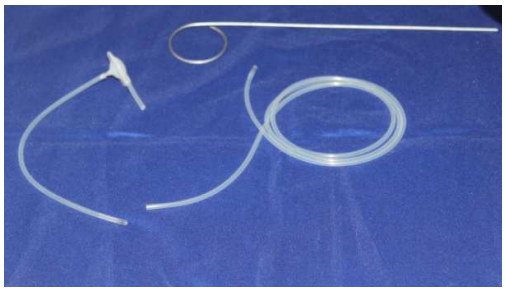
Second Generation mechanical heart valve

The second generation model TTK Chitra Heart Valve TC2 has the following improvements:

- Better minor orifice flow
- MRI compatibility
- Enhanced thrombo-resistance

The product is ready for multicentric clinical trials

Hydrocephalus Shunt



Hydrocephalus is a medical condition in which there is an abnormal accumulation of cerebrospinal fluid (CSF) in the cavities of brain. This may cause increased pressure inside the skull and progressive enlargement of the head, especially in young children. Although it does occur in older adults, it is more common in infants.

Hydrocephalus treatment is surgical, and involves the placement of a tube into the brain cavities to bypass the flow obstruction and drain the excess fluid into other body cavities, from where it gets reabsorbed. Most shunts drain the fluid into the peritoneal cavity.

Transferred to :

- *Hindustan Latex Limited (Currently HLL Lifecare Ltd) (1994) www.lifecarehll.com*

Branded as Ceredrain hydrocephalus shunt.

Ceredrain's Burr hole design enhances easy surgical placement and there is no interference with CT Scan

Bubble Oxygenator & Cardiotomy Reservoir

Bubble Oxygenator is a device used during extracorporeal cardiopulmonary bypass for exchanging oxygen and carbon dioxide in the blood. It serves to replace the work of the lungs during the surgery. The gas exchange takes place directly between blood and oxygen bubbles.

Cardiatomy reservoir is used for collection, filtration and reperfusion of blood from the surgical site.

Transferred to :

- *South India Drugs & Devices Pvt Ltd, (1991), Chennai*
  (Currently SIDD Lifesciences Pvt. Ltd.)
  www.spictra.com

Branded as Spictra Bubble oxygenator and Spictra cardiotomy reservoir.

The second generation membrane oxygenator has also been developed and commercialised.

Concentric needle electrode

Concentric Needle electrode is used to record electromyogram (EMG), which detects the electrical potential generated by muscle cells when activated. EMG is used as a diagnostic tool for identifying neuromuscular diseases, assessing low-back pain, and other muscular disorders.

To perform intramuscular EMG, a needle containing two fine-wire electrodes is inserted through the skin into the muscle tissue. These needle electrodes are high precision disposable devices.

Transferred to :

- *South India Drugs & Devices Pvt Ltd, (1999), Chennai*
  (Currently SIDD Lifesciences Pvt. Ltd.)
  www.spictra.com

Meets clinical requirements for different muscle types and patient profiles ranging from paediatric to adults.

Haemoconcentrator

Patients, especially children, undergoing cardiopulmonary bypass often develop the problems related to fluid over-load in the body.

Haemoconcentrator helps controlling this fluid over-load during cardiopulmonary surgery and considerably minimize the work load on kidneys.

Transferred to :

- *South India Drugs & Devices Pvt Ltd, (1999), Chennai*
  (currently SIDD Lifesciences Pvt. Ltd.)
  www.spictra.com

Membrane Oxygenator

Oxygenator is a device used during extracorporeal cardiopulmonary bypass for exchanging oxygen and carbon dioxide in the blood. It serves to replace the work of the lungs during the surgery.

Membrane oxygenator is the second generation device with improved performance and safety features. It employs microporous hollow fibre membranes for gas exchange. The absence of gas bubbles reduces hemolysis and propensity of air embolism.

Transferred to :

- *South India Drugs & Devices Pvt Ltd, (1995) Chennai*
  (Currently SIDD Lifesciences Pvt. Ltd.)
  www.spictra.com

Sponsored project by the industry.

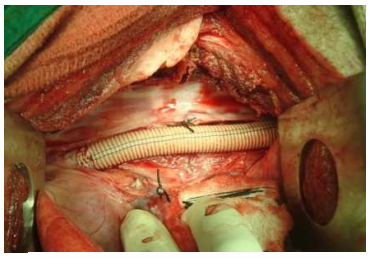
Branded as Spictra Membrane oxygenator

More than a decade of existence in the market.

Vascular Graft

The blood vessels carrying blood from the heart to other organs (arteries) are found to have different diseases like narrowing (coarctaion), weakening of the wall (formation of aneurysms) etc. In such cases, one of the techniques employed is the replacement of that portion of the artery using synthetic tubular devices. Vascular grafts are synthetic porous tubular devices used for replacing such diseased arteries.

Transferred to : *TTK Healthcare Ltd, Thiruvananthapuram (2007)*



Second generation vascular graft

(Fluoropassivated and Hydrogel Sealed Large Diameter Vascular Graft)

Fabric grafts need pre-clotting with patients' blood. For pre-clotting, collection of patient's own blood before surgery is essential. There is a possibility of residual clot formation, hemorrhage, additional surgery and blood transfusion A sealant avoids the need of preclotting of vascular graft. A sealant was coated on the graft that restrict the blood seepage through graft walls immediately after implantation & degrade once the purpose is served. This brings about reduced thrombogenicity and improved healing behavior.

Transferred to : *TTK Healthcare Ltd, Thiruvananthapuram (2016)*

The product is in multicentric trials

Dental composites

Dental composites are types of synthetic resins used in dentistry as restorative material or adhesives. Synthetic resins evolved as restorative materials since they were insoluble, aesthetic, insensitive to dehydration, easy to manipulate and reasonably inexpensive. Dental composites constituting the following four products: Chemical cure, Light Cure, Radiopaque dental composite and Dentine bonding agent.

Transferred to :

- *Anabond Stedman Pharma Research Pvt Ltd (2004), www.anabondstedman.com*

Anabond established an independent facility for the development of the dental composites.

Branded as Restofill.

Glass Ionomer Cement

Glass ionomer cement are dental restoratives used for core build up, luting and restorative applications. It is used for prevention of dental caries. The material has good adhesive property with the tooth and hence it act as dental sealant.

Transferred to :

- *Anabond Stedman Pharma Research Pvt Ltd (2008) www.anabondstedman.com*

Chitosan wound dressing

Chitosan is the material derived from shell of shrimp and other crustaceans. This material has good hemostatic property and hence used for development of wound dressings.

Transferred to :

- *Dynamic Orthopaedics Ltd, Kerala (2004)*

Hydroxyapatite & Bioactive composites for dental and orthopaedic applications

Hydroxyapatite derived materials are used as synthetic bioactive materials for orthopaedic applications due to their molecular structural and compositional similarity with the mineral part of the bone. Porous granule form of hydroxyaptite is a general purpose synthetic bone graft material.

The bioactive composites are a new generation ceramic composites based on hydroxyapatite used for various dental and orthopaedic applications.

There are different variants of the product like hydroxyapatite porous granules, graded porosity buttons for burr-hole closure, ceramic spacer for vertebral laminoplasty, bioactive composite blocks for iliac crest repair, bioactive composite porous blocks and rods etc.

Transferred to :

- *Basic Healthcare Producst (P) Ltd,(2006) Punjab. www.b-ostin.com*
- *IFGL Refractories Ltd, Kolkatta(2011) (both dental & orthopaedic). www.ifglref.com*
- *Dorthom Medidents Ltd, Coimbatore. www.dorthom.com*

The product has excellent bone-bonding and high resorption ability. The material acts as substrate for bone forming cells to proliferate and to lay collagen and bone material.

Branded as: B-Ostin, Grabio Glascera

Basic Healthcare was an entrepreneurial venture with the bioceramic products

Single solution bonding agent'

A single component dental bonding agent for replacing the two component system. This bonding agent carries out the priming and bonding activity together thus making the clinicians job easier.

Transferred to :

- *Anabond Stedmann Pharma Ltd (2006)*

Branded as Stedbond

Chemo Mechanical caries removal agent

The two component chemo mechanical caries removal agent is mixed into a gel and then applied to the decayed tooth. The gel softens the hard decayed material so that it can be partially removed with hand instruments. D-Solv removes only the non-remineralisable layer of dentine caries without affecting the remineralisable layer. minimizes use of the dental drill, it is the best option for patients who are anxious about drilling procedures, especially children.

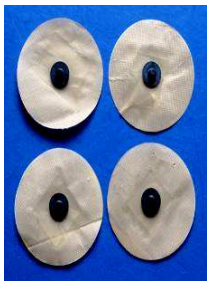
Transferred to :

- *Dr . Toms Laboratory (2008), Calicut.*

Branded as D-solv

Reduces or eliminates the need for the drill and local anesthetics. Dental filling materials bond very well to tooth after treatment with D-Solv.

ECG electrodes



Electrocardiography (ECG) is the process of recording the electrical activity of the heart over a period of time using ECG electrodes placed on the skin. These electrodes detect the tiny electrical changes on the skin that arise from the heart muscle's electrophysiologic pattern.

Transferred to : *Lakshmi Technologies Pvt Ltd, Coimbatore (2008)*

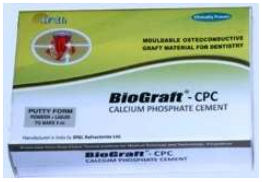
Microparticle based hemostatic chitosan material

Chitosan has excellent hemostatic property. Porous chitosan microparticles are developed as topical hemostat. Chitosan is the material derived from shell of shrimp and other crustaceans.

Transferred to :

- *India Sea Foods (2008)*

Calcium phosphate cement (CPC)



Periodontal defects and periapical cysts are managed in dentistry using bioactive ceramic grafts. However, ceramic materials in fine granule form pose difficulty in transfer in actual clinical situation. A mouldable bioactive cement material will be ideal for this requirement. A self-setting putty which solidifies into bone mineral has been designed for the purpose. This is a mouldable self setting material with powder and liquid components. On mixing, it will form a putty which will set into hydroxyapatite.

Transferred to :

- *M/s. IFGL Bioceramics Ltd (2010)*

CPC is highly useful in filling periodontal bony defects as it is easy to build up the contours. Also useful in filling cysts, as the cement could be transferred through minimal opening.

Polyurethane potting compound

The know-how on polyurethane potting compound for the fabrication of extracorporeal devices.

Transferred to :

- *M/s. NAL Medical devices India Private Limited(2011)*

Water curable polyurethane resin compound for the fabrication of orthopedic casting tapes

Orthopaedic bandages made from plaster of Paris using conventional methods have disadvantages such as heavy weight, which gives pain to the patient. The resin compound impart characteristics viz. lesser weight, strong and thin, drapable, not abrasive, easy to cut, having a low exotherm and setting time, good breathabilty and transparent to X-rays.

Transferred to :

- *Makim Med-Aids, Vadodara. (2010)*

Field kit for detecting antibiotic sensitivity of mastitic milk

Mastitis in dairy cattle is the persistent, inflammatory reaction of the udder tissue. This potentially fatal mammary gland infection is the most common disease in dairy cattle.

The device is a field kit which is cost effective, quick and convenient solution for testing antibiotic sensitivity in mastitic milk

Transferred to :

- *Institute of Animal Health & Veterinary Biologicals (IAHVB), Department of Animal Husbandry (2007) , Govt. of Kerala.*
- *Himedia Laboratories Pvt Ltd, Mumbai(2010)*

Branded as Mastitest

Nano fibre electrospinning station

Electrospinning station was developed by the design inputs from the Institute.

Transferred to :

- *Holmarc Opto-Mechatronics Pvt Ltd, Kerala(2012)*

Intrauterine system (IUS)

Most modern way of contraceptive device. Levonorgestrel releasing IUS which is expected to last for at least 3 years inside the patient.

The Levonorgestrel Intrauterine Delivery System (IUS) is reported to effectively prevent pregnancy and also can be used for the treatment of heavy menstrual bleeding for women.

Transferred to :

- *HLL Lifecare Ltd (2012)*
  www.lifecarehll.com.

Branded as Emily.

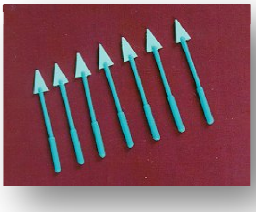
Calcium sulfate Cement

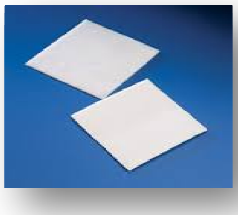
Bioactive Calcium Sulfate is a bone filler material in cement form, supplied as powder-liquid combination and forms self-setting putty upon mixing. The material with bioactive and resorbing properties enables the remodelling of bone defects.

Transferred to :

- *M/s. G. Surgiwear Limited, Uttar Pradesh (2016)*

PVA sponge





A lint free sponge which can be used as such and/or manipulated with the help of tweezers or can be attached to a malleable handle. These are single use only, sterile devices designed for tissue manipulation and fluid management.

Transferred to :

- *FDC Ltd, Maharashtra (1996)*
- *M/s. G. Surgiwear Limited, Uttar Pradesh (2016)*

PVA sponge swells to 8 times its volume.

Process for Gluteraldehyde treated bovine pericardium

The technical know how for the process of manufacture of glutaraldehyde cross-linked pericardium was developed. The cross-linked pericardium fabricated by this process can be used as a cardiovascular patch or for application in right ventricular outflow tract reconstruction.

Transferred to :

- *M/s. G. Surgiwear Limited, Uttar Pradesh (2016)*

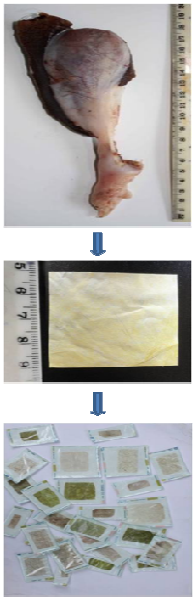
Fibrin Sealant

This fractionated plasma product meets listed specifications in the European/Indian Pharmacopoeia (IP) & WHO regulations for efficacy and safety, respectively. The product kit comprises mainly lyophilized fibrinogen and thrombin with >1y storage stability till reconstitution, just prior to use, in respective solvents included in the kit. Dual syringe applicator assembly in the kit ensures optimum mixing and the clot forms within 2-5s. Intended applications of Fibrin Sealant could be as biological soft tissue adhesive, as adjunct to surgical sutures and/or to promote haemostasis. The Know-How aims at producing Fibrin Sealant from small batch pools of plasma.

Transferred to :

- M/s. Zum Heilen Healthcare Private Limited (2017)

Process for preparation of extracellular matrix scaffolds from mammalian cholecyst/jejunum/urinary-bladder



Tissue engineering scaffolds of mammalian origin, prepared out of extracellular matrices of several organs/tissues have found very good clinical uses. The biomaterial quality of these scaffolds depends on the donor species, source organ/tissue, the technique used for preparation of the scaffold and modality for terminal sterilization/storage. The current technology on transfer is based on a non-detergent/enzymatic method for preparing extracellular matrix scaffold from cholecyst, jejunum and urinary bladder They are prepared as thin sheets of variable sizes (about 4cm x 4cm) with thickness less than 200µm. These scaffolds find application in fabricating wound healing matrix, skin-grafts, cornea-repair graft and hernia repair graft.

Transferred to :

- M/s. Optimus Life Sciences (2017)

Rapid diagnostic kit with antibiogram for Urinary Tract Infections

Urinary tract infections (UTIs) conventionally diagnosed by microbiological culture and the culture result and antibiogram require a waiting period of about 48 hours. Chitra rapid diagnostic kit for detection of UTI, which can be used in a primary health centre with little or no sophisticated facility or trained microbiologists. This also gives an antibiogram that will aid appropriate antibiotic for treatment.

Transferred to :

- M/s. Agappe Diagnostics Limited (2017)