

## 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](http://www.terumopenpol.com)
- *Hindustan Latex Limited (Currently HLL Lifecare Ltd), Thiruvananthapuram (1991)*  
[www.lifecarehll.com](http://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

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### 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](http://www.ttkhealthcare.com)

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

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### Second Generation mechanical heart valve



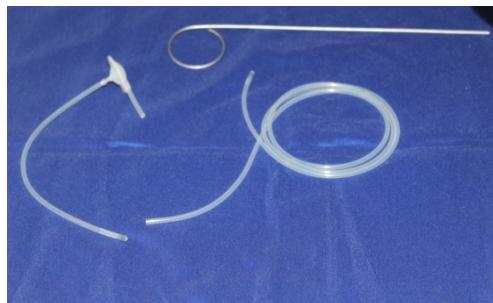
The second generation model TTK Chitra Heart Valve TC2 has the following improvements:

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

The product is ready for multicentric clinical trials

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## 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](http://www.lifecarehll.com)

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Branded as Ceredrain hydrocephalus shunt.

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

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## 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.

Cardiotomy 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](http://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](http://www.spictra.com)

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

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## 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](http://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](http://www.spictra.com)

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Sponsored project by the industry.

Branded as Spictra Membrane oxygenator

More than a decade of existence in the market.

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## Vascular Graft



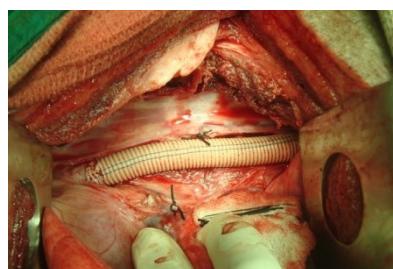
The blood vessels carrying blood from the heart to other organs (arteries) are found to have different diseases like narrowing (coarctation), weakening of the wall (formation of aneurysms) etc. In such cases, one of the techniques employed is the replacement of that portion of the artery using synthetic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

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Transferred to : TTK Healthcare Ltd, Thiruvananthapuram (2007)

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### 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.




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Transferred to : TTK Healthcare Ltd, Thiruvananthapuram (2016)

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The product is in multicentric trials

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## 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](http://www.anabondstedman.com)

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

Branded as Restofill.

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## 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](http://www.anabondstedman.com)

## Chitosan wound dressing

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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)*
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## 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 hydroxyapatite 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 Product (P) Ltd, (2006) Punjab. [www.b-ostin.com](http://www.b-ostin.com)*
- *IFGL Refractories Ltd, Kolkatta (2011) (both dental & orthopaedic). [www.ifglref.com](http://www.ifglref.com)*
- *Dorthom Medidents Ltd, Coimbatore. [www.dorthom.com](http://www.dorthom.com)*

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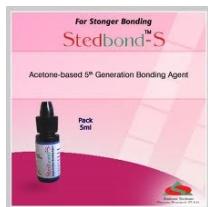
The product has excellent bone-bonding and high resorption ability. The material acts as substrate for bone forming cells to proliferate and to lay collagen and bone material.

Branded as: B-Ostin, Grabio Glascera

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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)*

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*Branded as Stedbond*

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## 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.*

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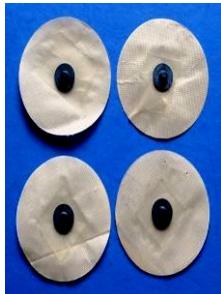
*Branded as D-solv*

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

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## 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)*

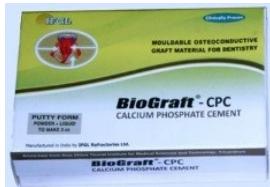
## Microparticle based hemostatic chitosan material

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)*

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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.

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## 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 )*
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## 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 breathability 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](http://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.*

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## Process for Glutaraldehyde 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 200 $\mu$ m. These scaffolds find application in fabricating wound healing matrix, skin-grafts, cornea-repair graft and hernia repair graft.

Transferred to :

- M/s. Alicorn Medical Private Limited (2017)

Technology partner Incubated at SCTIMST - TiMed

## 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)

In translation stage

## Vein Veiwer



Locating veins is the first step to a successful venipuncture procedure. In many cases, especially with less skilled nursing staffs, multiple pricks are done and infection is common and the task becomes highly challenging for pediatric cases. Chitra Vein Viewing system is developed to cater the need of the nursing staffs to locate the clinically relevant veins for adults and pediatric patients. The handy system with high quality display uses state of the art technology to detect blood vessels.

Transferred to :

- M/s. Agappe Diagnostics Limited (2017)

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Branded as Mispa View

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## **Beta Tricalcium Phosphate & 60% synthetic Hydroxyapatite and 40% Beta Tricalcium Phosphate**



Bone fillers are in regular use in day-to-day orthopedics and dentistry to cover the additional gaps of implant or graft placement. Calcium salts are preferred rather than ceramic material for bone filling purpose. The advent of calcium phosphate cement was a significant development because it gave a mouldable, resorbable and bioactive material for filling applications. This cement helps in the management of bone defects in bone, spine and maxillofacial structures.

Transferred to :

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- M/s. Onyx Medicals Pvt Ltd (2017)

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Branded as Fraclink

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## **Injectable hydrogel for potential applications in cartilage repair and growth plate defects**

The product has potential application for cartilage repair .The gel is a two component system. The technology also includes the applicator through which the two component system can be easily injected to the site. The two components when mixed



together gels at a faster rate thus providing a better matrix. The hydrogel can be used independently as a matrix support or with cells where the gel would act a vehicle for impregnation of the cells.

Transferred to :

- M/s. Phraction Scientifics Pvt Ltd (2018)

In translation stage. The industry partner is incubated in SCTIMST-TIMed.

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### **PT/INR monitoring device**



Anticoagulant therapy is the only available option for patients with heart diseases, heart valve replacement, history of strokes, deep vein thrombosis and the like. In order to maintain the blood clotting, Prothrombin time monitoring is must in all such cases. Due to the need of a regular monitoring; a handheld POC device is required at patient site/home. Chitra PT INR monitoring devices works on a novel image processing technology and analyzes the direct blood clotting unlike other commercial available devices where indirect methods are used for the detection.

Transferred to :

- M/s. Agappe Diagnostics Limited (2019)

In translation stage

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## Testing device for Tuberculosis diagnosis



One of the most challenging aspect of tuberculosis control is early diagnosis. There are several unmet needs in TB diagnosis including necessity for an accurate and rapid technique which is affordable, simple and able to generate same-day result at point of care (POC). The current techniques like smear microscopy, Xpert MT/RIF assay and TB lipoparabinomannan antigen test, however, do not fulfil the above requirements. It is essential to develop and roll-out cost effective POC test for TB for early diagnosis. This invention mainly intended to Primary health care setup for fast and accurate diagnosis of TB.

Transferred to :

- M/s. Agappe Diagnostics Limited (2019)

In translation stage

## Lint free absorbent wound dressing



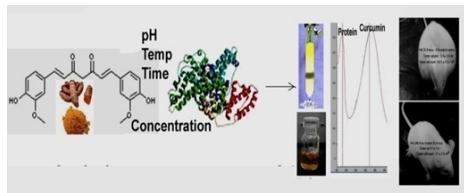
This is a non adherent and absorbent external wound dressing which is soft and pliable keeping the wound moist. Aimed at low to moderately exuding chronic wounds and surgical wounds. They can be tailored to different sizes and shapes for specific applications.

Transferred to :

- M/s. Phraction Scientifics Pvt Ltd (2019)

In translation stage. The industry partner is incubated in SCTIMST-TIMed.

### SCTAC2010 Albumin conjugated with drug



The Product involves conjugating pharmacopoeia grade human albumin and commercially available pure drug. This conjugation process increases the drug solubility by 100 fold. The major highlight of this Product is the use of Albumin, the most abundant protein in human blood which has good half-life in circulation. Through animal experiments the conjugate is proven to be safe for intravenous (IV) administration.

Transferred to :

- M/s. Eightoaksbio Private Limited (2019)

### Calcium phospho silicate composite



Calcium Phospho-silicate Composite (denoted as HA-BG, indicating hydroxyapatite and bioactive glass composite) is a bioactive ceramic material. This contains a combination of calcium silicate and calcium phosphates phases, including hydroxyapatite. The fine granules (less than 1 mm size grade) are useful for the defects in the alveolar, mandibular or maxillary bone. It be helpful for healing periodontal and furcal defects (arising out of periodontitis), periapical cysts and

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infra-bony lesions.

Transferred to :

- M/s. Prevest Denpro Limited (2019)
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In training stage

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## Bioactive bone cement based on calcium sulfate

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The product BIOACTIVE BONE CEMENT (denoted as BioCaS) is a calcium sulfate based bioactive material intended for bone defect filling applications in dentistry. BioCaS cement has applications in dentistry as an osteoconductive graft material. It is useful in the repair of infrabony defects seen as 'periodontal pockets' and also in filling periapical cysts. BioCaS cement is indicated for alveolar ridge reconstruction, endodontic perforation repair and extraction socket filling.

Transferred to :

- M/s. Prevest Denpro Limited (2019)
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## Left Ventricular Assist Device

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Congestive heart failure is a common cause of death worldwide and can occur when heart becomes terminally ill. Heart transplantation and support with mechanical heart assist devices are the only available

options of treatment under such conditions. Chitra pLVAD is a third generation, centrifugal pump based heart assist device, with hybrid magnetic / hydrodynamic bearing, Brushless DC (BLDC) motor, controller, battery pack, charger and software.

Transferred to :

- M/s. Meril Lifesciences Pvt Ltd (2019)

In translation stage

## Blood flowmeter



The Chitra Blood Flow Meter is a portable battery-operated blood flow meter with very high sensitivity, zero warm up time, minimum signal drift, lower heat dissipation and power losses for measuring flow of blood or conductive fluids in an extracorporeal circuit during bypass surgeries. The blood flow meter consists of a flow tube sensor and an instrument to measure the flow of blood passing through the flow tube sensor. The flow tube sensor is attached to the extracorporeal circuit and inserted into the flow meter. The device displays the flow of blood in its display unit as liters/min.

Transferred to :

- M/s. enPRODUCTS Pvt Ltd, (2020)

In translation stage

## External Pneumatic Compression Equipment (EPCE)

Deep Vein Thrombosis, or deep venous thrombosis,



(DVT) is the formation of a blood clot (thrombus) in a deep vein, predominantly in the legs.. Pulmonary embolism, a potentially life-threatening complication, is caused by the detachment (embolization) of a clot that travels to the lungs. Together, DVT and pulmonary embolism constitute a single disease process known as venous thromboembolism. Post-thrombotic syndrome, another complication, significantly contributes to the health-care cost of DVT. One of the well-established treatment methods to prevent deep vein thrombosis is the sequential compression technique using external cuff. The Product is EXTERNAL PNEUMATIC COMPRESSION EQUIPMENT(EPCE) for prophylaxis treatment for DVT (Deep Vein Thrombosis).

Transferred to :

- M/s. enPRODUCTS Pvt Ltd, (2020)

### Atrial Septal Defect closure device(Occluder)



Aortic Septal Defect is the most common type of heart disorder at birth.. Occluder is a Double umbrella device develop using superelastic alloys. Novel hub less design which promotes better healing and a ridge for softer edge. Delivery system has also been designed with a novel release mechanism to prevent any transmission of force to the device during its release.

Transferred to :

- M/s. Biorad Medisys (2020)

Developed in collaboration with National Aerospace Laboratories, Bangalore (CSIR-NAL)

### **Flow diverter stent**



Development using superelastic alloys. Used for diverting blood flow away from the aneurysms (localized ballooning, bulging or dilation of arteries in the brain) thereby helping reduce the blood flow into the aneurysm as well as its chances of rupture and promote the healing of the aneurysm. Novel design with kink resistance and improved radial strength through a novel braiding pattern, with minimal loss in flexibility

Transferred to :

- M/s. Biorad Medisys (2020)

Developed in collaboration with National Aerospace Laboratories, Bangalore (CSIR-NAL)

### **Infant warming wrapper and bassinet.**



Infant warming Wrapper /Bassinet is suitable for maintaining the body temperature of infants. The Bassinets are useful in hospitals where especially premature babies are treated. The portable Wrapper is intended for maintaining the body temperature of infants at home and in transit. The infrared radiations emitted by an array of LEDs under the soft padding behind the baby provide the required heat. The wrapper is provided with a battery for the operation. In both the wrapper and the Bassinet

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temperature is maintained by a closed loop controller

*Transferred to :*

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- *M/s. Kerala State Electronics Development Corporation (KELTRON) (2021)*
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*In translation stage*

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### **Automatic Smart Trash Bin for Disinfection Using UV Enabled Microwave (Astra)**



Automatic Smart Trash Bin For Disinfection Using Uv Enabled Microwave (Astra) which is a Remote Controlled Non touch opening dust bin with integrated disinfection based on UV light for infection control in COVID - 19 outbreak is developed for disinfection using a combined system that involves UV enabled microwave disinfection. It would be advantageous and safer to collect and disinfect the various hospital waste in the wards and ICU at the collection point and enable safe transport to places for disposal. More over the proposed technology can also be used outside hospital settings like mobile units, ambulances, isolation areas etc.

*Transferred to :*

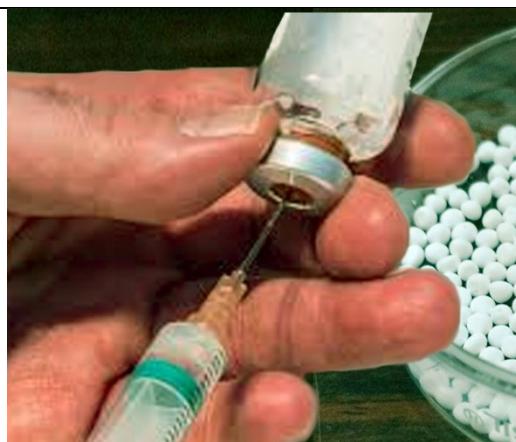
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- *M/s. Forsta Meditech Private Ltd (2022)*
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*In translation stage*

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### **Drug Eluting Bioactive Calcium Sulfate Cement**

A patented technique of making HA-TCP bioactive beads intended for drug delivery in bone infections (osteomyelitis) has been developed. The specially designed process allows the formation of globular shapes when a calcium phosphate slurry in a specific composition is dropped on a super-hydrophobic powder bed. The dried 'green globules', upon firing at high temperatures, form ceramic beads having multi-modal porosity (from micro to



nano sized pores, in a graded manner). Drugs in liquid form could be loaded in them through vacuum-impregnation method and implanted at the infected site. After achieving the infection control through drug delivery, the beads will remain at the site as osteoconductive and resorbable grafts which will integrate with the bone. It avoids the removal surgery and enhances defect healing.

Transferred to :

- *M/s. Onyx Medicals Pvt Ltd (2022)*

In translation stage

### **Liquid embolic agent**



Liquid Embolic Agent (LEA) is a neurological implant device supplied as a prefilled syringe with one ml liquid in it . The liquid is a brownish X-ray opaque polymer solution meant to be injected into the abnormal blood vessels of the brain through microcatheters by an experienced interventional radiologist. On injecting LEA, the vessels get embolized, i.e., blocked, by precipitation of the polymer. The solvent will diffuse into the blood stream and escapes through the lungs. The polymer is biocompatible and non-degradable and acts as a permanent implant occluding the abnormal blood vessels of the brain.

Transferred to :

- *M/s. Biorad Medisys Pvt Ltd (2022)*

In translation stage

### Bioactive HA-TCP ceramic beads for drug delivery



HA-TCP bioactive beads are intended for drug delivery in bone infections (osteomyelitis). The specially designed process allows the formation of globular shapes when a calcium phosphate slurry in a specific composition is dropped on a super-hydrophobic powder bed. The dried 'green globules', upon firing at high temperatures, form ceramic beads having multi-modal porosity (from micro to nano sized pores, in a graded manner). Drugs in liquid form could be loaded in them through vacuum-impregnation method and implanted at the infected site. After achieving the infection control through drug delivery, the beads will remain at the site as osteoconductive and resorbable grafts which will integrate with the bone. It avoids the removal surgery and enhances defect healing.

Transferred to :

- M/s. Onyx medicals Pvt Ltd (2023)

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In translation stage

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