



Cardiology & Pulmonology



Accessibility for the public to the Emergency Management System, to adequate radio space for providers to communicate with each other in spite of disaster, communications is the epitome of EMS.



Interventional Cardiology now obviates the need for a surgery in most cases

DEPARTMENT OF CARDIAC CARE



FOREWORD: CARDIOLOGY

The Department of Cardiology & Cardiothoracic Surgery is always there with you in your journey from diagnosis to recovery and ensure that you get back to normal life. This Department has specially trained group of experienced cardiothoracic surgeons, cardiologists, critical care specialists, cardiac nurses and technologists who work collaboratively to diagnose and treat all types of heart diseases. We believe in evidence-based approach in the diagnosis & treatment of heart ailments.

At Virinchi Hospitals your heart is in safe hands and with every passing day you have every reason to feel healthy, stronger and more active.





Dr. Sumeet Sinha
MBBS, MD, DM (Cardiology)
Sr. Consultant Interventional Cardiologist
Head Department of Cardiology

Dr. Sumeet Sinha is our Senior Consultant Interventional Cardiologist at Virinchi Hospitals. He has more than 20 years of Interventional Cardiology experience. He performed more than 10000 invasive & non-invasive procedures to date. He specializes in Trans-radial Angiography, Angioplasty, Stenting with special interest in Complex Interventions, Device Closures and Valvuloplasties. He has worked as a Consultant Cardiologist at Medicit Hospital; Senior Consultant Cardiologist at Global Hospital; and Senior Consultant Cardiologist at Kamineni Hospital, Hyderabad.



Dr. Ashish K. Nema
M.D., D.N.B. (Cardiology), F.A.C.C.
Sr. Consultant & Interventional Cardiologist

Dr. Ashish Nema is Sr. Consultant & Interventional Cardiologist at Virinchi Hospitals. He has an overall 15 years of experience in department of Cardiology. He started his professional career with Indraprastha Apollo Hospital, New Delhi in 2002 as senior resident in department of Gastroenterology and Cardiology. He worked in Apollo Hospitals for a couple of months and moved to other hospitals in the same year. By the end of year 2002, he joined Netaj Subash Chandra Bose Medical College as assistant professor in department of General Medicine and worked for five years.

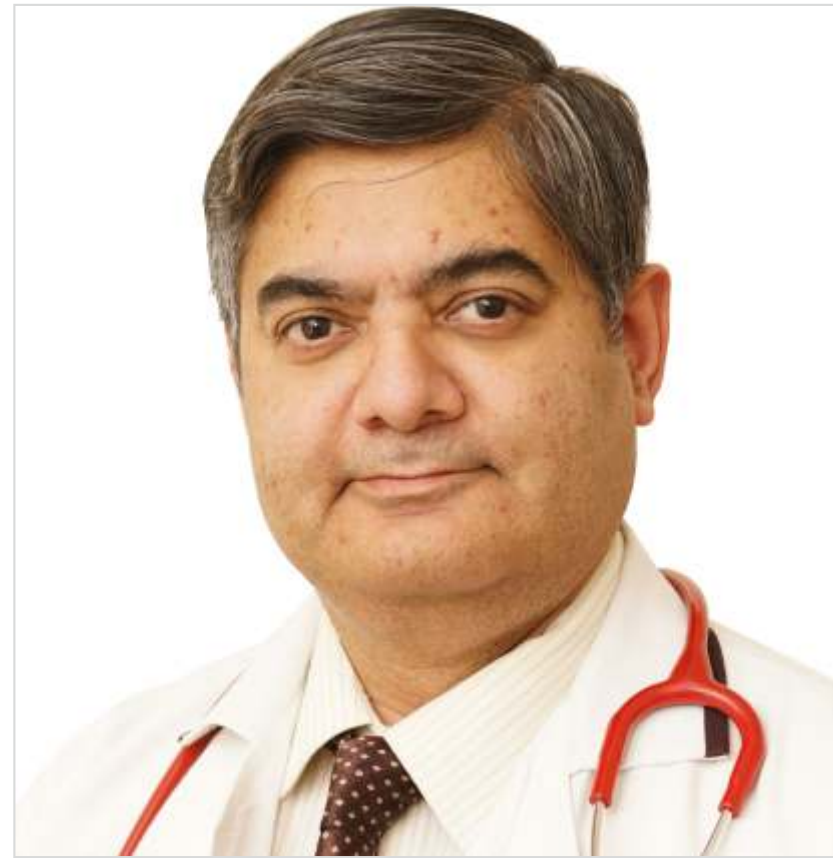
From 2007 to 2010, Dr. Ashish finished his Fellowship in Cardiology (D.N.B.) from Care Hospitals, Hyderabad. He continued at Care Hospitals as Junior Consultant for another year in department of Cardiology. Later, he moved to Kamineni Hospitals as Consultant Cardiologist and worked till year 2014, after which he worked for Olive Hospital as Consultant Cardiologist in department of Cardiology till 2017.



Dr. Deepak Kumar Saha
MBBS, MD (Medicine), DNB (Cardiology), MNAMS
Sr. Consultant Interventional Cardiologist

Dr. Deepak Kumar Saha is a Senior Consultant Interventional Cardiologist in the Department of Cardiology at Virinchi Hospitals. He has worked as Asst. Professor Cardiology, NIMS, Hyderabad and Senior Consultant Cardiologist, Kamineni Hospitals, Hyderabad. He has immense experience in Coronary Angioplasty including complex procedures along with Peripheral and Carotid Angioplasties. He has expertise in Echocardiography including 3 D Echocardiography, and TEE. He is trained in PBMV, Balloon Pulmonary and Aortic Valvuloplasty. He has special interest in device closures and has successfully implanted pacemakers, Implantable Cardioverter Defibrillator (ICD) and Cardiac Resynchronization Therapy (CRT) devices (He underwent training in Milan, Italy). He has quite a few Endovascular Aneurysm Repair of Aorta (EVAR) to his credit as well.

Dr. Saha has won Vaidya Ratna Award by Mother Foundation. He has published several research papers in journals of repute. He was involved in several multinational clinical trials as a principal and co-investigator and delivered case studies, presentations, and seminars.



Dr. Avinash Dal

MBBS, MS (Gen Surgery), M Ch (CTVS)

Chief Cardiothoracic and Vascular Surgeon of Cardiology

Dr. Avinash Dal is our Chief Cardiothoracic and Vascular Surgeon at Virinchi Hospitals – The Heart Center. In his career span of over 21 years, Dr. Dal has successfully performed more than 9000 cardiothoracic and vascular surgical procedures. He has extensive hands-on experience in Off-pump Coronary Artery Bypass Surgery, Minimal Access Cardiac Surgery, Thoracoscopy [VATS], Mediastinoscopy, Aneurysm Surgery for Aortic Dissections and Endovascular Repair. Dr. Dal holds the distinction of performing the 1st Elective Autotransplantation of the heart [BENCH CARDIAC SURGERY] in 1997; for end-stage heart disease and Battista Operation [Reduction Cardiomyoplasty] for dilated cardiomyopathy in 1999. Dr. Dal introduced the VATS (Video Assisted Thoracoscopic Surgery) program in 2000 and has so far performed over 1800 VAT surgeries. In 2004, Dr. Dal performed CON CAB (Conscious coronary artery bypass) for the first time in the state. He pioneered the Minimal Access Cardiac Surgery program at Apollo Health City, Hyderabad in 2007 and performed EVAR (Endovascular Aneurysm Repair of Aorta) in 2008.

FOREWORD: CARDIOVASCULAR & CARDIOTHORACIC SURGERY

Virinchi Hospitals' Cardiovascular unit is known for its outstanding capabilities to treat full range of cardiovascular disorders, conditions and diseases. Clinically, the team very well manages individuals of all age groups with variety of cardiovascular disorders and are also known for performing minimally invasive surgical procedures, implantation of mechanical heart devices, application of improved heart valves, etc. with highest probability for success and decent prognosis.

Virinchi Hospitals' Cardiothoracic Surgery department provides highly specialised treatment for patients with heart, lungs and chest diseases or disorders or conditions. The services include cardiac surgery, thoracic surgery, heart and lung transplantation, and adult congenital heart diseases. The team of cardiothoracic surgeons work continuously and collaboratively with cardiologists, vascular surgeons and interventional radiologists using highly advanced imaging and diagnostic procedures to provide heart and lung patients with the highest level of safety, efficiency, comfort, accuracy with best in practice patient care & experience.



Dr. Biswajeet Mohapatra

MBBS, MS, MCh (CTVS)

Junior Consultant, Cardiothoracic and Vascular Surgery

Dr. Biswajeet Mohapatra is our Jr. Consultant in department of Cardio Vascular and Thoracic Surgery at Virinchi Hospitals. He has an overall experience of 3 years before joining Virinchi Hospitals. He worked as Registrar in Surgery at Apollo Hospitals, Bhubaneswar, in 2010-2011. After completing his three year residency program (MCh) in Cardio Vascular and Thoracic Surgery at IPGMER & SSKM Hospital, Kolkata, he joined as Junior Consultant in that department at Apollo Hospitals, Hyderabad in 2014.

After completing MBBS in 2005, Dr. Biswajeet did one year internship in SCB College Hospital, Cuttack. It followed with three year Residency in General Surgery at same college. He passed his MS in General Surgery in 2010 from SCB Medical College. He has also contributed to lot of publications and attended many national conferences.



Dr. Kiran Kumar Uppala

M.B.B.S, MD (Anaesthesiology)

Consultant Cardiac Anaesthesiologist

Dr. U. Kiran Kumar is our Consultant Cardiac Anaesthesiologist in the Department of Anaesthesia and Pain Management Centre at Virinchi Hospitals. He has overall 12 years' experience in his field. Prior to joining Virinchi Hospitals, he worked as a Senior Registrar at NIMS Hospitals and Consultant Cardiac Anaesthesiologist at Care Hospitals. Dr. Kumar believes in better care and safety during preoperative and post-operative periods for high risk cardiac patients. Non-invasive and invasive, interventional procedures, ultrasound-guided venous catheterization and regional anaesthesia, percutaneous tracheostomy and central venous catheterizations are his areas of interest.



Dr. Dnyanesh Chauhan

MBBS, PGDCC

Clinical Cardiologist

Dr. Dnyanesh Chauhan is our Clinical Cardiologist in the Department of Cardiology at Virinchi Hospitals. He has overall five years' experience in cardiology. Prior to joining Virinchi Hospitals, he worked as a Senior Resident at RLKC Metro Hospital, Heart Centre New Delhi and Kamineni Hospital, Hyderabad. He is well-versed in all aspects of cardiology and has developed many clinical skills over the years. As a Clinical Cardiologist, he has been trained in non-invasive evaluation of cardiac patients with hands-on experience in various diagnostic modalities including ECG, TEE, TMT and Echocardiography. As a Clinical Cardiologist, he provides routine outpatient care, manages cardiac emergencies and ICCU patients independently. He is adaptable, self-motivated, and loves playing cricket, travelling, cooking, web browsing and chatting with friends in his leisure time.



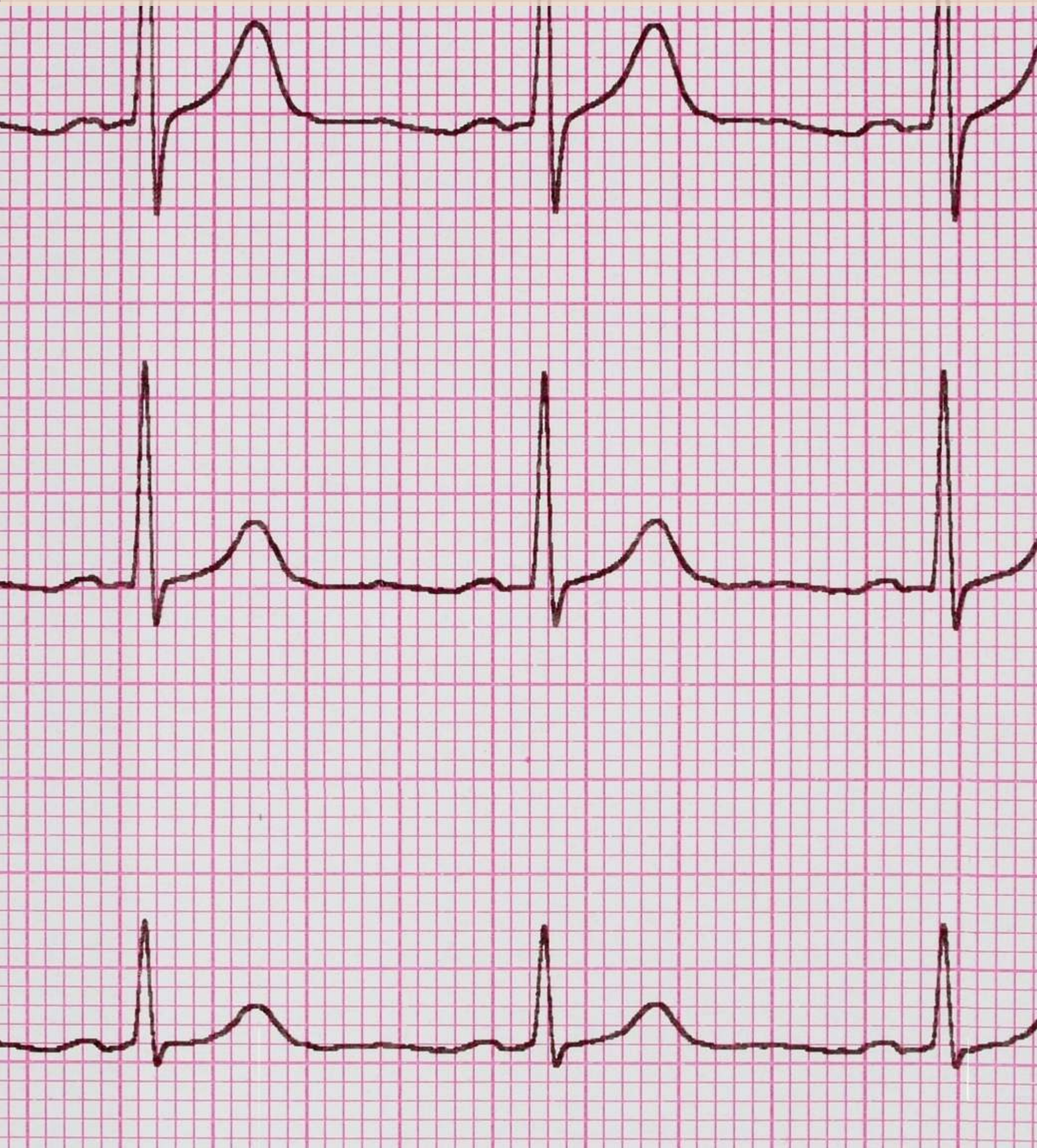
Dr. Kaveri Kurapati

MBBS, PGDCC

Associate Cardiologist

Dr. Kaveri Kurapati is our Associate Cardiologist in the Department of Cardiology at Virinchi Hospitals. She has overall three years' experience in cardiology. Prior to joining Virinchi Hospitals, she worked at Apollo Hospitals, and Usha Mullapudi Hospital. She is well-versed in all aspects of cardiology and has developed many clinical skills over the years. As a Clinical Cardiologist, she has been trained in non-invasive evaluation of cardiac patients with hands-on experience in various diagnostic modalities including ECG, TEE, 2D Echo, TMT, Dobutamine Stress Test, Echocardiography, 3D Echocardiography, and Electrocardiography. As a Clinical Cardiologist, she provides routine outpatient care, manages cardiac emergencies and ICCU patients independently. She is caring, compassionate and enjoys her profession as a Clinical Cardiologist.

Evaluate your heart waves periodically to stay in rhythm



Dr. Arun Kumar Nagelli

MBBS, PGDCC

Clinical Cardiologist

Dr. Arun Kumar Nagelli is our Associate Clinical Cardiologist in the Department of Cardiology at Virinchi Hospitals. He has overall five years' experience in his field. Prior to joining Virinchi Hospitals, he worked as a cardiologist at Maxcure Hospitals. He has hands-on experience in 2D Echo-cardiography, DSE, TEE, TMT, Holter reporting and ICU management. He is proficient in managing cardiac ICU, cardiac emergencies like acute Myocardial Infarction (MI), arrhythmias, acute pulmonary edema, heart failure, etc. Non-invasive cardiology is his area of interest. He believes that stem cell therapy and nanotechnology would have a huge bearing in cardiology and Virinchi Hospitals is well placed in this area with its state-of-the-art futuristic technology, equipment and medical infrastructure.



Dr. P. Thirupathi Swamy

MBBS, PGDCC

Clinical Cardiologist

Dr. Thirupathi Swamy is our Clinical Cardiologist in the Department of Cardiology at Virinchi Hospitals. He has overall six years' experience in medicine including three years in cardiology. Prior to joining Virinchi Hospitals, he worked in the Department of Cardiology at Apollo Hospitals and Yashoda Hospitals, respectively. His areas of interest include ECG, 2D Echo, ICU Management, management of cardiac diseases and Cath Lab procedures. Over the years he has developed clinical skills in cardiology and is well-versed in all aspects of cardiology including non-invasive evaluation of cardiac patients. Dr Thirupathi Swamy possesses hands-on experience in different diagnostic modalities including TMT, ECG, TEE, dobutamine Stress test, Echocardiography, 3D Echocardiography and electrocardiography. As a Clinical Cardiologist, he handles ICCU patients independently and manages cardiac emergencies in addition to providing routine outpatient care.



3T FUNCTIONAL MAGNETIC RESONANCE IMAGING

Magnetic Resonance Imaging (MRI) is a medical imaging technique used in radiology to image the anatomical structures and the physiological processes in healthy and affected individuals. MRI scanners use strong magnetic fields, radio waves, and field gradients to generate images of the body. The MRI with 3tesla capability at VH is the first in the country ever to offer advanced imaging features with exceptional anatomic detail.

HOW CAN MRI SCAN BE ANY DIFFERENT?

- Increased bore space to reduce anxiety in claustrophobic patients
- Smart software to reduce retakes, increase consistency and exam speed
- Digital coil design greatly reduces coil weights and leads to less patient repositioning in many exams
- Ambient light ring on the magnet façade and adjustable, in-bore lighting enhance the openness of the system
- Patient-perceived gradient acoustic noise is reduced by more than 80%

CARDIAC IMAGING MADE EASY THROUGH 3T MRI

- 3.0T with dStream and Elite cardiac clinical solutions advances cardiac MR workflow to mainstream use
- Powerful clinical tools such as kt-BLAST, PSIR, and volumetric imaging for cutting edge, one stop cardiac MR exams
- Supporting dStream coil solution and wireless VCG for high quality cardiac imaging
- Workflow support tools such as real time interactive planning and cardiac explorer for task-guided processing including automated segmentation, screen layout and reporting
- Advanced cardiac imaging applications include myocardial perfusion and viability studies



CARDIAC CATHETERIZATION LAB

A cardiac catheterization lab, also known as a “cardiac cath lab,” is a specialised examination room for carrying out minimally invasive examinations and procedures to diagnose and treat cardiovascular conditions.

The CATH lab at Virinchi hospitals offers a variety of diagnostic and interventional cardiology procedures used in the treatment of coronary artery and peripheral vascular disease.

The catheter navigation system is designed to assist physicians performing interventional procedures with more precision and control, especially in difficult to reach areas of the heart.

HOW CAN A CATH REPORT BE ANY DIFFERENT?

- Detector technology with 2k resolution captures images that are four times more detailed than conventional x-rays system
- 3D coronary angiography is an exceptional interventional tool for cardiac imaging as it helps in avoiding misrepresentations of lesions and their bifurcations
- 3D brings together advanced image acquisition and visualization tools, multimodality access, haemodynamic monitoring and integrated reporting

Intra Vascular ultrasound + FFR

- Intra Vascular Ultrasound (IVUS) Catheters offer plug and play simplicity for immediate imaging
- Fractional Flow Reserve (FFR) Lesion Assessment provides high fidelity pressure sensor and enables quick, accurate and reliable measurements to assess lesion severity
- ChromaFlo® Stent Apposition Assessment Clearly identifies stent mal-appositions and confirms minimum lumen Cross sectional area (CSA)
- VH® IVUS Plaque Characterization Classifies plaque into 4 tissue types
- Core Mobile provides clarity of approach with excellent results in a single suite of imaging & physiology analysis

KEY ADVANTAGES

- **Advanced treatment:** High quality fluoroscopy and dynamic 3D road map can further enhance the navigation which results in reduced x-ray dose and contrast medium
- **Integrated ultrasound solutions:** The Allura Exam room display provides premium ultrasound image quality which decreases procedure time and provides diagnostic information immediately
- **Speeding up archive and reports:** With ViewForum, post processing can be performed while the patient is being examined and treated; thereby improving lab efficiency with medical reports sharing feature via email



128-SLICE COMPUTED TOMOGRAPHY SCAN

The radiology department at Virinchi Hospitals is equipped with the latest Computed Tomography Scanner which is the 1st "Volume Spectral Computerized Tomography (CT) Technology" designed to improve small lesion detection, tissue characterization and metal artifact reduction, with a simplified workflow. It scans and combines a series of X-Ray images taken from different angles and uses computer processing to create cross-sectional images of heart. Cardiac CT helps to visualize heart anatomy, coronary circulation and arteries with or without Intra Venous (IV) contrast dye.

HOW CAN CT SCAN BE ANY DIFFERENT?

- 128 slice CT has sensitive detection technology (Gemstone), which is by far the best innovation and the first new detector material in the past two decades, as far as high definition scanning with less noise is concerned
- High-definition imaging with the clarity detector (Gemstone Spectral Imaging (GSI)) helps in quantitative tissue characterization, anatomical analysis and functional imaging
- Recovery time is four times faster compared to other detectors and the primary speed is nearly 100 times faster than any other detectors to date
- Overcomes the biggest challenges like calcium blooming and beam hardening to get accurate perfusion and plaque characterization
- Low-dose and high-resolution cardiac imaging

CLINICAL APPLICATIONS

- Coronary calcium scan
- CT Angiography
- Coronary Computed Tomography Angiography (CCTA)
- Congenital heart disease
- Total body CT scan



ELECTROCARDIOGRAM

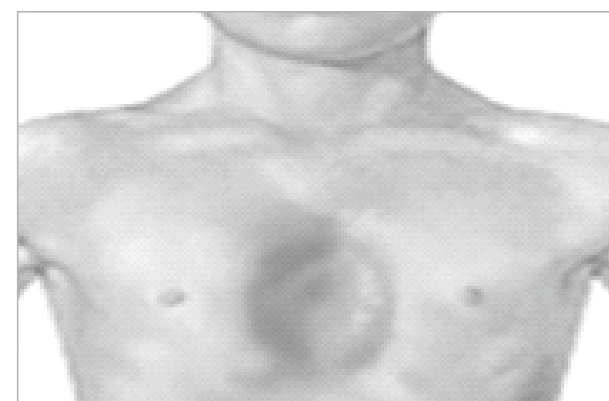
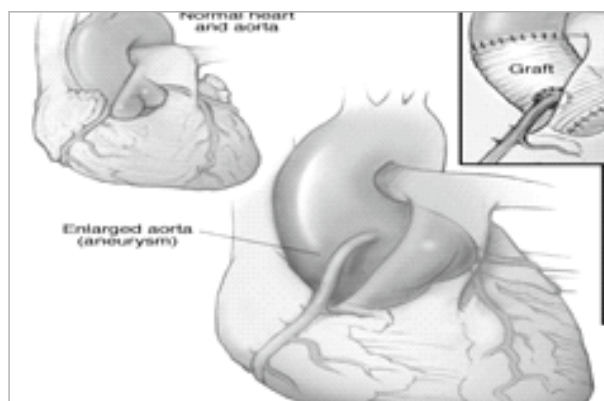
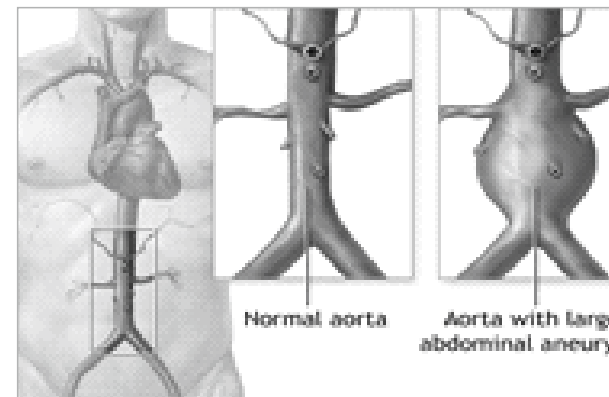
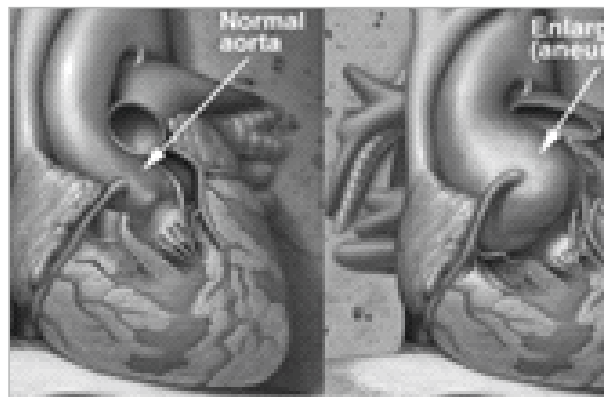
ECG @ VIRINCHI

- Our cardiologists at Virinchi Hospitals use DXL algorithms with industry leading clinical decision support with STEMI diagnostic tools to diagnose abnormal heart rhythms or arrhythmias
- STEMI diagnostic tools including graphical ST presentation, culprit artery, and critical values
- Touch operation provides most sophisticated operation with seamless data retrieval
- Highlights critical values for conditions which require immediate clinical attention
- 6 event markers help with diagnostic efficiency

CLINICAL APPLICATIONS

- Used to check the heart's electrical activity, and find the cause of unexplained chest pain or pressure that could be caused by a heart attack, pericarditis or angina
- Check how well mechanical devices that are implanted in the heart, such as pacemakers, are working
- It is used to check the causes of heart disease

symptoms include shortness of breath, dizziness, fainting, and heartbeats that are rapid (tachycardia) and irregular (fibrillation)



- Arrhythmias
- Aneurysm
- Angina
- Aorta diseases
- Atherosclerosis
- Cardiomyopathy
- Cerebral vascular disease
- Chest wall abnormalities
- Complex cardiac emergencies
- Congenital heart disease
- Coronary artery diseases
- Endocarditis



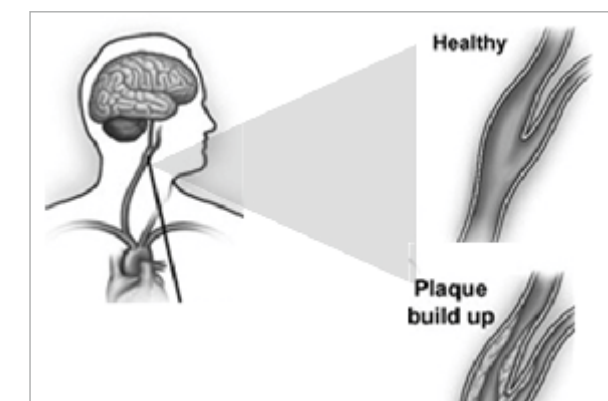
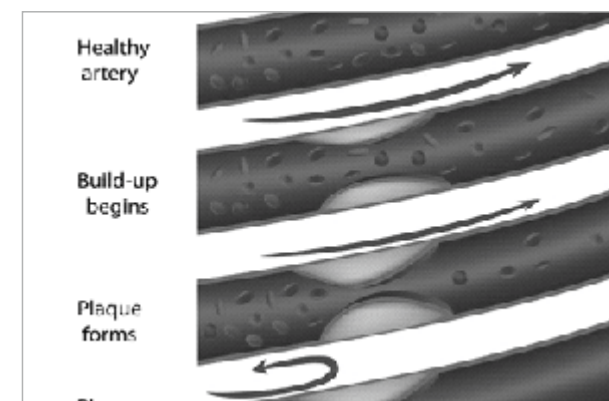
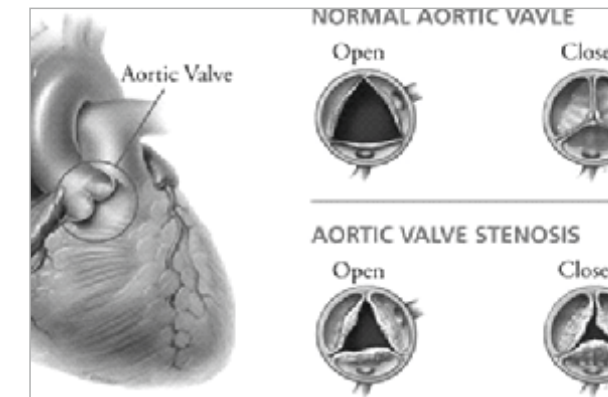
ECHOCARDIOGRAPHY

3D ECHO @ VIRINCHI

- iScan helps in automatic image optimization
- Insight imaging architecture gives images with optimum resolution
- xMATRIX is the most leading-edge, versatile ultrasound transducer technology
- Easily compare past and current studies without the use of an external reading station and even review these multimodality images while live imaging
- The real-time integration of EchoNavigator between fluoroscopy and Live 3D TEE provides automatic registration and tracking – all controlled bedside
- It has Pure Wave Crystal technology, which is the biggest breakthrough in the 40 years – with which it images technically difficult patients
- It has amazing mobility, ease of usage, workflow & ergonomics

CLINICAL APPLICATIONS

- It is used to guide the location of biopsies during right ventricular endomyocardial biopsies, placement of catheter-delivered valvular devices, and in many other intraoperative assessments



- Aortic stenosis
- Heart attack
- Heart failure
- Heart valve disease
- High blood pressure (hypertension)
- Mitral valve insufficiency and prolapse
- Marfan syndrome
- Pericarditis
- Peripheral arterial disease
- Rheumatic heart disease
- Stroke
- Tracheobronchial tree problems
- Valvular heart disease



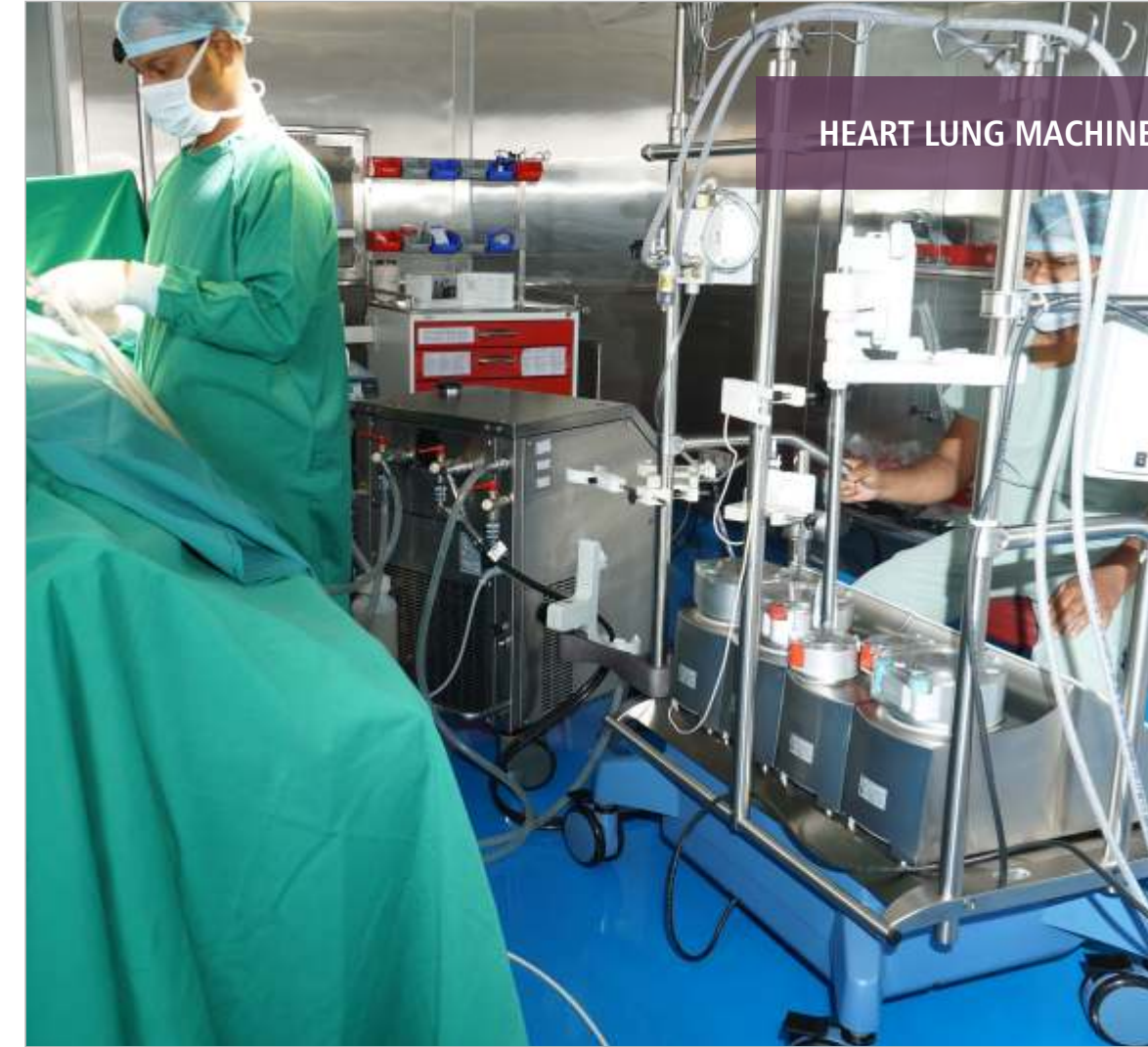
INTRA AORTIC BALLOON PUMP

IABP @ VIRINCHI

- Has fast, one-button start-up and delivery of therapy
- Automatically adjust to changes in patient conditions without clinician intervention
- An electrically isolated, low-level pressure output from the CS300 enables clinicians to send the fiber-optic arterial pressure waveform directly to a patient monitor by simply attaching an appropriate cable
- The fiber-optic IABP and catheter system automatically calibrates in the patient after insertion and automatically recalibrates in vivo every two hours or sooner
- Offers consistent support for patients with premature ventricular Contractions (PVC's) and arrhythmias
- Fast Pneumatics

CLINICAL APPLICATIONS

- To assist the heart during or after a heart attack
- To assist the heart during or after a procedure to open a blocked artery, such as the placement of a coronary stent and coronary artery bypass surgery



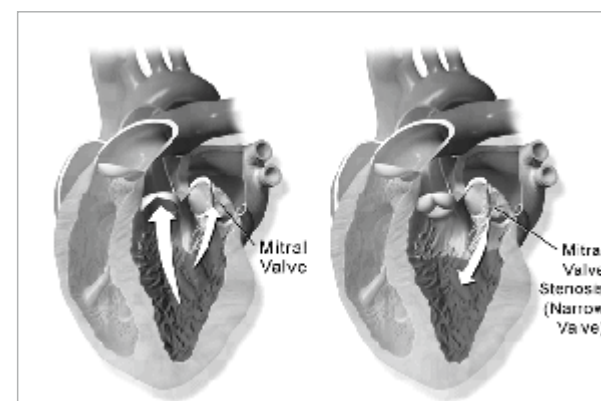
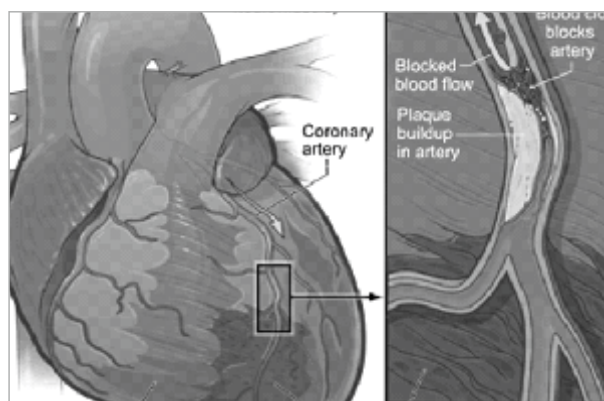
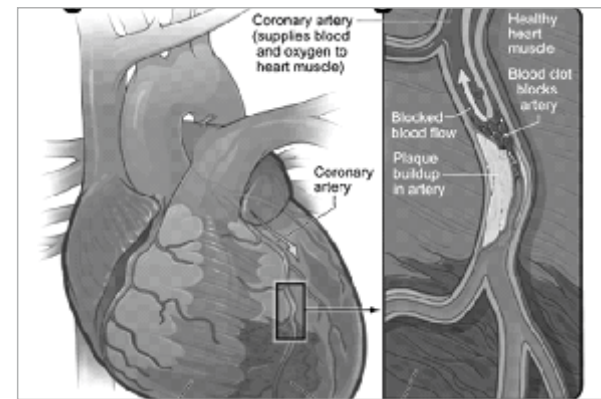
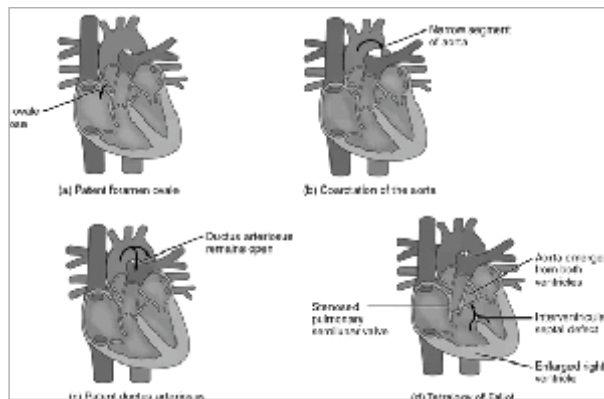
HEART LUNG MACHINE

HEART LUNG MACHINE @ VIRINCHI

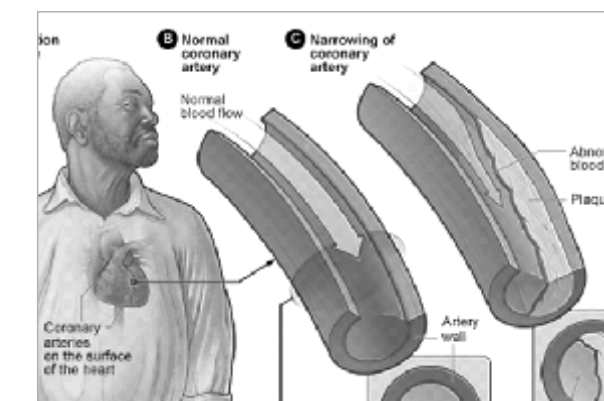
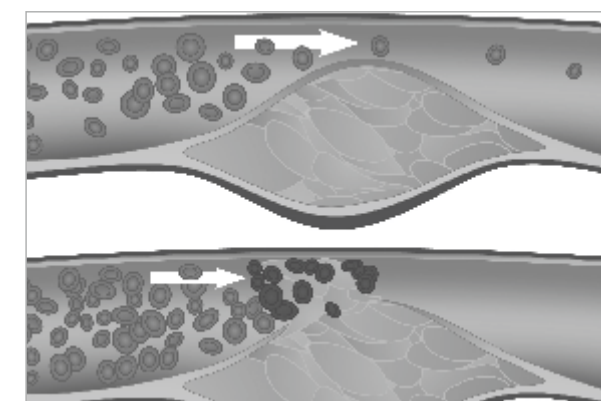
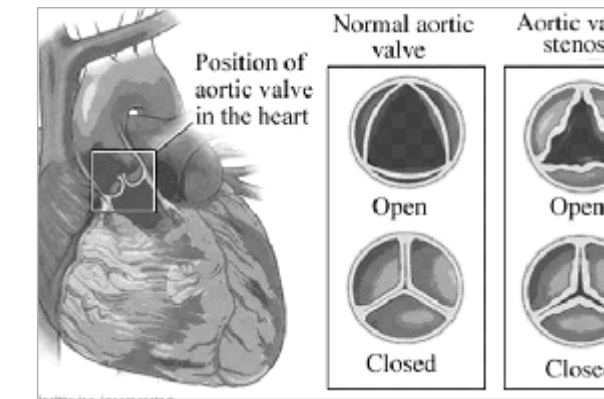
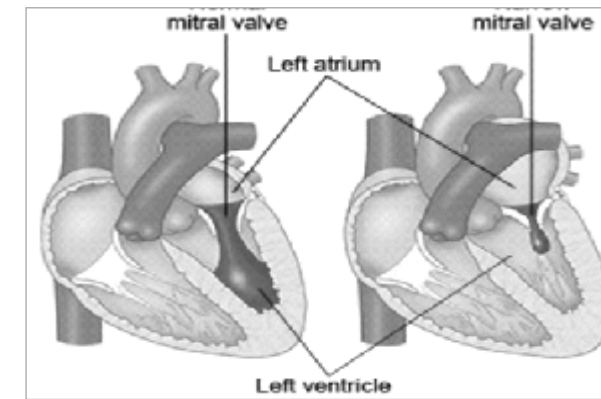
- Better integration with the perfusion circuit
- More configuration options to accommodate a greater assortment of procedures
- Speed adjustments are performed via an Incremental Encoder, a maintenance-free technology that increases longevity and reliability
- Miniaturized sensor modules utilize 100% SMD technology
- Operated by PC-independent software using state-of-the-art micro controllers in conjunction with a high-integrity serial CAN bus
- Patient temperature can be monitored and controlled without diverting the operator's attention

CLINICAL APPLICATIONS

- Coronary artery bypass grafting (CABG)
- Percutaneous trans luminal coronary angioplasty (PTCA) and stent procedures
- Open-heart surgery for valve repair or repair of cardiac anomalies
- Aortic aneurysm repairs, along with treatment of other cardiac-related diseases



- Adult congenital heart surgery
- Aneurysm repair
- Angioplasty
- Aorta and aortic valve surgery
- Arrhythmia treatment
- Arterial coronary artery bypass grafts
- Artificial heart valve surgery
- Atherectomy
- Balloon angioplasty
- Balloon mitral valvotomy
- Bypass surgery
- Cardiac implant closure
- Cardiac stent
- Cardiomyoplasty
- Cardioversion



- Catheter ablation
- Coronary angiography and angioplasty
- Coronary artery bypass grafting (CABG)
- Electrophysiological studies such as AV node ablation
- Electrophysiology syncope study
- Heart transplant
- Heart valve disease - percutaneous interventions
- Heart valve repair or replacement
- Internal cardioverter defibrillator implant
- Left ventricular assist devices placement surgery
- Minimally invasive and robotically assisted heart surgery
- Minimally invasive direct coronary artery bypass surgery
- Minimally invasive mitral valve repair
- Open-heart & off pump heart surgery

Dedicated Intensive Cardiac Care Unit

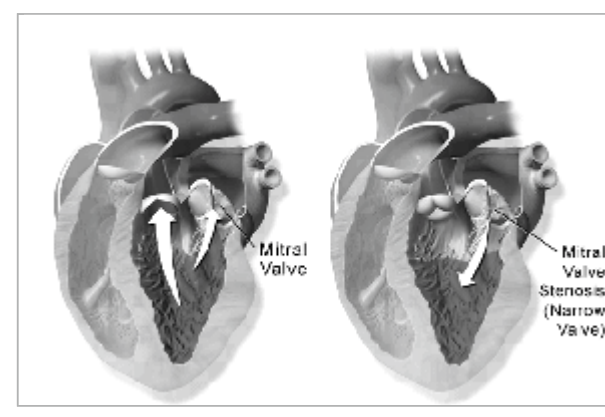
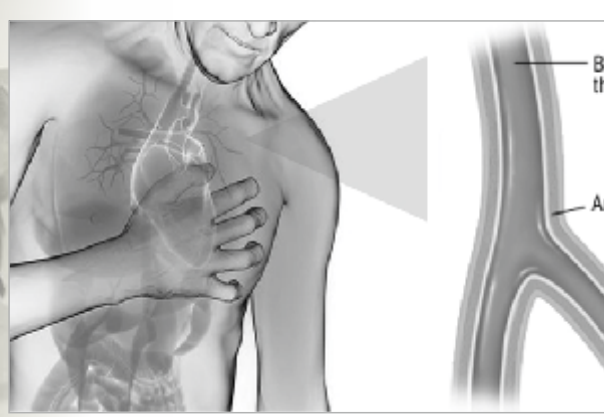
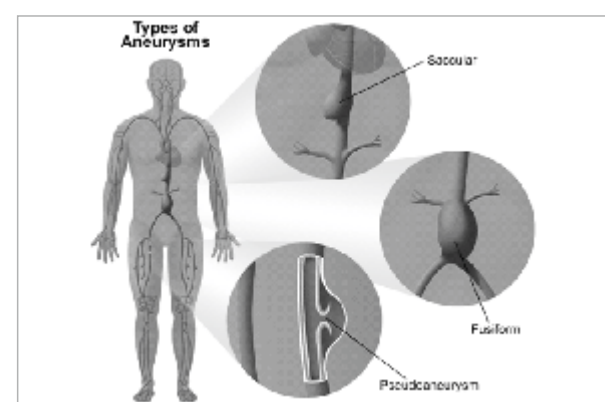
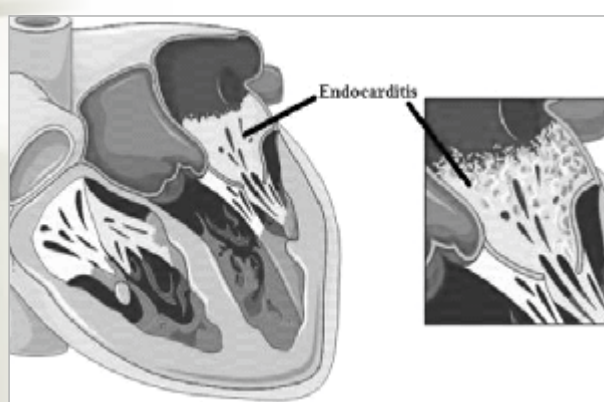


HOW IS BMI REPORT SO ACCURATE?

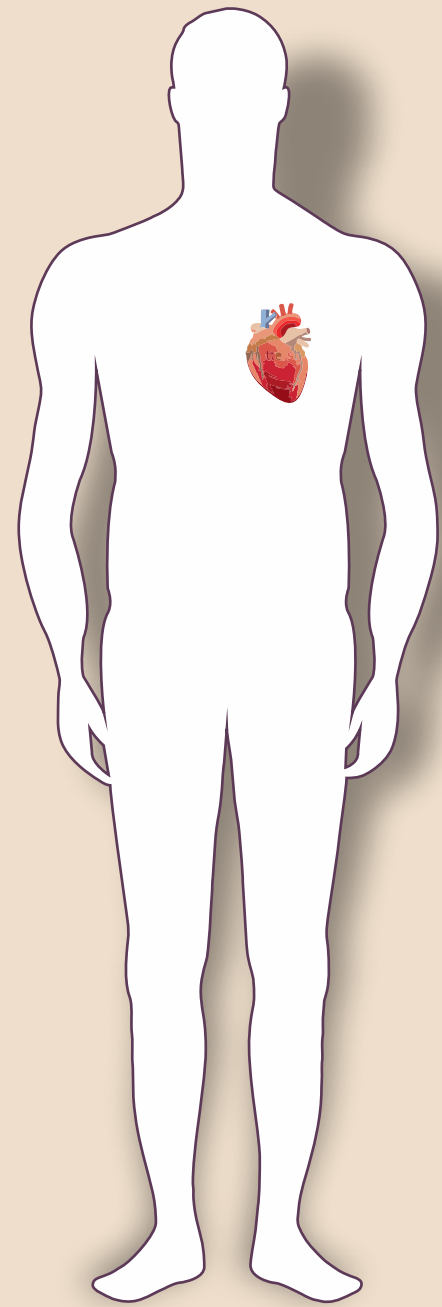
- Based on the tetra polar multi-frequency (5- 50-250 kHz) method to achieve greatest accuracy, ioi353 technology allows full assessment of the nutrition status of the patient
- ioi353 enables to measure several nutritionally relevant bodily compartments such as lean and soft body mass, body fat, total body water
- ioi353 measurements are clearly presented through easy-to-read reports and show goals to control for weight, mass of body fat and soft lean mass based on body composition analysis results
- Mobile friendly, as it can be located everywhere as it possess foldable body part and its ultra-light weight (10 kgs)
- Whole body and segmental measurements

CLINICAL APPLICATIONS

- It supports the risk evaluation of development of obesity related medical conditions or the identification of malnutrition in patients
- It also measures visceral fat in order to assess abdominal fatness



- Pacemaker and defibrillator implantation
- Percutaneous transluminal catheter angioplasty
- Radiofrequency catheter ablation
- Rotablation of heavily calcified vessels
- Septal closure device implantation
- Surgery for Chronic Thrombo Embolic Pulmonary Hypertension (CTEPH)
- Surgery for hypertrophic cardiomyopathy
- Surgery for infective endocarditis
- Surgical treatment for atrial fibrillation
- Trans myocardial revascularization
- Treatment of stenotic heart valves
- Tricuspid valve surgery
- Valve replacement surgery
- Ventricular assist device implantation



BIOCHEMICAL



ELECTROPHYSIOLOGICAL



HISTOPATHOLOGICAL



ANATOMICAL



PATHOGEN SCREENING



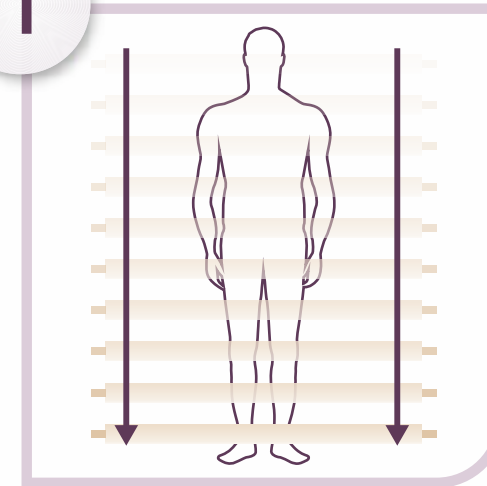
PHENOTYPIC & GENETIC



IMMUNOLOGICAL

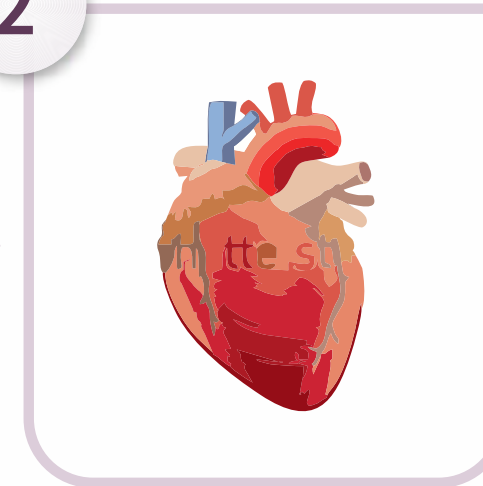


1



EVERY MEMBER UNDERGOES A MASTER HEALTH CHECK UPON JOINING

2



IF PROBLEM IN ORGAN DISCOVERED

3



VIRINCHI'S BE-HAPPI™ FRAMEWORK IS APPLIED TO THE ORGAN SYSTEM AND TREATMENT PLANNED ACCORDINGLY

Biomarkers are biological indicators that provide us with a means of understanding the relationship between measurable biological processes and clinical outcomes for evaluating health and wellness. Further, the study of biomarkers enables us to devise treatment options for all disorders and diseases since they enhance our understanding on physiology and anatomy of an individual.

Proper functioning of every organ and system in our body is essential for us to live a healthy and good quality of life as we progress through various phases of our life. Any deviation from performing one function may result in disordered physiological processes and will be associated with either symptomatic or asymptomatic disorder. If the disorder is manifested in the form of symptoms and signs, then it can be identified accurately with the help of specific diagnostics tests. However, asymptomatic disorders that typically do not show any clinical symptoms and signs could gradually lead to secondary complications affecting one or multiple systems that may be difficult to understand and treat

Therefore it is very essential to understand the health of all the organs and systems of our body irrespective of respective/overall disorderliness with or without any symptoms in order to understand thoroughly whether any function is impaired or progressing towards impairment with the help of comprehensive diagnostic tests. Virinchi's proprietary BE-HAPPI™ evaluates the health status of every organ and organ system from a biochemical, electrophysiological, histological and cytological, anatomical, pathogenic, phenotypic and genotypic, immunological perspectives. The influences of these factors on biomarker levels also indicate disorder's onset and/or its progression either as an independent or comorbid consequence.

With advanced and sophisticated technology housed in world-class infrastructure, and strong rooting in evidence-based medicine, Virinchi is well-positioned to undertake this comprehensive analysis to derive accurate and predictable diagnosis, thus enabling its physicians to devise individual-specific predictive, preventive and reactive therapies and interventions.

VIRINCHI'S PROPRIETARY BE-HAPPI™ DIAGNOSTICS FRAMEWORK

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Virinchi Hospitals, Virinchi Circle, Road #1, Banjara Hills, Hyderabad-500 034, India.

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BIOCHEMICAL



Many of the biological molecules including nucleic acids, proteins, lipids, fats and naturally occurring small chemicals that are formed due to metabolic and physiological activities serve as important contributors to understand the health of every organ and system in our body; and also help us to evaluate the nature and degree of disorderliness across systems and organs with the help of analytical, cytological, histochemical and immunological methodologies.

PARAMETERS TESTED @ VIRINCHI

ACE / Angiotensin I converting enzyme 1, Activated protein C resistance (APCR), AGT / Angiotensinogen, Albumin excretion rate, AMPK / Protein kinase, Angiopoietin, Angiotensin converting enzyme (ACE) polymorphism (insertion/deletion), Ankle-brachial index, ANP / Atrial natriuretic peptide, APOAIV / Apolipoprotein A-IV, APOC3 / Apolipoprotein C3, Apolipoprotein A1 (Apo A1), Apolipoprotein B (ApoB), Apolipoprotein E, ARH / LDL receptor, Blood culturing & identification with Echocardiography (TTE/TEE), Blood pressure, Brain natriuretic peptide(BNP or NT-proBNP), Cardiac troponin isoforms, CBS / Cystathionine-synthase, CETP / Cholesterol ester transfer protein, Cholesterol/HDL ratio, Chromogranin A, Circulating endothelial cells, CK-MB, CNP / C-type natriuretic peptide, Coagulase, Collagen, Complement C3, Copeptin (C-terminal pro-endothelin-1), Coronary artery calcium, Creatinine, CRP / C-reactive protein, C-terminal pro-endothelin-1 (CT-proET-1), Cyclic GMP, Cystatin-C, Decreased fibrinolysis -TPA/PAI-1, DES / Desmin, DMD / Dystrophin, dRVVT screen with reflex to dRVVT confirm and dRVVT 1:1 mix, E1B adenovirus interacting protein 3 (BNIP3), Endostatin, Endothelial markers CD31, Endothelins, ESR2 / Estrogen receptor β , Estrogen receptor alpha, Exhaled nitric oxide, Extracellular superoxide dismutase (EC-SOD), FGB / Fibrinogen B Beta polypeptide, FGB / Fibrinogen Beta chain, Fibrinogen antigen, Free Triglycerides, Fungal Infective Endocarditis, Galectin-3, GCK / Glucokinase, GGT, Glomerular filtration rate, Glucose, Glutathione-S-transferase P1 (GSTP1), Glycated hemoglobin (HBA1C), GNB3 / Guanine nucleotide binding protein (G protein) Beta Polypeptide 3, GP1BA / Plasma glycoprotein 1, GPIIIa / Glycoprotein IIIa, GPX1 activity, HDL protein, HFE / Hemochromatosis, High Sensitive Cardiac Troponin T (hs-cTnT), High Sensitive C-reactive protein (hs-CRP), HMOX1 / Heme oxygenase (decycling) 1, Homocysteine (cardiovascular), HP / Haptoglobin, HSP70A1 / Heat shock protein 70-1, Hypercoagulable-D-dimer, Hypercoagulable-Fibrinogen, IFNG / Interferon-Gamma, IL-18, IL-4 / Interleukin-4, IL-6 / Interleukin-6, Increased coagulation factors (von Willebrand Factor), INSR / Insulin receptor, Insulin, Interleukins, Isoprostanes, LCAT / Lecithin cholesterol acyltransferase, LDL, LDL-associated PLA2 (PLAC), Levels of ApoB and ApoA1 or ratio of ApoB : ApoA1, Lipoprotein a (Lp [a]), Low-density lipoprotein particle number/concentration (LDL-P), LPL / Lipoprotein lipase, Lp-PLA2 (Lipoprotein-Associated Phospholipase A2), Matrix Metalloproteinases, MDM2 overexpression and MFAP4 in serum, Microalbumin, Midkine, Mid-regional pro-atrial natriuretic peptide (MR-proANP), Mitochondrial NADH dehydrogenase (MT-MD5), MMP1 / Matrix metalloproteinase 1, MMP13 / Matrix metalloproteinase 13, MMP3 / Matrix metalloproteinase 3 (stromelysin 1), MMP-9, Myeloperoxidase (MPO)sFMT-1, N/A / Mitochondrial respiratory chain, Natriuretic peptides, Neutrophil gelatinase-associated lipocalin(NGAL), Nitrotyrosine, Non-HDL-C, N-terminal pro-B-type natriuretic peptide (NT-proBNP), Osteoprotegerin, Oxidized LDL, Pro-collagen, Proteins, REN / Renin, Rho Rho-kinase 1 and ROCK2, SAA(Serum Amyloid A), Soluble ST2, Soluble vascular adhesion molecule-1, Squamous cell carcinoma antigen (SCCA), StarD5 cholesterol binding, Sterol regulatory element binding protein-2, sTRAIL, sTWEAK(soluble tumor necrosis factor-like weak inducer of apoptosis), Superoxide dismutase, Surfactant protein D, Taurine, TH / Tyrosine hydroxylase, THBD / Thrombomodulin, thioredoxin, Thyroglobulin, tissue polypeptide antigen (TPA), Total cholesterol, Triacylglycerols, Triglyceride, Troponins, tumour necrosis factor (TNF)-Alpha, Tyrosine-protein kinase, Uric acid, Urine albumin excretion, Urine Albumin/Creatinine Ratio (Ualb/Cr), very low-density lipoprotein (VLDL), vitamin D, VWF / von Willebrand factor, Beta-trace protein

ELECTROPHYSIOLOGICAL



Electrodiagnostic biomarkers provide information on electrical activity (action potential) due to native or altered electrophysiology of cells and tissue or their response towards electrical stimuli (evoked potential). Typically, electrocardiography (ECG), electroencephalography (EEG), and electromyography (EMG) are employed to measure the electrical activity values and help to diagnose, evaluate, and treat the individual with impairments of the neurologic or neuromuscular or muscular systems.

PARAMETERS TESTED @ VIRINCHI

Ejection fraction-echocardiogram, Heart's electrical activity-electrocardiogram (EKG or ECG), Pericardial effusion-TTE, Thickness and movement of the heart wall-Transthoracic echocardiogram (TTE), Ventricular aneurysm-echocardiogram, Ventricular tachycardia-ECG

HISTOPATHOLOGICAL



Cytopathology and Histopathology observations of cells and tissue allow the understanding of gross structural, physiological and molecular changes at the cell and tissue level respectively. These microscopic observations with grading and staging are vital to understand the response of cells due to external stimuli or DNA changes which either might result into a transient change or pathological consequence requiring suitable surgical or medical or radiological therapy.

PARAMETERS TESTED @ VIRINCHI

Cardiac Contractility, Coronary Artery Contractility, Endomyocardial Biopsy

ANATOMICAL



Imaging techniques offer sensitive and precise visualization and also digitization of anatomical features of organs and systems of the body. It helps the patient or individual to undergo a gamut of pain free investigations, non-invasively. And these biomarkers can be measured using either radiological or non-radiological modalities such as, X-ray, CT, Ultrasonography, Electroencephalography, Magnetoencephalography, and Magnetic Resonance Imaging in order to provide us with either qualitative or quantitative measure of the anatomical features and physiological processes such as blood flow.

PARAMETERS TESTED @ VIRINCHI

Calcified lesions, Carotid intima-media thickness (CIMT), Coronary artery calcium, Epicardial fats, Inflammation Imaging , Inflammation or Angiogenesis, Myocardial Perfusion Imaging, Stenosis

PATHOGEN SCREENING



Pathogen screening helps to find out either presence or absence of all the relevant pathogenic microorganisms including - bacteria, fungi, viruses, mycoplasma and protozoans. This identification process allows the healthcare provider with specific information on every possible mode that can be implemented towards prevention, treatment and eradication. It also allows the physician to decide pathogen specific medication in suitable dosage and form for effective and safe elimination without causing any adverse effects to the affected patient.

PARAMETERS TESTED @ VIRINCHI

Abiotrophia defectiva, Abiotrophia spp, Actinobacillus actinomycetemcomitans, Adenovirus, Aspergillus spp., Bartonella species, Brucella species, Candida spp, Cardiobacterium hominis, Chlamydia species, Coxiella burnetii, Echinococcus granulosus, Echoviruses, Eikenella corrodens, Entamoeba histolytica, Enterobacteriaceae, Enterococci, Enterococcus casseliflavus, Enterococcus faecalis, Enterococcus faecium, Enterococcus gallinarum, Enterovirus/Coxsackievirus, Epstein-Barr virus, Gemella balaenopterae, Gemella bergeriae, Gemella group, Gemella hemolysans, Gemella morbillorum, Gemella sanguinis, Granulicatella adiacens, Granulicatella elegans, Granulicatella paraadiacens, Granulicatella species, Group C streptococci, Group G streptococci, Groups B streptococci, HACEK group, Haemophilus aphrophilus, Haemophilus parainfluenzae, Haemophilus paraprofitus, Helicobacter pylori antibodies, Hepatitis C virus, HIV, Human herpes virus 6, Influenza virus, Kingella denitrificans, Kingella kingae, Legionella species, Moraxella [Branhamella] catarrhalis, Neisseria elongata subspecies nitroreducens, Neisseria flavescens, Neisseria mucosa, Neisseria sicca, Neisseria flava, Neisseria perflava, Neisseria pharyngis, Parvovirus B19, Pneumococcus spp, Pseudomonas burkholderia, Pseudomonas Species, Salmonella choleraesuis, Salmonella enteritidis, Salmonella typhimurium, Serratia marcescens, Staphylococci , Staphylococci aureus, Staphylococci lugdunensis, Staphylococci epidermidis, Streptococcus anginosus / Streptococcus milleri, Streptococcus bovis, Streptococcus constellatus, Streptococcus intermedius, Streptococcus mutans, Streptococcus oralis (mitis), Streptococcus pneumoniae, Streptococcus pyogenes, Streptococcus salivarius, Streptococcus sanguis, Streptococcus viridans group, Streptococcus spp, Taenia solium, Trichinella spiralis, Tropheryma whipplei, Trypanosoma brucei gambiense, Trypanosoma brucei rhodesiense, Trypanosoma cruzi, Tuberculosis spp

PHENOTYPIC & GENETIC



Changes brought about to the DNA, RNA and their respective derivatives due to germline or somatic mutations influence an individual's overall existence and susceptibility or resistance towards a wide variety of disease causing infectious agents. Understanding the underlying molecular details with the help of advanced/next generation sequencing technologies provides insights into either devising a therapeutic or corrective intervention.

PARAMETERS TESTED @ VIRINCHI

ABCA1 gene, ABCA1 gene promoter, ABCG1 gene promoter, ABCG1-CpGC3, ACTC / Cardiac actin, ADD1 / Adducin 1 (a), ADMA, ADRA2 / $\alpha 2$ Adrenergic receptor, ADRB2 / Beta2 Adrenergic receptor, ADRB3 / Beta3 Adrenergic receptor, AGTR1 / Angiotensin II receptor type 1, AMHC / α -Cardiac myosin heavy chain, Angiotensin II type 1 receptor (AGTR1) gene 1166A & C polymorphism, APOE Gene, BAX, BCL-2, CCR5 / Chemokine (C-C motif) receptor 5, CD14, CMYBPC / Cardiac myosin binding protein C, CST3, CYP11B2 / Aldosterone, CYP11B2 / Cytochrome P450, CYP1A1 / Cytochrome P450, DNMT2, DSG2 / Desmoglein 2, DSP / Desmoplakin, DTNA / α Dystrobrevin, ELAM / Endothelial leukocyte adhesion molecule-1, END1 / Endothelin 1, END2 / Endothelin 2, F2RL3, Factor V HR2 allele DNA mutation analysis, Factor V Leiden mutation analysis (1691G>A), FOXP3 gene, GALNT2 gene promoter, GCCR / Glucagon receptor, GCK gene-body, GNAI1 / G protein α subunit, GNAS / GNAS complex locus, Growth-differentiation factor 15, H-FABP, HMGCR gene promoter, IGF2, ITGA2 / Integrin $\alpha 2$ Glycoprotein Ia, LEP, LEPR / Leptin receptor, LIPC-CpGA2, LMNA / Lamin A/C, LRP / Lipoprotein receptor related protein, Mid-regional pro-adrenomedullin (MR-proADM), Mitochondrial ATP synthase (MT-ATP6 and MT-ATP8), Mitochondrial Cytochrome C oxidase (MT-CO1, MT-CO2, MT-CO3), Mitochondrial tRNA leucine (MT-TL1), MPO, MTHFR / Methylene tetrahydrofolate reductase (NADPH), MYBPC3 / Myosin-binding protein C cardiac-type, MYH7 / α -Cardiac myosin heavy chain, MYL2 / Myopalladin, N-cadherin and connexin-43, NEBL / Nebulette, Neuregulin 1, NOS2A / Nitric oxide synthase 2A, NOS3 / Nitric oxide synthase 3, NPC1 promoter, NR3C1 / Glucocorticoid receptor, p15INK4b, p16INK4a, P1A1 / Glycoprotein IIIa, PAFAH / Phospholipase A2 group VII, PAI1 / Plasminogen activator inhibitor 1, PDE4D / Phosphodiesterase 4D, PECAM1 / Platelet-endothelial cell adhesion molecule-1, Pentraxin, Pentraxin 3, PKP2 / Plakophilin 2, PLA2G7 gene promoter, PLTP-CpGC, PON1 / Paraoxonase 1, PON2 / Paraoxonase 2, PPAR α / Peroxisome proliferator activated receptor α , Prothrombin (factor II) 20210G>A mutation analysis, PTT-LA with reflex to hexagonal phase confirm, RETN / Resistin, S100A8/A9 complex, sCD40, SCN5A / Sodium channel voltage-gated, SCN1B / Epithelial sodium channel Beta subunit, SELP / Selectin P, SGCD / Delta-sarcoglycan, siCAM-1, SLC30A8, SOD2 / Manganese superoxide dismutase, STAT 3, STAT 4, STAT2, stratifin (SFN), subfamily I (aromatic compound-inducible) polypeptide 1, subfamily X1B (steroid 11-Beta-hydroxylase), TAFI / Thrombin activatable fibrinolysis inhibitor, TAGAP, TAZ / Tafazin, TGF-B, TGFB1 / Transforming growth factor Beta 1, Tissue inhibitors of metalloproteinase (TIMP1), TNFAIP2 / Tumor necrosis factor $\alpha 2$, TNFAIP3, TNF-Alpha and receptors, TNF-Alpha promoter, TNIP1, TNIN3 / Troponin I cardiac muscle, TNNT2 / Cardiac troponin T, TNNT1 / Cardiac troponin I, TPM1 / Tropomyosin 1 alpha chain, TTN / Titin, VCAM-1, VDR / Vitamin D receptor, VEGFA, ZC3H12C, ZNF313

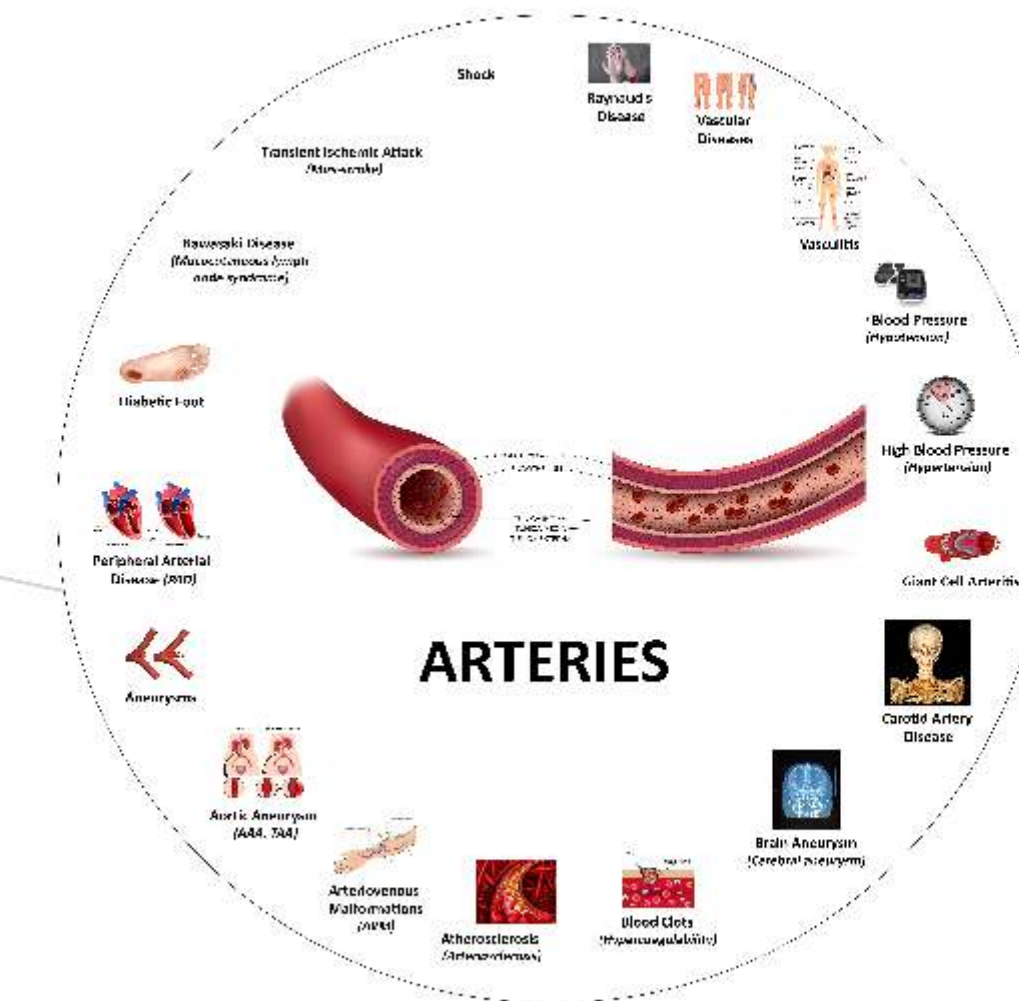
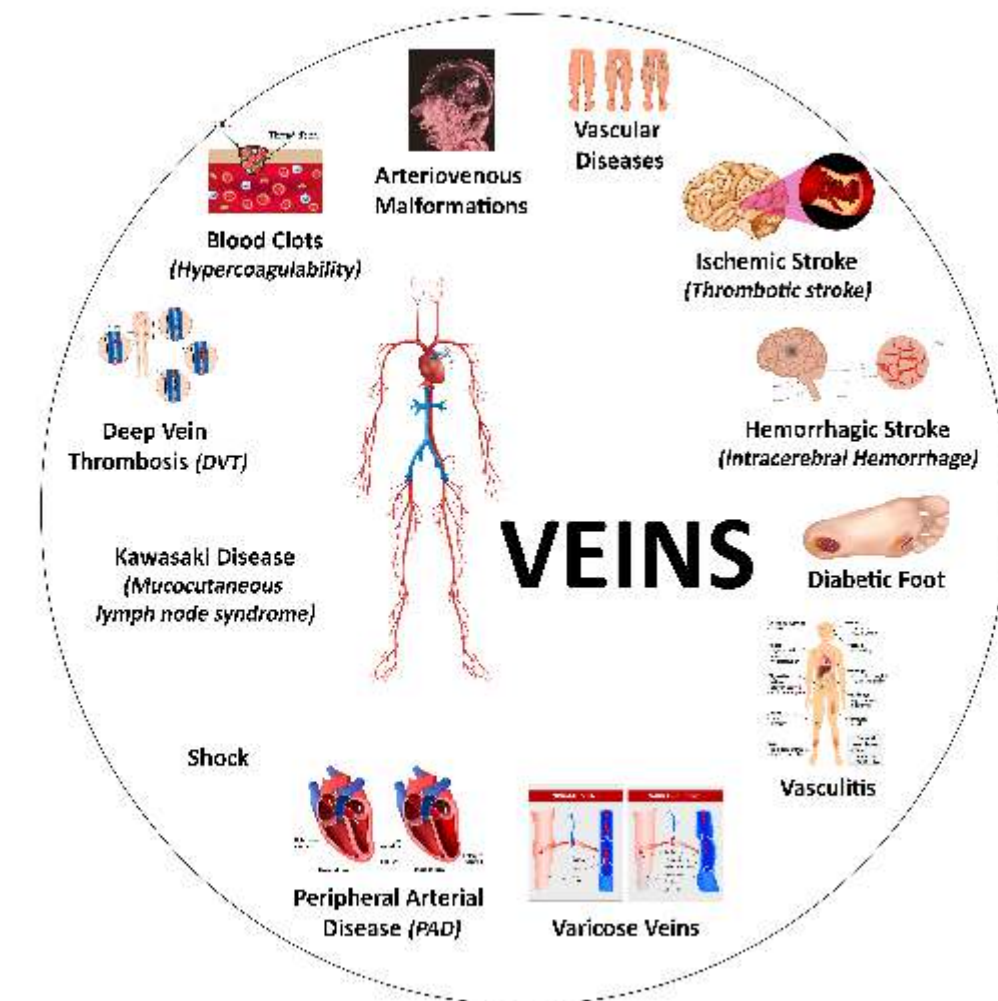
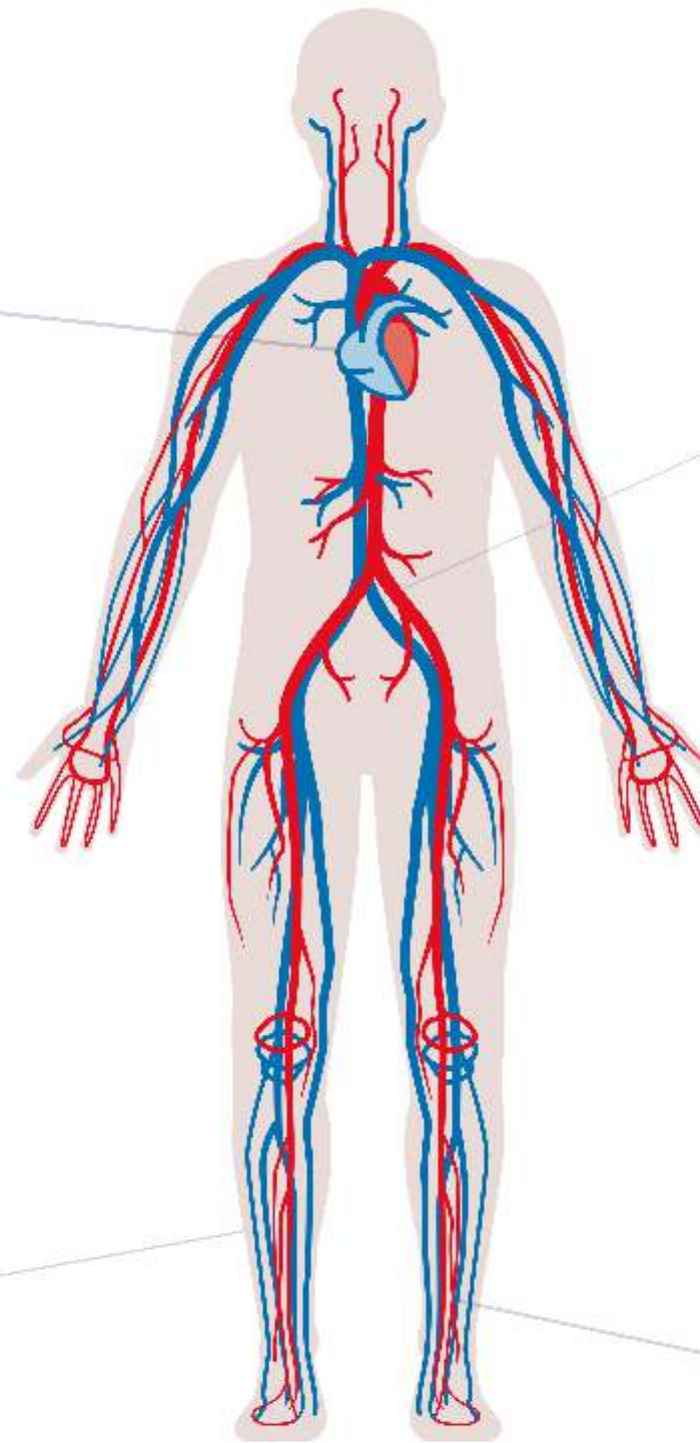
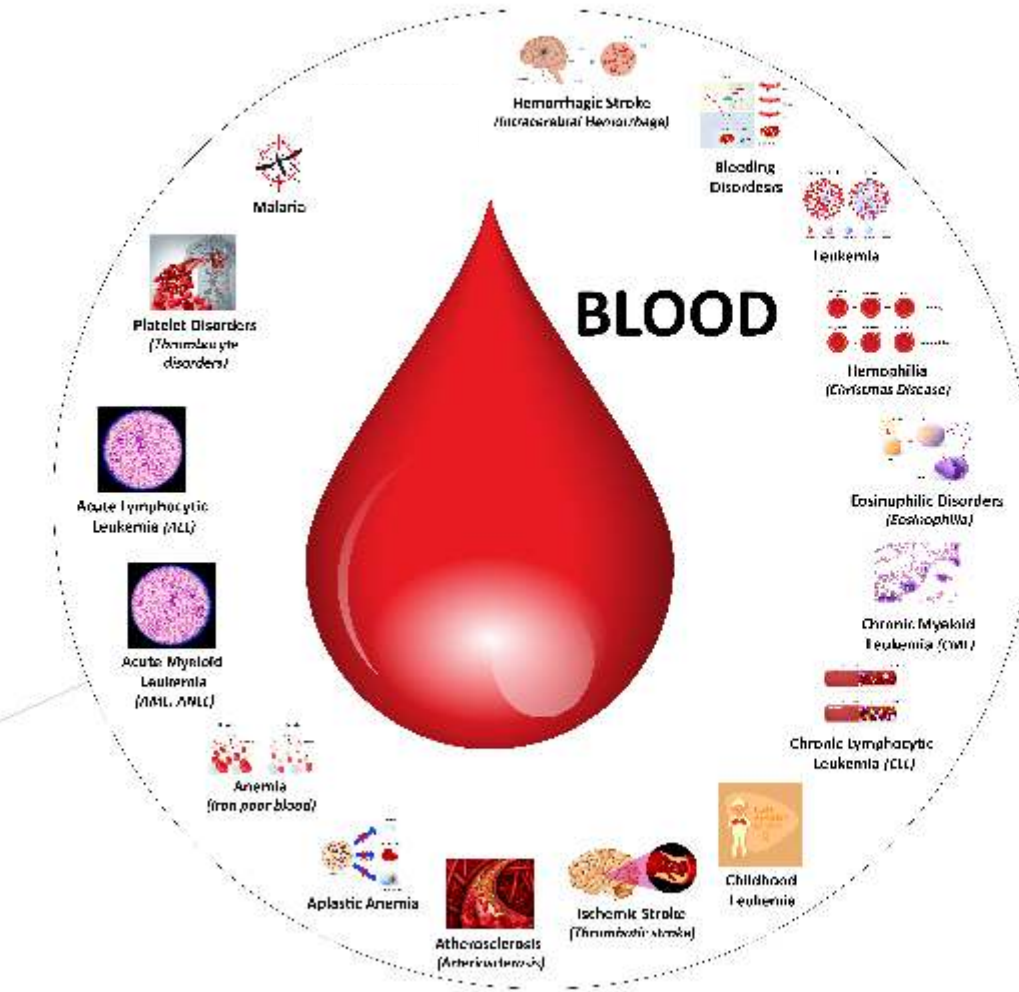
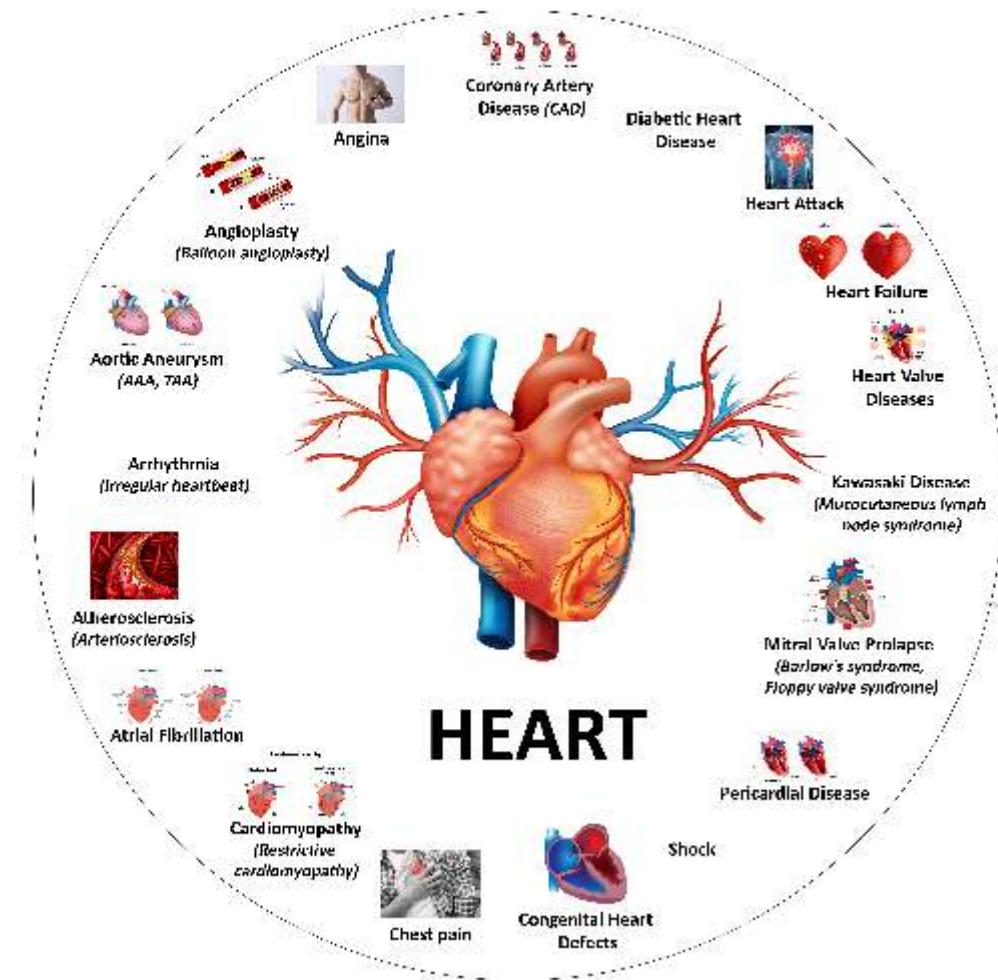
IMMUNOLOGICAL



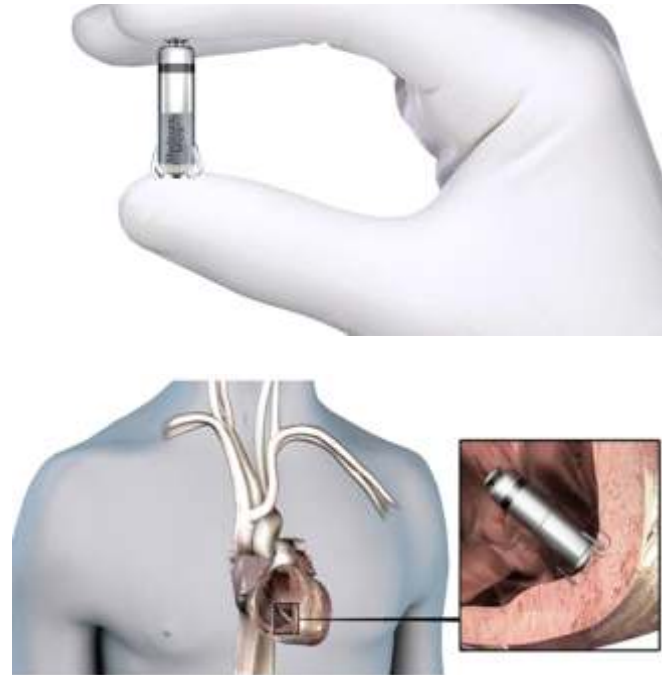
The immunologic Biomarkers provide insights into the body's response towards cancer, infectious diseases, immunization, immunodeficiency, allergies, asthma, autoimmunity, and other immune disorders. These features can be studied from variety of biological specimens by using highly advanced and high throughput immune assay systems. And these biomarkers also help to understand the extent of disease progression and probability of positive prognosis for a wide range of diseases.

PARAMETERS TESTED @ VIRINCHI

Beta-2-Glycoprotein I Antibodies, Cardiolipin antibodies, Chlamydia pneumoniae antibodies, Cytomegalovirus (CMV) antibodies, Lupus anticoagulant assay, Phosphatidylserine antibodies



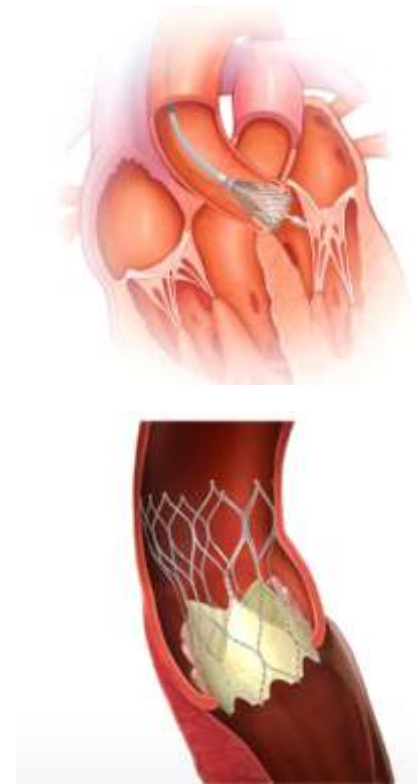
LEADLESS MICRO PACEMAKER



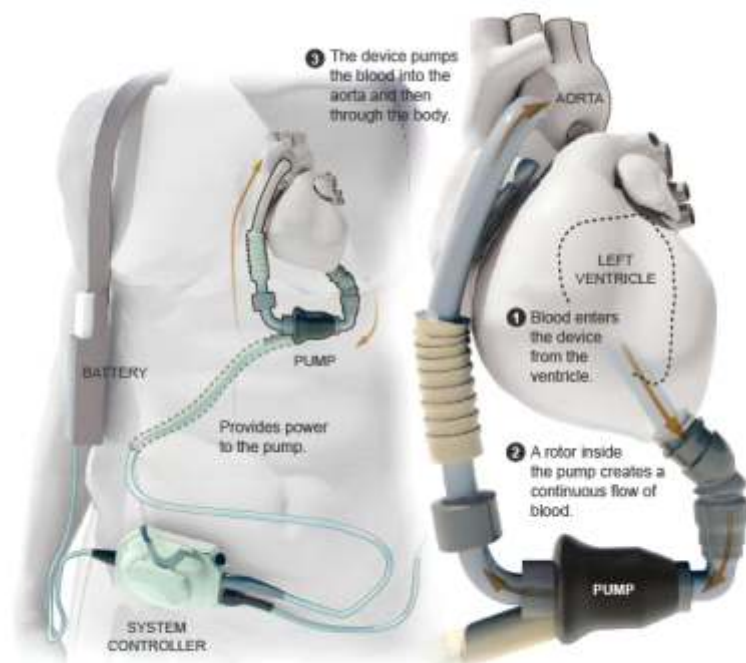
- World's smallest pacemaker delivered precutaneously via a minimally invasive approach
- 93% smaller than conventional pacemakers
- First pacemaker that does not require the use of wired leads to provide an electrical connection between the pulse-generating device and the heart
- Pacing System works like other pacemakers to regulate heart rate, the self-contained, inch-long device is implanted directly in the right ventricle chamber of the heart
- Eliminates the need of leads, that can sometimes malfunction or cause problems when infections develop in the surrounding tissue, requiring a surgical procedure to replace the device

TRANSCATHETER AORTIC VALVES

- Minimally invasive surgical procedure repairs the valve without removing the old, damaged valve and wedges a replacement valve into the aortic valve's place
- Similar to a stent placed in an artery, the TAVI approach delivers a fully collapsible replacement valve to the valve site through a catheter



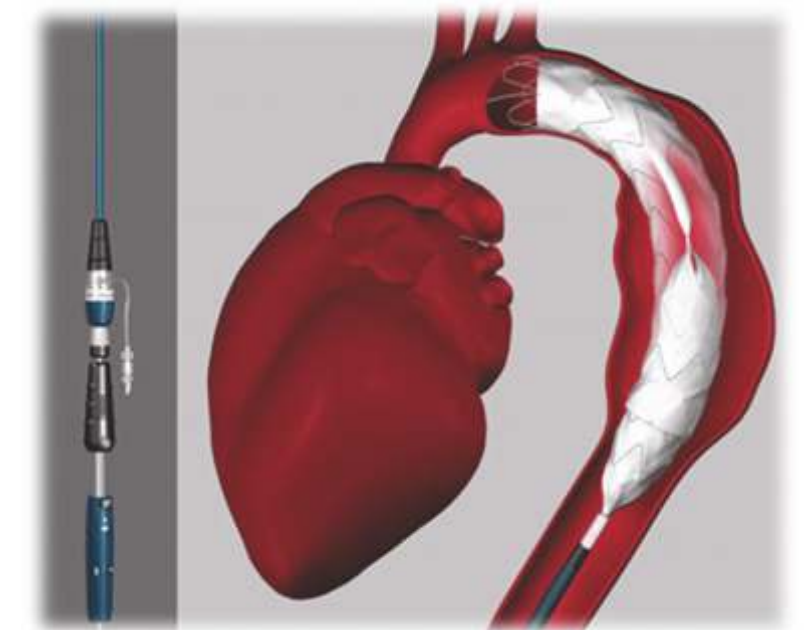
LEFT VENTRICULAR ASSIST SYSTEM (LVAS)



- Designed to supplement the pumping function of the heart and helps circulate blood throughout the body for patients whose hearts are too weak to pump blood adequately on their own
- Intended for a broad range of advanced heart failure patients and is designed to restore blood flow, improve survival, functional status and quality of life
- Can pump up to 10 litres of blood per minute through an external, wearable controller and battery system that powers the pump

THORACIC ENDOVASCULAR GRAFT

- Indicated for the endovascular treatment of patients with isolated lesions of the descending thoracic aorta (not including dissections) having vascular anatomy suitable for endovascular repair
- Was developed to address vascular access issues associated with larger-profile devices and to increase conformability in tortuous anatomy
- An ergonomic design that requires fewer procedural steps than previous designs to deploy the device without sacrificing the precision and control

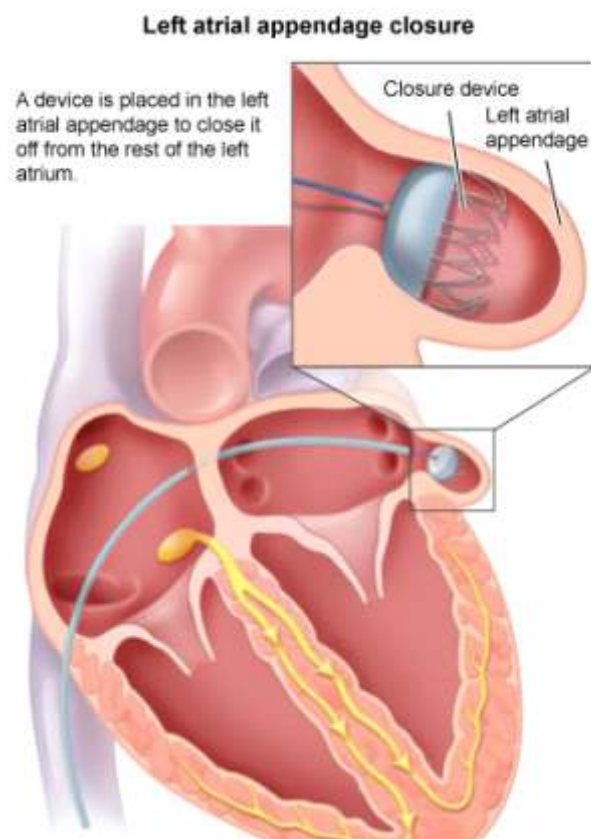


SUB-CUTANEOUS IMPLANTABLE DEFIBRILLATOR (S-ICD) SYSTEM



- A treatment option that provides protection for patients at risk of sudden cardiac arrest (SCA)
- S-ICD System is implanted just under the skin and provides the patient the same protection from cardiac arrest without invading the heart and blood vessels
- May be implanted using only anatomical landmarks, thereby reducing the need for fluoroscopy during implant

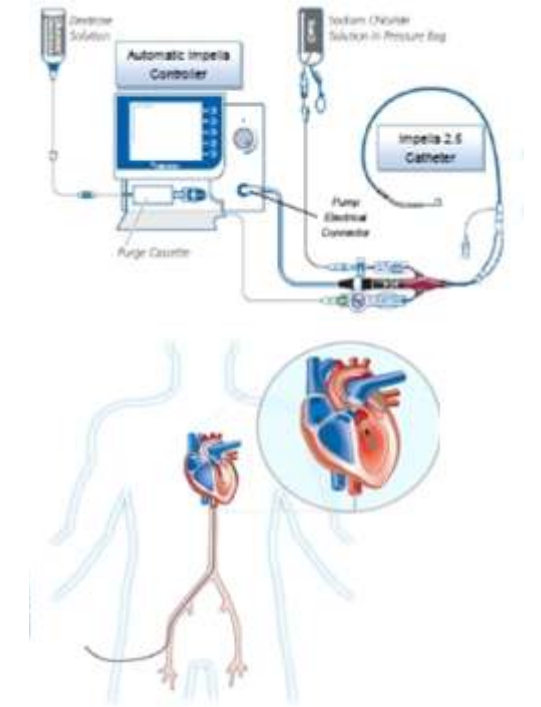
LEFT ATRIAL APPENDAGE CLOSURE DEVICE



- Offers a new stroke risk reduction option for high-risk patients with non-valvular atrial fibrillation who are seeking an alternative to long-term warfarin therapy
- Indicated to reduce the risk of thromboembolism from the left atrial appendage in patients with non-valvular atrial fibrillation
- Can be introduced for those are at increased risk for stroke and systemic embolism based on CHADS2 or CHA2DS2-VASc scores

VENTRICULAR SUPPORT DEVICE

- Indicated for use during high risk percutaneous coronary interventions (PCI) performed in elective or urgent, hemodynamically stable patients with severe coronary artery disease and depressed left ventricular ejection fraction
- Used for short term (≤ 4 days) in the treatment of ongoing cardiogenic shock that occurs immediately (< 48 hours) following acute myocardial infarction or open heart surgery
- Pulls blood from the left ventricle through an inlet area near the tip and expels blood from the catheter into the ascending aorta
- Pump can be inserted via a standard catheterization procedure through the femoral artery, into the ascending aorta, across the valve and into the left ventricle



INTRA-AORTIC BALLOON CATHETER

- World's first Fiber Optix technology reliably captures consistent AP information from aorta to pump
- AP Signal converted to aortic flow calculates the future AV closure with 98% accuracy during severe Arrhythmias
- Signal is unaffected by dampening, noise, and movement – and will not degrade over time
- Speed-of-light AP signal acquisition overcomes the delays of fluid-filled systems to set timing accurately during Arrhythmias
- Unlike conventional fluid-filled system, the Fiber Optix sensor is unaffected by routine conditions such as dampening, flushing, blood draws noise, and transducer movement



CORONARY ORBITAL ATHERECTOMY SYSTEM



- A device used for the treatment of a severely calcified narrowing of a coronary artery (that is, a lesion)
- A percutaneous orbital atherectomy system intended to facilitate stent delivery
- Used in patients with coronary artery disease (CAD) who are acceptable candidates for percutaneous transluminal coronary angioplasty (PTCA) or stenting due to severely calcified coronary artery lesions that have not been previously treated

CARDIAC CRYOABLATION CATHETER



- Intended for the treatment of patients with drug refractory, recurrent, symptomatic atrial fibrillation
- The second generation of the world's first cryoballoon indicated for the treatment of Paroxysmal Atrial Fibrillation (PAF)
- Cryoadhesion improves contact and stability, minimizing the amount of fluoro used
- Preserves the extracellular matrix and endothelial integrity
- Decreases risk of thrombus formation
- Demonstrates well demarcated lesions

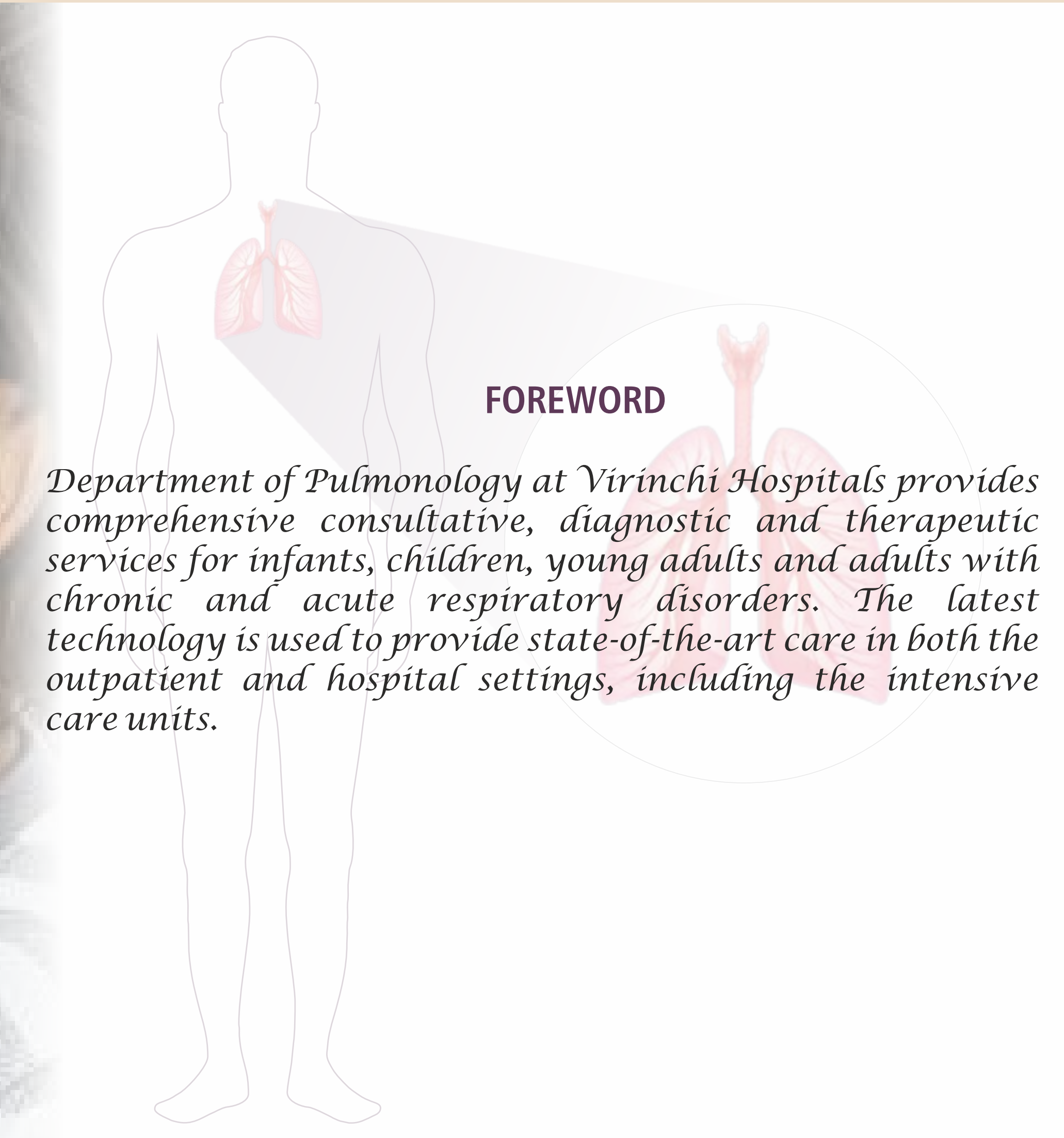
TRANSCATHETER MITRAL VALVE REPAIR

- A technological breakthrough for select high-surgical-risk patients with severe degenerative mitral regurgitation
- World's first transcatheter mitral valve repair that delivers a therapeutic option when no other option exists
- A permanent implant that attaches to the mitral valve leaflets and this procedure results in a double opening of the mitral valve allowing greater closure and reduces the leakiness of the valve (mitral regurgitation or MR)



The relentless Biological Pumps of Life

DEPARTMENT OF PULMONOLOGY



FOREWORD

Department of Pulmonology at Virinchi Hospitals provides comprehensive consultative, diagnostic and therapeutic services for infants, children, young adults and adults with chronic and acute respiratory disorders. The latest technology is used to provide state-of-the-art care in both the outpatient and hospital settings, including the intensive care units.



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Dr. Sudheer Nadimpalli

MBBS, MD (Resp. Med), MRCP (Gen. Med)

Sr. Consultant Pulmonologist & Sleep Medicine Specialist

Dr. Sudheer Nadimpalli is a Senior Consultant Pulmonologist in the Department of Pulmonology, Virinchi Hospitals. He has 19 years of experience in his field. Prior to Virinchi Hospitals, he worked as a Consultant Pulmonologist at Sunshine Hospitals and Medici Hospital, Hyderabad. He also worked as a Pulmonologist at Royal Preston Hospital, Preston, UK and University Hospital Aintree, Liverpool, UK. He possesses hands-on experience in Medical Thoracoscopy, Diagnostic & Therapeutic Bronchoscopy, Rigid bronchoscopy, Sleep study interpretation, Non-invasive ventilation, Pleurocentesis, Paracentesis, Lumbar puncture, CVP lines, Intercostal chest drains, Endobronchial ultrasound (EBUS) and Joint aspiration. Interventional Pulmonology, TB, ILD, Sleep medicine and NIV are his areas of interest.

He sees a great potential in the field of Interventional Pulmonology and is passionate about holistic respiratory care. He would like to put in, the enormous experience that he has gained over the years in the field of pulmonology, to the best use at Virinchi Hospitals to make it the centre of excellence in pulmonology. In addition, he believes in offering the best professional support to other specialties as and when required. With his expertise and experience in various aspects of pulmonology, coupled with the state-of-the-art technology, he would like to see Virinchi Hospitals in a different league.



Dr. Uthara Vijai Kumar

MBBS, DNB (Respiratory Medicine)

Consultant Pulmonologist

Dr. Uthara Vijai Kumar is a Consultant Pulmonologist in the Department of Pulmonology at Virinchi Hospitals of Prior to Virinchi Hospitals, she worked as a Senior Registrar in the Department of Respiratory Medicine at Sunshine Hospitals and Yashoda Hospitals. She has hands-on experience in Thoracentesis, Chest drain, CVP Lines, Bronchoscopy (including TBNA, TBLB) and Medical Thoracoscopy. Interventional bronchoscopy, Lung cancer, sleep disorders and ILD are her areas of interest.



ENDOBONCHIAL ULTRASOUND (EBUS)

UNIQUE FEATURES

- Real-time sampling
- Accurate and precise
- High-resolution imaging display helps in better detection & characterization of lesions
- Reduces biopsy sampling errors due to superior site selection

THERAPEUTIC APPLICATIONS

- Staging of lung cancer
- Mediastinal abnormalities
- Lymph node enlargement
- Non-thrombotic endovascular lesions (NELs)
- Endobronchial lesions
- Peripheral pulmonary nodules



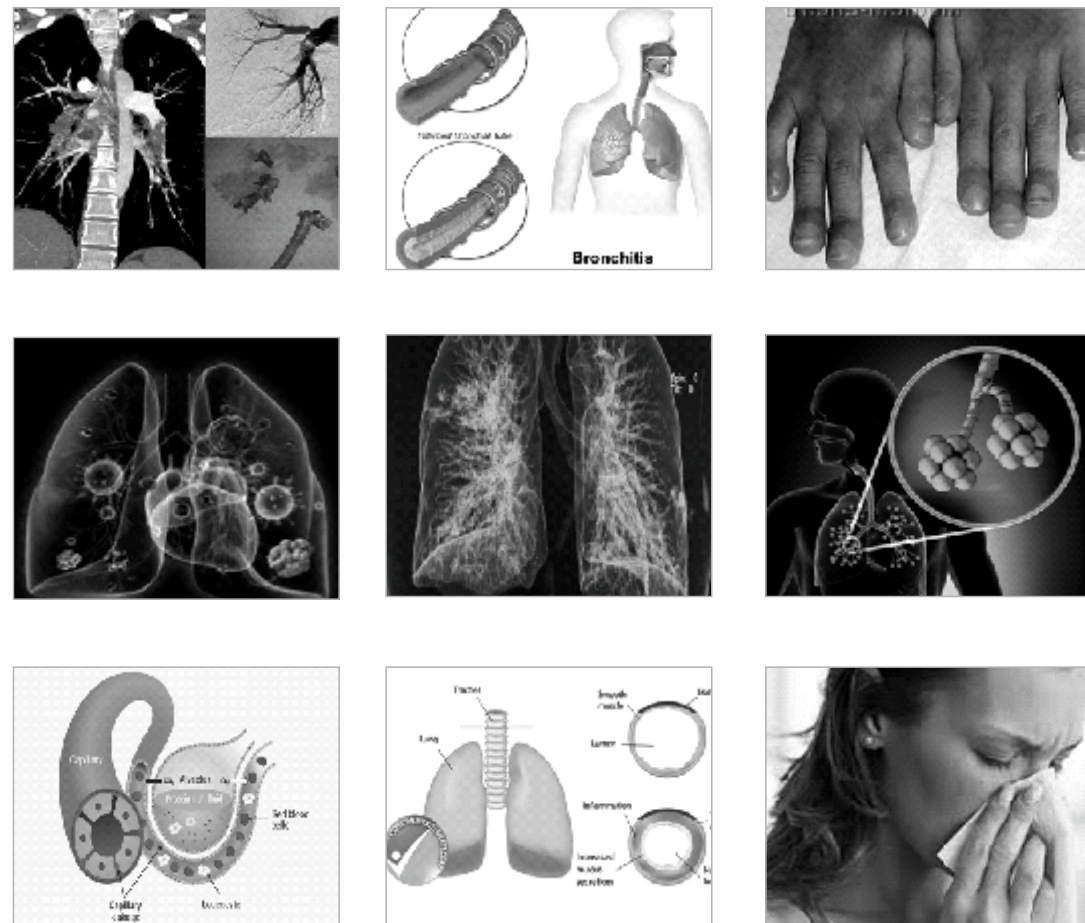
FLEXIBLE VIDEO BRONCHOSCOPIES

UNIQUE FEATURES

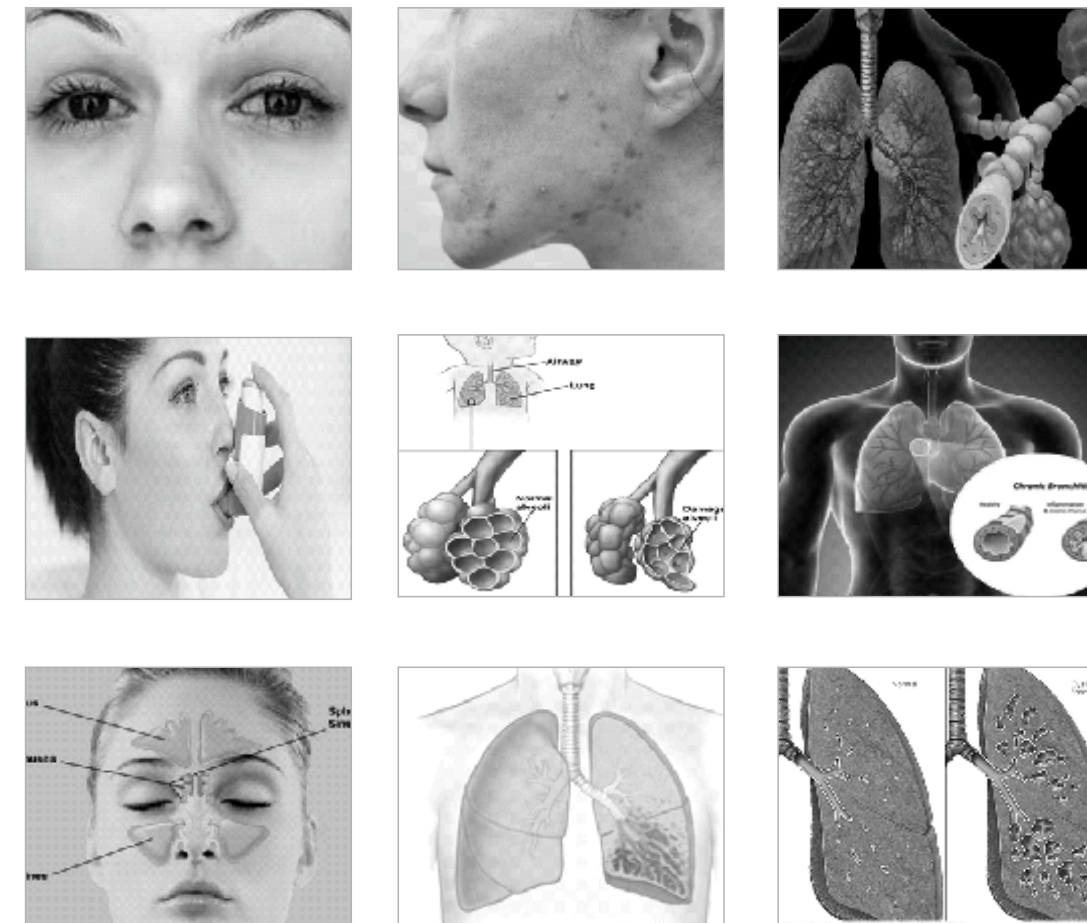
- Works seamlessly with a wide range of endoscopes
- Advanced Visualization
- Narrow Band Imaging(NBI)
- Advanced Maneuverability

THERAPEUTIC APPLICATIONS

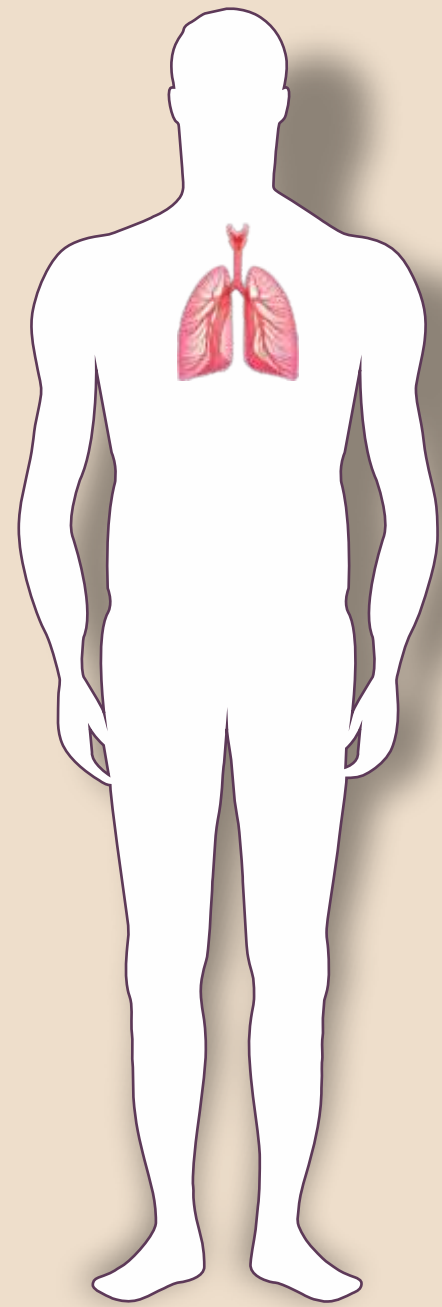
- Abnormalities of airway
- Inflammatory conditions of lungs
- Sarcoidosis
- Lymphoma
- Tuberculosis (TB)
- Pneumonia
- Fungal or parasitic lung infections



- Allergies
- Angioedema
- Atopic dermatitis
- Bronchiectasis
- Chronic Bronchitis
- Chronic lung disease
- Emphysema, including lung volume reduction surgery
- Food or drug allergies
- Fungal infections of the lung
- Granulomatosis with polyangiitis (Wegener's granulomatosis)
- Granulomatous lung diseases
- Hepatopulmonary syndrome
- Home mechanical ventilation
- Idiopathic pulmonary fibrosis
- Insect hypersensitivity
- Lung Cancers and other pulmonary disorders
- Pneumothorax
- Porto pulmonary hypertension
- Pulmonary Embolism
- Pulmonary embolism
- Pulmonary Sarcoidosis
- Pulmonary vascular diseases
- Pulmonary Rehabilitation



- Respiratory failure (I & II)
- Sarcoidosis
- Sleep disorders like obstructive sleep Apnoea and central Apnea
- Tuberculous and nontuberculous mycobacterial pulmonary disease
- Bronchial Thermoplasty (Severe Asthma Treatment)
- Bronchoscopic Argon Plasma Coagulation (APC)
- Bronchoscopic Cryotherapy
- General Pulmonary & Critical Care
- Lung Transplant
- Non Invasive Ventilation
- Paediatric Pulmonary Care
- Pleural Aspiration
- Pleural Procedures
- Tracheo-bronchial stenting
- Bronchoscopic Electrocautery
- Bronchoscopic Laser ablation
- Chest Tube/ Intercostal Drain
- Positive Airway Pressure (PAP) Titration Sleep Study
- Pulmonary Hypertension Treatment



BIOCHEMICAL



ELECTROPHYSIOLOGICAL



HISTOPATHOLOGICAL



ANATOMICAL



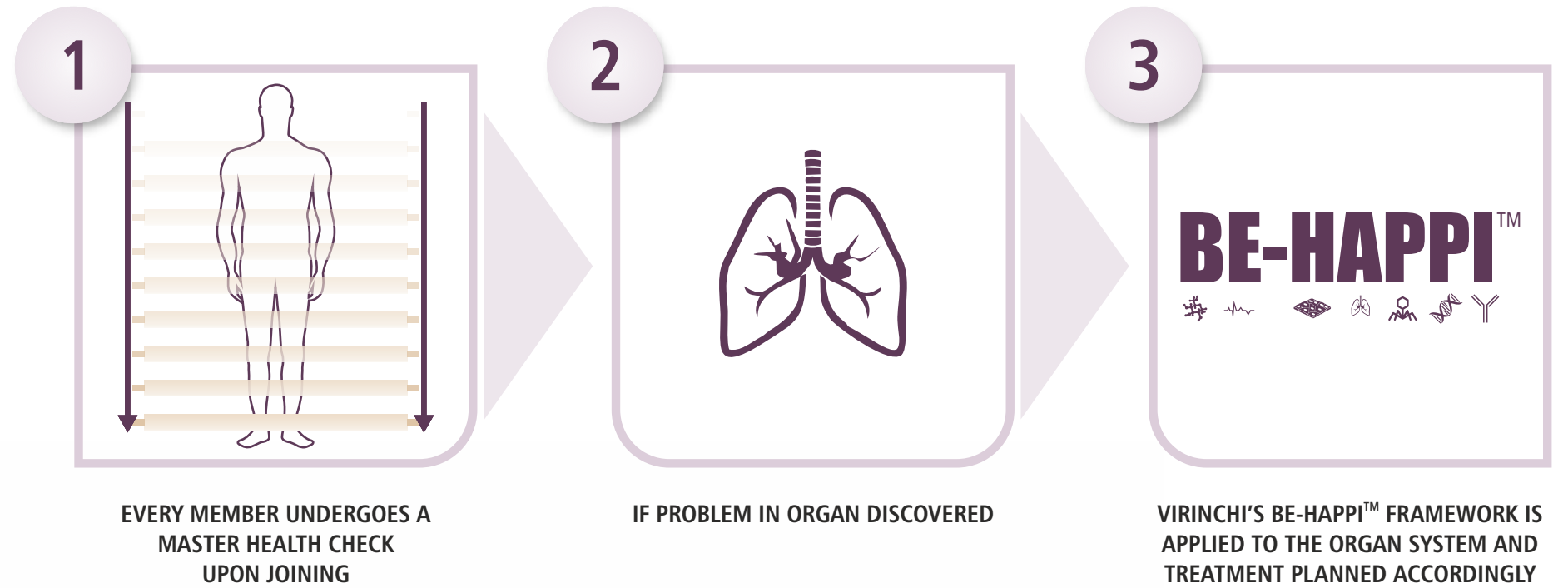
PATHOGEN SCREENING



PHENOTYPIC & GENETIC



IMMUNOLOGICAL



Biomarkers are biological indicators that provide us with a means of understanding the relationship between measurable biological processes and clinical outcomes for evaluating health and wellness. Further, the study of biomarkers enables us to devise treatment options for all disorders and diseases since they enhance our understanding on physiology and anatomy of an individual.

Proper functioning of every organ and system in our body is essential for us to live a healthy and good quality of life as we progress through various phases of our life. Any deviation from performing one function may result in disordered physiological processes and will be associated with either symptomatic or asymptomatic disorder. If the disorder is manifested in the form of symptoms and signs, then it can be identified accurately with the help of specific diagnostics tests. However, asymptomatic disorders that typically do not show any clinical symptoms and signs could gradually lead to secondary complications affecting one or multiple systems that may be difficult to understand and treat.

Therefore it is very essential to understand the health of all the organs and systems of our body irrespective of respective/overall disorderliness with or without any symptoms in order to understand thoroughly whether any function is impaired or progressing towards impairment with the help of comprehensive diagnostic tests. Virinchi's proprietary BE-HAPPI™ evaluates the health status of every organ and organ system from a biochemical, electrophysiological, histological and cytological, anatomical, pathogenic, phenotypic and genotypic, immunological perspectives. The influences of these factors on biomarker levels also indicate disorder's onset and/or its progression either as an independent or comorbid consequence.

With advanced and sophisticated technology housed in world-class infrastructure, and strong rooting in evidence-based medicine, Virinchi is well-positioned to undertake this comprehensive analysis to derive accurate and predictable diagnosis, thus enabling its physicians to devise individual-specific predictive, preventive and reactive therapies and interventions.

VIRINCHI'S PROPRIETARY BE-HAPPI™ DIAGNOSTICS FRAMEWORK

VIRINCHI'S PROPRIETARY BE-HAPPI™ DIAGNOSTICS FRAMEWORK



Biochemical



Many of the biological molecules including nucleic acids, proteins, lipids, fats and naturally occurring small chemicals that are formed due to metabolic and physiological activities serves as important contributors to understand the health of every organ and system in our body; and also help us to evaluate the nature and degree of disorderliness across systems and organs with the help of analytical, cytological, histochemical and immunological methodologies.

PARAMETERS TESTED @ VIRINCHI

Acidic fibroblast growth factor (FGF), ACRP-30, Activin-A, Adhesion molecules (E, L-SELECTIN, I-CAM-1, V-CAM-1, VWF), Alpha-fetoprotein, Anaplastic Lymphoma Kinase (ALK), Apo A-I, Apo B-100, Arterial Blood Gases, ASC, b-glucuronidase, C reactive protein, Calgranulin, Cancer antigen-125 (CA-125), Carbohydrate antigen-19.9 (CA-19.9), CK-19, Complement component 9 (C9), Cytokeratin-19 fragments (CYFRA 21-1), Endoglin [CD105], Eotaxin-2, Epidermal growth factor (EGF), Epidermal Growth Factor Receptor (EGFR), Extracellular signal-regulated kinase (ERK), Haptoglobin β chain [Hp β], HDL-C, Hepatocyte growth factor (HGF), Human neutrophil peptides (HNP), IL-13, Immunoglobulin heavy delta chain, Insulin like growth factor (IGF-1), Insulin-like Growth Factor-Binding Protein-2 (IGFBP-2), Interferon- γ (IFN- γ), Interleukin (IL)-8, Keratinocyte growth factor (KGF), LDH (Lactate Dehydrogenase), LDL-C, Lysophospholipids, Macrophage inflammatory protein (MIP) -1 α , Major histocompatibility complex class II DP Beta 1 (HLA-DPB1), Matrix metalloproteinase (MMP)-9, Matrix Metalloproteinase-1 [MMP-1], MIP-1A, Monocyte chemotactic protein (MCP)-1, MPlF-1, Mucin-associated antigens (KL-6/MUC1), N-acetyl-proline-glycine-prolin, Neopterin, Neutrophil elastase (NE), NF- κ B, Nicotinamide N-methyltransferase, p21(Cip1)-interacting zinc finger protein (Ciz1), Phosphatidylcholines (PCs), Phosphatidylethanolamines (PEs), Phosphatidylinositols (PIs), Phosphoinositide 3-kinases (PI3-K), Plasma kallikrein (KLKB1), Platelet derived growth factor (PDGF), Pro-gastrin-releasing Peptide (proGRP), Progesterone Receptor Membrane Component 1/ sigma-2 Receptor (Pgrmc1), Prostaglandin D2 synthase (PTGDS), Retinoic acid, Serum amyloid A (SAA), Serum Ferritin, sIL-2R, Sphingolipids, Spleen Tyrosine Kinase (Syk), Surfactant protein A (SP-A), Surfactant protein B (SP-B), Surfactant protein D (SP-D), Thrombospondin 1, TNF, Total Cholesterol, Transforming Growth Factor- β (TGF- β), Triglyceride, Tumor M2- pyruvate kinase (PKM2), Tumor necrosis factor α (TNF- α), Type III procollagen, Urokinase Plasminogen Activator Receptor (uPAR), Vascular endothelial growth factor (VEGF).

Electrophysiological



Electrodiagnostic biomarkers provide information on electrical activity (action potential) due to native or altered electrophysiology of cells and tissue or their response towards electrical stimuli (evoked potential). Typically, electrocardiography (ECG), electroencephalography (EEG), and electromyography (EMG) are employed to measure the electrical activity values and help to diagnose, evaluate, and treat the individual with impairments of the neurologic or neuromuscular or muscular systems.

PARAMETERS TESTED @ VIRINCHI

Sympathetic skin response(SSR), Resistance and lung volume measurement-Pneumograph, Pulmonary function -impedance pulmonary function system (IPFS)

Histopathological



Cytopathology and Histopathology observations of cells and tissue allow the understanding of gross structural, physiological and molecular changes at the cell and tissue level respectively. These microscopic observations with grading and staging are vital to understand the response of cells to due to external stimuli or DNA level changes which either might result into a transient change or pathological consequence requiring suitable surgical or medical or radiological therapy.

PARAMETERS TESTED @ VIRINCHI

Anti-Human Epithelial Antigen, Ber-EP4 by Immunohistochemistry, Calretinin by Immunohistochemistry, CD15, Leu M1, CD56 (NCAM), Cytokeratin 19 Fragment (CYFRA 21-1), Cytokeratin 20 (CK 20), Cytokeratin 5.6 (CK 5,6), Epithelial-related Antigen, Fibroblastic focus (FF), IHC-CK7, Iroquois homeobox 5, Lysosomal-associated membrane protein 3, Microfibrillar-associated protein 4, Napsin A, Pan Cytokeratin (AE1,3) by Immunohistochemistry, Precision Cut Lung Slices (PCLS), Secretoglobulin, family 1A, member 1 (uteroglobin), Solid Tumor Mutation Panel, Soluble Mesothelin Related peptides, Thyroid Transcription Factor (TTF-1), Transmembrane protein 100, Wilms Tumor (WT1), N-terminus

Anatomical



Imaging techniques offer sensitive and precise visualization and also digitization of anatomical features of organs and systems of the body. It helps the patient or individual to undergo a gamut of pain free investigations, non-invasively. And these biomarkers can be measured using either radiological or non-radiological modalities such as, X-ray, CT, Ultrasonography, Electroencephalography, Magnetoencephalography, and Magnetic Resonance Imaging in order to provide us with either qualitative or quantitative measure of the anatomical features and physiological processes such as blood flow.

PARAMETERS TESTED @ VIRINCHI

Coronal 2-fluoro-2-deoxy-d-glucose-PET, Airway stenosis, Coronal subtraction perfusion image of lung, Diffused tree-in-bud opacities in CT Image, Emphysema volume and distribution, Fat attenuation in the right lobe nodule nodule in CT, First pass lung perfusion (embolism, hypoxic vasoconstriction) - 3D gradient echo T1-weighted, Fractal dimension, High resolution angiogram (embolism AVM) - 3D gradient echo T1-weighted, Infiltrates - Fast spin echo T2-weighted, Iodine and FDG Uptake, Lobe volumes, Lung Lesions - diffusion-weighted imaging (DWI) MRI, Lung parenchyma perfusion - First Pass Perfusion MRI, Lung parenchyma volume, Lymph nodes bone metastases - Fast spin echo T2-weighted, Lymph nodes bone metastases - Short tau inversion recovery, Masses - Fast spin echo T2-weighted, Nodules and masses - Diffusion weighted imaging (DWI), Nodules and masses - Fast spin echo T2-weighted, Pulmonary arterial tree - MR angiography, Pulmonary embolism - MR angiography and MR perfusion, Pulmonary embolism - Steady state GRE, Pulmonary nodules, masses, airways - 3D gradient echo T1-weighted, Respiration mechanics - Steady state GRE, Spiculated mass in the left lower lobe in CT

Pathogen screening



Pathogen screening helps to find out either presence or absence of all the relevant pathogenic microorganisms including - bacteria, fungi, viruses, mycoplasma and protozoans. This identification process allows the healthcare provider with specific information on every possible mode that can be implemented towards prevention, treatment and eradication. It also allows the physician to decide pathogen specific medication in suitable dosage and form for effective and safe elimination without causing any adverse effects to the affected patient.

PARAMETERS TESTED @ VIRINCHI

Bacillus species, Aspergillus, Blastomyces dermatitidis, Bordetella pertussis, Branhamella catarrhalis, Chlamydia pneumoniae, Chlamydia psittaci, Coccidioides immitis, Corynebacterium diphtheriae, Histoplasma capsulatum, Influenzavirus A, Klebsiella pneumoniae, Legionella pneumophila, Measles Virus, Mucor, Mumps Virus, Mycobacterium tuberculosis, Mycoplasma pneumoniae, Neisseria meningitidis, Pneumocystis jiroveci (carinii), Respiratory Syncytial Virus (RSV), Rhizopus, Staphylococcus aureus, Streptococcus pneumoniae, Streptococcus pyogenes

Phenotypic & genetic



Changes brought about to the DNA, RNA and their respective derivatives due to germline or somatic mutations influence an individual's overall existence and susceptibility or resistance towards a wide variety of disease causing infectious agents. Understanding the underlying molecular details with the help of advanced/next generation sequencing technologies provides insights into either devising a therapeutic or corrective intervention.

PARAMETERS TESTED @ VIRINCHI

ABCA3, CDKN1A, Clara-cell protein -CC16, Cytochrome B-Reductase 1 (CYBRD1), D13S170, D9S286, D9S942, DAPK1, E2F4, E74 like factor 1 (ELF1), Erythroblastosis virus E26 oncogene homologue (2ETS2), ESR1, FABP3, FHIT, Filamin A (FLNA), GATA49D12, GJB1, HIC1, HS3ST2, IL-1ra, ITAC/CXCL-11, K-ras gene, LTB4, MEK1, NKX2.1, p53 gene, PARC, PAX3, Peroxiredoxin 1 (PRX1), PRDM2, PRKCCBP, PRSS3 (serine protease family member-trypsinogen IV - a putative tumor suppressor gene), RAP1, RAR, RASSF1, RIPK3, ROS, SFN, s-ICAM-1, SLX, Surfactant protein C gene (SP-C), TMS1, Tumor suppressor p16INK4a

Immunological

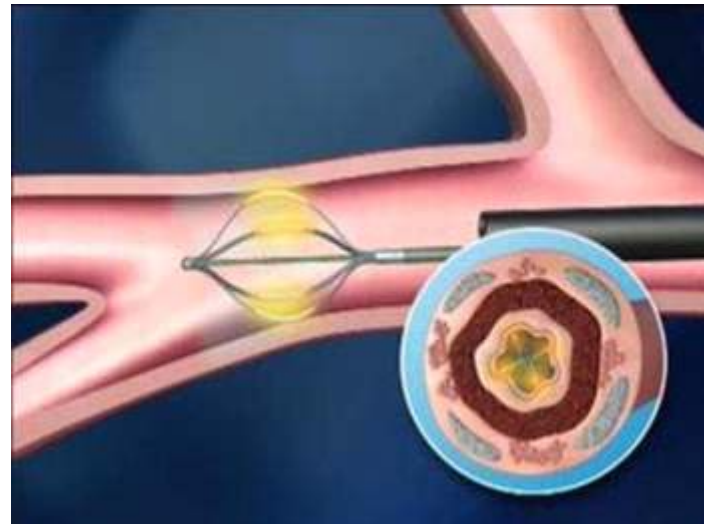


The immunologic Biomarkers provide insights into the body's response towards cancer, infectious diseases, immunization, immunodeficiency, allergies, asthma, autoimmunity, and others. These features can be studied from variety of biological specimens by using highly advanced and high throughput immune assay systems. And these biomarkers also help to understand the extent of disease progression and probability of positive prognosis for a wide range of diseases.

PARAMETERS TESTED @ VIRINCHI

Allergen-specific IgE antibody Test, Angiotensin converting enzyme (ACE), Anti serum antibodies, Anti-CCP antibodies, Anti-ds DNA Test, Anti-elastin*, anti-GBM autoantibodies, Anti-JO-1 autoantibodies, Antinuclear (or anti-cytoplasmic) antibodies, Anti-SRP antibodies, Anti-tRNA synthetase antibodies, H. influenzae antibodies, IGFBP-2 and anti IGFBP-2 autoantibody, IgG, IL-8 autoantibodies, S. pneumoniae antibodies, Serum IgE testing to Aspergillus fumigatus

ALAIR BRONCHIAL THERMOPLASTY SYSTEM



- A modality for treating asthma and is thought to prevent the chronic structural changes that occur in the airway smooth muscles (ASM) in individuals with asthma
- Bronchial thermoplasty targets Airway Smooth Muscles by delivering a controlled specific amount of thermal energy (radio frequency ablation) to the airway wall through a dedicated catheter

DRY POWDER INHALER DEVICE WITH PULMOSPHERE TECHNOLOGY

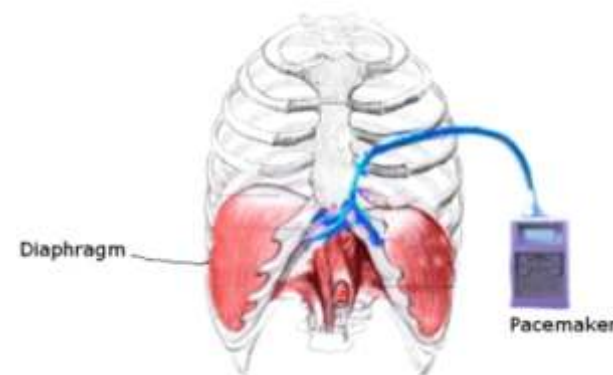
- An emulsion-based spray-drying process that enables the production of light porous particles, dry-powder formulations, which exhibit improved flow and dispersion from passive dry powder inhalers



DIAPHRAGM PACING SYSTEM

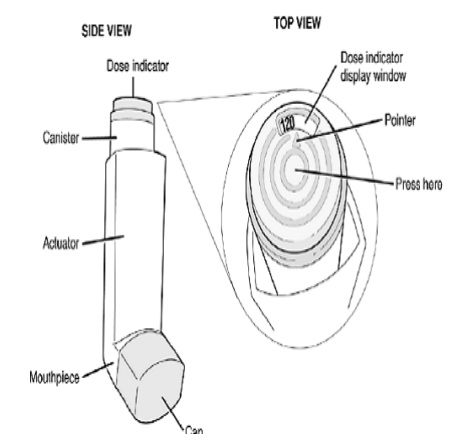


- A groundbreaking neurostimulation technology for treating people with both Amyotrophic lateral sclerosis (ALS) and other breathing problems
- Electronic Program Guide is a stimulator box that sends electrical signals to the diaphragm, replacing the signals normally send by your brain along your nerves
- The signals cause the diaphragm to contract, which conditions and exercises the muscle. The EPG settings are adjusted by doctor to match natural and comfortable breathing pattern



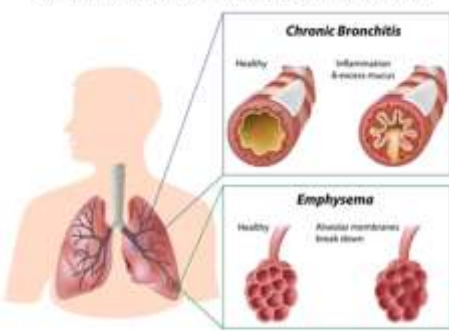
GLYCOPYRROLATE / FORMOTEROL FUMARATE

- A prescription medication used to treat adults with chronic obstructive pulmonary disease (COPD), including chronic bronchitis, emphysema, or both
- A new long-term treatment for adults with Chronic Obstructive Pulmonary Disease (COPD)
- Helps the muscles around the airways in your lungs stay relaxed in two way- an anticholinergic and long acting beta2-adrenergicagonist (LABA)
- Comes in the most commonly used inhaler
- It is the first and only FDA-approved medication designed to deliver COPD medicine throughout the airways in lungs



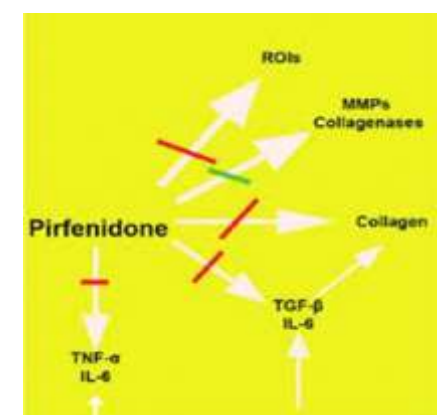
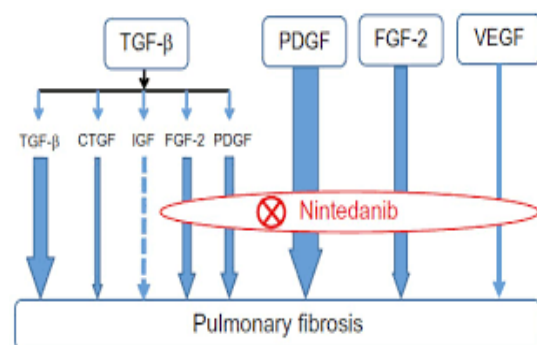
COMBITIDE STARHALER FOR ASTHMA AND COPD

Chronic Obstructive Pulmonary Disease (COPD)



- Combitide Starhaler for asthma and Chronic Obstructive Pulmonary Disease (COPD) is a 60-dose dry powder inhaler containing a steroid and a beta agonist formulation
- Designed to treat patients with asthma and Chronic Obstructive Pulmonary Disease (COPD), using a novel de-agglomeration engine to separate the drug from the carrier particles

NEW MEDICATIONS FOR IDIOPATHIC PULMONARY FIBROSIS



- Nintedanib, a Tyrosine Kinase Inhibitor, targets growth factor receptors involved in the mechanisms by which pulmonary fibrosis occurs
- Most importantly nintedanib inhibits the platelet-derived growth factor receptor (PDGFR), fibroblast growth factor receptor (FGFR) and vascular endothelial growth factor receptor (VEGFR)
- Pirfenidone inhibits cell proliferation, apparently by inhibiting DNA synthesis, in human myometrial and leiomyoma cells and also decreases levels of mRNAs encoding collagen I and collagen III in these cells
- In human retinal pigment epithelial cells, pirfenidone inhibits a transforming growth factor (TGF)- β 1-induced increase in fibronectin synthesis

NIVOLUMAB AND PEMBROLIZUMAB

- One important braking molecule targeted by checkpoint inhibitors is called PD-1, found on certain immune cells

