GE Healthcare

Discovery™ NM 530c and Discovery™ NM/CT 570c
It’s time for a revolution in nuclear cardiology

If the future arrived today, what could you accomplish?

GE is committed to pioneering technologies that enable clinicians to change the way that healthcare is delivered to patients. No where is this commitment stronger than in nuclear cardiology.

This is the nuclear imaging system you’ve imagined with the revolutionary capabilities that you told us you needed:

- Better image quality to improve visualization and diagnostic confidence.
- More accurate access to dynamic function and flow.
- Flexibility to manage dose more effectively.
- Faster exams to optimize patient care and workflow.

We’ve met the challenge and can now bring to you:

- An up to 4 fold increase in sensitivity and zero equipment motion for improved image quality.
- Potential new clinical applications for 3D dynamic acquisitions enabling first pass and other dynamic applications.
- The choice for dose reduction, fast acquisition or improvement in statistics - it’s up to you.
- Scans as fast as 3 minutes improving your workflow and patient experience.

Alcyone technology harnesses four leading-edge technologies in nuclear imaging: CZT detectors, focused collimation, 3D reconstruction, and stationary data acquisition. The sum of their strengths is an imaging platform with powerful new capabilities to help you increase diagnostic confidence and efficiency, and achieve your goals in nuclear cardiology. Available in SPECT (Discovery NM 530c) and SPECT/CT (Discovery NM/CT 570c) configurations, Alcyone technology will take your department and your work to new heights.
Did you ever wonder when you’d see another true advancement in nuclear cardiology? Now is the time to take one giant step forward.

Alcyone technology brings together innovative solutions with the potential to redefine the way in which physicians study the heart.

**CZT Detectors: A brilliant leap in resolution**

Image quality in nuclear medicine has been held back by the limitations of traditional detector designs. Alcyone technology breaks through these barriers with unique cadmium zinc telluride (CZT) detectors. When combined with an Application Specific Integrated Circuit (ASIC), these detectors directly convert gamma rays into digital signals without the need for photomultiplier tubes. Alcyone technology combines CZT’s high stopping power with direct, lossless conversion to deliver improved energy, spatial and temporal resolution.

**Focused Collimation: More information, less time**

Another advancement with Alcyone is the use of focused multi-pinhole collimation to improve sensitivity and detection efficiency. This GE exclusive design features an array of multi-pinhole collimators strategically positioned to view a specific body segment. With all pinholes focused on this segment – a volume large enough to encompass the heart – Alcyone delivers a “quality field of view” that focuses on cardiac anatomy and pathology with greater clarity and speed.

**Stationary Data Acquisition: No motion equals fewer artifacts**

With Alcyone’s focused collimation design, all views are acquired simultaneously during a fully stationary SPECT acquisition. Unlike other systems, the detectors and collimation are in a fixed position relative to the patient’s body during acquisition, so there is no equipment movement during the scan. This virtually eliminates the risk of motion artifacts due to inconsistent projections, resulting from patient movement projection to projection. It also significantly shortens scan times, reducing the frequency and magnitude of artifacts caused by patient motion or physiological changes.

**3D Reconstruction: Do more with your data**

Alcyone takes advantage of a proprietary, fully 3D iterative reconstruction, developed and implemented in order to generate accurate and easily interpretable images of the myocardial region. The reconstruction model accounts for acquisition, detector geometry and physics, scatter and specific detector efficiencies and has been optimized for the best results in each clinical protocol.
It’s time to expand your capabilities

Have you wished there were a better way to find the answers you need? Now is the time to think big.

The Discovery NM 530c system with Alcyone technology gives you highly versatile capabilities, enabling you to acquire more data and do more with it. Consider how your clinical practice might be enhanced with a nuclear cardiology system that can:

- Acquire volumetric dynamic SPECT data, opening the door to future flow applications.
- Stop on a desired number of counts for SPECT and gated SPECT studies, so you can personalize acquisitions to each patient assuring adequate information density.
- Acquire the sum of accepted and rejected beats during gated SPECT to eliminate the effects of gating errors on perfusion images.
- Manually stop SPECT and gated SPECT scans while retaining acquired data to enable complete studies even when procedures have to be terminated prematurely.
- Acquire list mode data, so you can see every event and mine patient data in new ways.

You’ll also be able to use a wide array of imaging agents. The Discovery NM 530c system is optimized for energies from 40 to 200 keV, a broad range that encompasses such isotopes as Tc99m, TI201, and I123 for single or dual isotope imaging. There’s no need to change collimation when switching from one of these isotopes to another, and the excellent energy resolution has the potential to enable simultaneous isotope acquisitions. Furthermore, Alcyone technology provides the same intrinsic spatial resolution for all isotopes, improves contrast in TI201 procedures, and lower penetration in I123 studies.

The high sensitivity delivered by Alcyone technology translates to faster acquisitions – up to four times faster than conventional cameras. This means fewer motion artifacts, less camera time for your patients, and faster study throughput.

Stationary detectors hug the patient throughout the scan, expanding the patient’s line of sight and eliminating the risk of camera-body impact. Exclusively designed arm and leg supports reduce joint strain and enable more natural positioning.

The Discovery NM 530c also supports prone imaging, allowing you to gain more data to differentiate attenuation artifacts from perfusion abnormalities without increasing radiation exposure.
It’s time to push SPECT/CT to its boundaries

Have you imagined exploring the heart using volume coverage and thin slices? Now is the time to start making plans.

Discovery NM/CT 570c ushers in the first generation of volume SPECT/CT technology, opening the door to new procedure possibilities in non-invasive cardiac imaging beyond those offered by conventional SPECT or SPECT/CT scanners.

This leap is achieved through the combination of Alcyone technology, and a revolutionary system design that enables the clinician, for the first time ever, to utilize volume coverage and thin slice imaging concurrently in a cardiac scan.

Complete cardiac scan in less than 5 minutes acquisition time

By combining Alcyone technology with the capabilities of a 64-slice Lightspeed VCT, the Discovery NM/CT 570c enables a complete cardiac scan consisting of SPECT, Attenuation Correction, Calcium Scoring and CT Angiography in less than 5 minutes acquisition time. The speed and comprehensive nature of this procedure represents a significant improvement in patient care and diagnostic confidence.

Faster workflow, fewer artifacts

Discovery NM/CT 570c streamlines workflow for cardiac hybrid SPECT/CT acquisitions. The ability to scan the patient in the same position on the same table reduces registration and motion artifacts, shortens acquisition time compared with separate SPECT and CT exams, and enables more convenient patient scheduling.

Reducing cardiac CT dose by 83%

Dose is a critical issue when conducting a comprehensive cardiac scan. The Discovery NM/CT 570c with the Snapshot Pulse option delivers up to an 83% reduction in CT dose.

Discovery NM/CT 570c is a true breakthrough in SPECT/CT scanner speed, dose management, workflow, and clinical performance.
It’s time for research to meet reality

What innovation can we translate next?

Unmet clinical needs in healthcare have led researchers to focus their investigation on better understanding the biological processes and pathways of diseases. With advances in transgenics and the rapid development of animal models, they increasingly utilize pre-clinical imaging to visualize phenotypes, study the progression of disease and evaluate the efficacy of potential treatments.

Pre-clinical imaging serves both the understanding of disease development and the development of new therapeutics by using the advanced imaging technologies on animal disease models. These developments are opening innovative applications in the field of clinical diagnostic imaging, as results gathered at research level are translated to human applications, both from a technological and clinical perspective.

GE Healthcare’s translational research from animals to man for Aloyne technology began with the introduction of the pre-clinical eXplore speCZT/CT and Triumph PET/SPECT/CT systems. The SPECT detectors are based on CZT solid state technology and pinhole collimation, offering improved energy and spatial resolution, higher count rate and miniaturization. The studies performed with the eXplore speCZT/CT and Triumph PET/SPECT/CT systems demonstrated that the significant improvement in energy resolution and sensitivity could significantly impact many cardiovascular challenges by potentially enabling capabilities such as quantification, simultaneous isotopes and dynamic studies.

Dynamic imaging

The murine SPECT/CT images below demonstrate the ability to perform dynamic imaging studies over 30 sec time intervals using Tc99m-DTPA.

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Dual isotope imaging

The murine SPECT/CT images below, performed on an eXplore speCZT/CT, demonstrate a simultaneous dual isotope study depicting Tl201 myocardial perfusion (green) and Tc99m labeled blood plasma (yellow).

Triple isotope imaging

The murine SPECT/CT image below, performed on the Triumph system, demonstrates multi-isotope imaging capabilities using Tc99m-DTPA (orange), Tl201 (green), and I123 (blue).

Images courtesy of Dr. T. Doyle, Stanford Small Animal Imaging Facility, California, USA

Images courtesy of Dr P. Choquet and Pr. A. Constantinesco, Hôpital de Hautepierre, Strasbourg, France

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Where will you take nuclear cardiology next?

GE Healthcare is leading the way in healthcare innovations. The years of research dedicated to the next generation of detector technology are clearly paying off today.

We have built a solid foundation for your nuclear cardiology department to grow from. It started with the Ventri™ system and its innovative, open architecture that enabled you to image 99% of your patient population with confidence. The Discovery NM 530c is the next step forward, taking the Ventri platform to a higher level with our breakthrough Alcyone technology and its potential for improved image quality, faster scan times, advanced applications, and lower dose.

Rest assured that in moving forward, we are leaving no one behind. GE Healthcare provides a practical upgrade pathway from Ventri to the Discovery NM 530c and Discovery NM/CT 570c systems – so you can expand your nuclear cardiology capabilities to meet your changing needs.

In the meantime, let’s keep talking and working together to write the next chapter in nuclear cardiology and bring it to life.
Scar

Overview
Patient
74 Y/O male; height: 168 cm; weight: 66 Kg; BMI: 24.9
Medical History
CAD, 2 vessel disease, ischemic cardiomyopathy
Procedure
One day high dose stress / low dose rest
Stress type: pharmacological
Diagnosis
Anterior-apical akinetic and partly dyskinetic scar.
No ischemic areas, but a massively diminished LVEF; 19% Ejection Fraction

Negative Ischemia

Overview
Patient
58 Y/O female; height: 162 cm; weight: 64 Kg; BMI: 24.9
Medical History
History CAD, CP, Abn ECG, R/O CAD
Procedure
Low dose rest / high dose stress
Stress type: Exercise
Diagnosis
Negative for ischemia 78%

Ischemia

Overview
Patient
68 Y/O female; height: 163 cm; weight: 83 Kg; BMI: 24.9
Medical History
R/O CAD, HTN, Dyslipidemia, DM
Procedure
Low dose rest / high dose stress
Stress type: Exercise
Abnormal ECG
Diagnosis
Lateral wall ischemia. 55% Ejection Fraction

Overview
Patient
74 Y/O male; height: 168 cm; weight: 65 Kg; BMI: 23
Medical History
CAD, 2 vessel disease, ischemic cardiomyopathy.
Anterior-septal myocardial infarction in 2001
PTCA/Stenting of a LAD occlusion was then performed.
CvRF: hypertension, dyslipidemia
Procedure
One day high dose stress / low dose rest
Stress type: pharmacological
Diagnosis
Anterior-apical akinetic and partly dyskinetic scar.
No ischemic areas, but a massively diminished LVEF; 19% Ejection Fraction

Overview
Patient
63 Y/O male; height: 170 cm; weight: 104 Kg; BMI: 36
Medical History
Evaluate known CAD, HTN, Dyslipidemia, CABG
Procedure
Low dose rest / high dose stress
Stress type: Exercise
Abnormal ECG
Diagnosis
Lateral wall ischemia. 55% Ejection Fraction

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Patient
63 Y/O male; height: 168 cm; weight: 65 Kg; BMI: 23
Medical History
CAD, 2 vessel disease, ischemic cardiomyopathy.
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Healthcare Re-imagined

GE is dedicated to helping you transform healthcare delivery by driving critical breakthroughs in biology and technology. Our expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, drug discovery, and biopharmaceutical manufacturing technologies is enabling healthcare professionals around the world to discover new ways to predict, diagnose and treat disease earlier. We call this model of care “Early Health.” The goal: to help clinicians detect disease earlier, access more information and intervene earlier with more targeted treatments, so they can help their patients live their lives to the fullest. Re-think, Re-discover, Re-invent, Re-imagine.

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