

Circulating Rare Cell Positive Enrichment & Retrieval System

Abnova's CytoQuest™ CR is a non-invasive system for capture, enumeration, isolation and retrieval of circulating rare cells (CRCs). Three major subtypes of CRCs in translational research and clinical studies are circulating tumor cells (CTCs), circulating progenitor cells (CPCs), and circulating fetal cells (CFCs). A challenge for market adoption of CRCs is the efficient and reproducible identification, single cell isolation, and retrieval of highly pure and viable CRCs, with their applications supported by a wide repertoire of standardized, GMP grade bioreagents.

CytoQuest™ CR technology utilizes SCx™ spiral chamber, HBx™ micromixer, antibody immobilized nanoarray, and TCx™ thermal control to enable a multitude of CRC functions. SCx™ spiral chamber is equipped with a non-sticky coil and a self-contained micro-vibrator for unimpeded delivery of pretreated blood sample into the nanoarray. HBx™ micromixer provides a herringbone conduit for cell mixing. CytoChipNano is a streptavidin nanoarray which captures the CRCs for cell enumeration and single cell isolation by laser micro-dissection or micromanipulation. CytoChipNano CR is a specialized streptavidin nanoarray with thermo-sensitive coating which captures and releases the CRCs via a TCx™ thermal control of alternating temperatures.

Monoclonal antibodies targeting specific surface biomarkers of circulating rare cells can be flexibly interchanged to accommodate the biomarker switch in CRC progression. This results in highly pure and viable CRCs for downstream protein characterizations, gene analyses, and cell assays. Cell enumeration is currently the only FDA approved application as a prognostic marker in breast, prostate, and colorectal cancers. In contrast, effective single cell isolation and retrieval of CRCs opens up new scope of applications in the diagnostic and pharmaceutical industry.

Subtypes of CRCs

- Circulating tumor cells (CTCs)
- Circulating progenitor cells (CPCs)
- Circulating fetal cells (CFCs)

Applications of CRCs

- Protein Characterizations
- Gene Analyses
- Cell Assays

Advantage of Integrated CytoQuest™ CR

- Bottle reservoir
- Fluidic handler
- SCx™ spiral chamber
- TBx™ tension balancer
- Coupler
- HBx™ micromixer
- Chip receptor
- TCx™ thermal chuck
- Touch user interface

Antibody-Based, Cell Capture

- Cell enumeration (CytoChipNano)
- Single cell isolation (CytoChipNano)
- Thermal cell release (CytoChipNano CR)



Bottle Reservoir



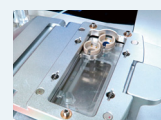
Fluidic Handler



SCx™ Spiral Chamber



Spiral Chamber Holder



TBx™ Tension Balancer



Coupler



Chip Receptor



HBx™ Micromixer



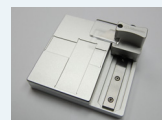
CytoChipNano



CytoChipNano CR



TCx™ Thermal Chuck



Chip Opener



Temperature Display



QR Code Scanner



Power On LED



Touch User Interface

CytoQuest™ CR system, SCx™ spiral chamber, TBx™ tension balancer, HBx™ micromixer, and TCx™ thermal control are trademarks and pending patents of Abnova Corporation.

CytoQuest™ CR

Hardware General Specifications	
Dimensions:	565.06 mm(h) x 340.8 mm(d) x 271.8 mm(w)
Weight:	18 kg
Power:	Fluidic Handler: 100-240 VAC, 50/60 Hz, 1.6 A Thermal Controller: 100-240 VAC, 50/60 Hz, 4.0 A
Replace Fuse:	Fluidic Handler: 1.6 A(Peak)/250 V Thermal Controller: 4 A (Peak)/250 V
Operating Temperature:	60°F to 104°F (15°C to 40°C)
Programable Thermo Control Profile:	4-40°C, Variable Time Span

Hardware Environmental Specifications	
Storage Temperature:	-5°F to 158°F (-20°C to 70°C)
Operation Altitude:	Up to 2000 m
Operation Environment:	For Indoor Use
Operating Humidity:	20% to 90% Relative Humidity, Non-Condensing
Storage Humidity:	20% to 95% Relative Humidity, Non-Condensing

Software Specifications	
Scanner Function:	Scanning Capability to Read QR Code/Barcode
Status Display:	Progress and Fluid Handling
System Clean:	Prime and Clean
Report Generation:	Print and Export File

Pad PC Specifications	
Operating System:	Windows 7/8/10 (32-bit and 64-bit)
Processor:	Pentium III/Celeron 866 MHz or Equivalent
Memory:	1GB Minimum (2GB Recommended)
Free Disk Space:	4GB
Interfaces/USB Ports:	USB 2.0 Port*1

Reference:

- Cell-surface Vimentin: A mislocalized protein for isolating csVimentin+ CD133- novel stem-like hepatocellular carcinoma cells expressing EMT markers. Mitra A, Satelli A, Xia X, Cutrera J, Mishra L, Li S. *Int J Cancer*. 2015 Jul 15;137(2):491-6.
- EMT, CTCs and CSCs in tumor relapse and drug-resistance. Mitra A, Mishra L, Li S. *Oncotarget*. 2015 May 8;6(13):10697-711.
- Epithelial–Mesenchymal Transitioned Circulating Tumor Cells Capture for Detecting Tumor Progression. Satelli A, Mitra A, Brownlee Z, Xia X, Bellister S, Overman MJ, Kopetz S, Ellis LM, Meng QH, Li S. *Clin Cancer Res*. 2015 Feb 15;21(4):899-906.
- Circulating Tumor Cell Enumeration with a Combination of Epithelial Cell Adhesion Molecule– and Cell-Surface Vimentin–Based Methods for Monitoring Breast Cancer Therapeutic Response. Satelli A, Brownlee Z, Mitra A, Meng QH, Li S. *Clin Chem*. 2015 Jan 1;61(1):259-66.