Indian Institute of Science Education and Research Mohali

Technical Specifications for LASER Capture Microdissection with Incubation system for fixed and live samples.

The system should be capable of collecting large as well as micro samples from slides or petri dishes using laser Micro dissection with single pulsed UV laser with long lifetime (solid state pulsed laser).

- Specimen collection should be on non-contact and against the gravity basis to prevent any kind of contamination.

- The system should be based on fully motorized advanced inverted microscope for live cell Microdissection.

- Laser path should be through epi-fluorescent illumination with possibility of simultaneous real-time fluorescence visualization and laser Microdissection.

- The laser focusing and power attenuation should be motorized and continuously adjustable from system software and should be programmed for settings of individual objective.

- Laser beam should be stationary and focused in the centre of the field of view to cut the sample at the focus.

- The system should enable fast, easy, single-cell and large area Microdissection of soft as well as non-soft tissues of size range of min. 5 µm or less to 100 µm or more.

- The system should be capable of micro dissecting live cell as well as sub-cellular structures such as chromosomes, organelles etc.

- System should allow one to keep the sample free in order to obtain morphologically intact specimen.

- System should be capable of morphologically intact Microdissection and its visualization in the collection vessel/cap.

- System should be suitable to use locally available and less expensive consumables (like standard micro centrifuge tubes/caps) for sample collection without requiring any special consumables / adhesives.

- System should be capable of laser micro dissection and microsurgery / irradiations of range of preparations including :

- Paraffin embedded tissue sections (new or archival).
- Frozen tissue cryosection (new or archival).
- Tissue culture in vitro.
- Chromosomal preparations.

- Cytospin (new or archival).
- Biofilm in vitro, e.g., moist materials.
- DNA Double Strand Breaks for protein studies in vivo (fluorescent mode).
- Plant tissue/cells in bright field as well as fluorescent mode.

- System should be suitable for laser Microdissection and collection of live cells inside sterile vessel/cap using Live Cell Collector.

The system should consist of following components:

01 Motorized Inverted Research Fluorescence Microscope with step size of 10 nm or better.

- 12V/100W halogen illumination with motorized 6-position condenser for DIC.

- Computer controlled high precision motorized scanning stage, with moving speed of 50mm/sec, repositioning accuracy of 1 micron, and with at least three slides holding positions as well as inserts for cell culture. The stage must be of the micro titer form factor.

- Objectives for 2x, 10X /0.3 or better, Long Distance 20X / 0.4 or better w/correction collar (WD 8.4- 7.4 mm), Long Distance 40X / 0.6 or better w/ correction collar (WD 3.3 – 2.5 mm) and 63X /1.25 oil/water or better. Objectives should be compatible for fluorescence visualization and microdissection.

- 100W/120W Pre-centered HBO/broad spectrum metal halide illumination for Fluorescence application along with six special laser suitable Bandpass FL filters for DAPI, FITC, green (GFP standard), yellow (YFP standard), blue (CFP standard), Rhodamine, UV etc.

- Motorized fluorescent attachment along with 6 position turret for mounting of fluorescent filters with automatic identification facility should be offered.

- Complete Automatic PlasDIC/Hoffman accessories for Live Cell applications should be offered as a standard with the system. Mentioned accessory modules must be engaged automatically in the light-path with respective objectives without any manual insert.

02. Specimen Collector

- Collection of dissected sample by non-contact way. The system should have motorized cap/collector for single and double cap collector. The system should allow using of 96-plate wells collector for multiple sample collection at a time. The collector may be integrated with diffuser (controlled through operating software) for better visibility of morphological information from uncovered specimen. Individual positions in 96 plate well collector must be programmed for specific sample collection after dissection. Collectors should be in light path only during Sample collection.

- It should accommodate at least three slides and three cap/collection tube at a time.

- Alignment of collector should be automatic through the software and there should be single button push possibility for the movement of the cap to and from the collecting position.

03. Incubation System:

- A complete software programmable large incubation system for long term cell incubation and analysis with large doors above and below the stage for adequate access of samples during micro dissection process .

04. Control Computer and Software:

- Latest computer configuration (minimum core-2-duo with 2.5 GHz processor speed, at least 4 GB RAM, 500x2GB HDD; suitable OS (Windows 7 if compatible) with high resolution 27" LCD monitor.

05. Camera & Software:

- The system should be offered with high-resolution digital cooled color camera with 12 Bit CCD Digital camera with at least 1.4 mega pixel resolution, full well capacity of 17000 e, Pixel size of 6.45 µm X 6.45 µm, 2/3"CCD Chip size, firewire interface for precise visualization of samples under micro dissection as well as imaging.

- The microscope image should be overlaid with the user interface for real time control of the laser positions.

- There should be facility for drawing free hand ROIs of the cutting area of the sample and the ROIs should be color coded as a batch collection.

- The stage movements should be smoothly transformed through mouse movement.

- The system should have image storage with image archiving and other relevant image process options.

- Modules for Multichannel acquisition, time lapse, z stack, Extended Depth of Focus should be part of standard support

06. Structured Illumination attachment for haze free optical sectioned multichannel fluorescence imaging with automatic grid change technology. It should be quoted with scientific monochrome Cooled 12 Bit CCD Digital
camera with 1.4 mega pixel resolution, full well capacity of 17000 e, Pixel size of 6.45 µm X 6.45 µm,
2/3"CCD Chip size, fire wire interface.

07 General Requirements:

- The system should have all safety measures for laser safe operation.
- The system should be installed and demonstrated at site by factory trained service engineer and training should be provided by the application specialist.
- User training with sample preparation details should be provided.
- Suitable online UPS for the complete system should be provided.
- The complete system should be from one single source for better integration.
- Suitable Active Anti vibration table should be provided.
- Provide satisfactory certificate from at least three government research institute /university

- Two years complete warranty followed by three years CMC to be quoted
- System maintenance and service supports should be specified clearly. Any upgrade of the system within one year from the date of installation should be provided free of cost.
- Services should be provided within 48 hours, as and when required.

08. All components quoted should be of the latest model as of the date of submission

The system should be optionally quoted for following attachments:

1) 100x/1.3 oil or better should be offered for small cells/chromosome Microdissection and sample holder.

All accessories/attachments available for the system and consumables required should also be quoted separately as optional items.