Specifications of DNA Sequencer

A DNA sequencer, which should be a fully automated Multi-capillary, fluorescence-based genetic analysis system, along with a suitable Next Generation type.

- Capillary system should have minimum 8 or 24 capillaries operating in parellel to accommodate the future throughput.
- Should have an upgrade path to hiher number of capillaries to meet future throughput
- The system must be able to detect and analyze 6 fluorescent dyes simultaneously for DNA Fragment analysis and better multiplexing capabilities.
- Cooled CCD detection technology and a spectrograph for color separation
- The system to utilize a single line 505nm Solid State long life laser utilizing a standard power supply
- Radio-Frequency identification technology to tracks key consumables data.
- Simultaneous dual-side illumination detection system to maximize signal uniformity and sensitivity that in turn reduces the requirements placed on the user for sample preparation and cleanup.
- Active temperature cooling/heating that can maintain temperatures from 18ºC to 70º C.
- Employ capillary arrays that use bare silica capillaries with a useful life that exceeds 160 runs
- System software allowing real-time data quality evaluation providing immediate access to base-called or size called data to make decision about the quality of data as it is generated.
- Sequencing throughput of >275 samples/day having ≥500bp read length with QV20.

- **The Next Generation Sequencing system** (Ion Torrent / Ion) System should have a massively parallel array of proprietary semiconductor sensors to perform direct **real time** measurement of (data) the hydrogen ions produced during DNA replication.
- System chemistry use's natural nucleotides with no enzyme cascades, no fluorescence or chemiluminescence and no optics is required to run the system.
- *System should have no fluorescence, no cameras, no lasers, no LEDs, no optical elements*
- System should have high-density array of wells on the Ion semiconductor chips that provide millions of individual reactors while integrated fluidics allow reagents to flow over the sensor array.
- System should have shortest run time of ~2 hrs with data output of upto 1 Gb and minimum readlength in single direction of 200 bp with possibility of enhancement to 400bp and more.
- System should come along with preconfigured server that has softwares to convert signals to basecalls.
- System should be able to perform applications like Whole genome sequencing (smaller and higher genome- Plants/Human), resequencing of higher plant genome, target sequencing, RNA sequencing, Exom sequencing etc.
- System should have a short run time of ~4-6 hours for data output of atleast upto10 Gb and possible future upgrade to higher throughput. Fast run time will be preferred.
- System should support read length of upto 200 bp in one direction with low run cost, preference will be given to low cost running technology.

- Actual sequencing cost for Higher genome i.e. Human and Lion genome at 30 X coverage should be quoted
- System comes along with preconfigured server that has softwares to convert signals to base calls and good data storage capacity.
- System has automation support for template preparation and should support up to 384 barcodes for various applications.
- Vendor should be able to provide local service and support.

The vendor must supply softwares and application-specific kits that are optimized for the instrument in the area of de novo, comparative sequencing, Long Read Sequencing and Resequencing, fragment analysis applications like Microsatellite, SSCP, HMA (Heteroduplex Mobility Assay), Linkage analysis, LOH (Loss of Heterozygosity), AFLP, SSR, SSCP, SNP validation and screening.

Purchase of the instrument must include:

- System installation and operator training performed by a vendor service engineer.
- Local service engineers.
- Regional technical support/applications training.
- On-site, in-lab customer training.
- Technical phone support.