Department of Pediatrics

Specifications for High Speed Video Microscopy (HSVM) analysis system

Use: It will be used to analysis High Speed Video Microscopy for frequency and pattern of cilia movements in children with suspected Primary Ciliary Dyskinesia.

Quantity required: One set consist of one each of (1) Software/Hardware for video recording and analysis of cilia beat frequency and pattern, (2) High speed video camera.

General specifications for both components:

1) The system should work in 5-35^{0}C temperature and relative humidity of 20-90%.
2) It should operate on 230-250 Volts and 50 Hz AC power.
3) The manufacturer should have CE (European Conformity) OR US FDA certification.
4) It should have warranty of five years.
5) All components should be compatible with each other to function smoothly.
6) It should be supplied with all accessories to run the system at installation.
7) The supplier will provide training to use the system as intended.

Technical specifications for each component are as follows:

1. Software for video recording and analysis of cilia beat frequency and pattern

1) Provision to enter patient details (name, id no., serial no. etc) and sample details.
2) It should have designed for video analysis of cilia beat frequencies and pattern.
3) Should be compatible with camera provided and inverted microscope.
4) The video recording screen displays a live image from the video camera continuously.
5) The operator should be able to change the settings for the video camera, and immediately view the results of the changes on the screen.

6) A live video image should be updated continuously to allow for focusing and location of active cilia.
7) There should be option so that operator can select points or regions for analysis.
8) Displays the time of video recording.
9) Should record videos of frame rate up to 200 frames in full filed and up to 400 frames per second half field.
10) It should acquire up to 1024 frames for analysis.
11) Analysis should be possible in previously recorded videos.
12) It should be possible to pause the video display and step forward or backward in single frame mode. The frame rate and frame number should be displayed, along with the elapsed time from the start of the test.
13) In single frame mode, there should be option to export the image in a variety of formats (at least JPG, TIFF).
14) During analysis, the operator should able to select a point, a rectangle, or a line for analysis.
15) It should calculate and display video length in seconds, maximum frequency, and frequency resolution of the spectrum.
16) The recording screen should display pixel intensity, elapsed time since start of recording, list of samples, and histography of video images.
17) There is should be auto-saving at regular intervals.
18) Live video should be updated continuously for focusing and location of active cilia.
19) There should be option to select areas for analysis by user.
20) It should be able to perform automated whole field analysis also.
21) Statistical quantities should be calculated for the frequencies of the selected points, including mean, standard deviation, and standard error.

22) All analysis results should automatically exported to a spreadsheet compatible file (PDF and excel) for giving print reports or other analysis.

23) There should be provision to upgrade the software free of cost is new version available during warranty.

2. High speed video camera

1) It should have USB 3 interface.
2) It should have CMOS or better technology.
3) Resolution: 1280x1024 pixels or better.
4) Frame rate: 200 or more frames per second for full field
5) Should have C-mount for attaching to inverted microscope.
6) Should be compatible with supplied, software.