

Digital Video Microscopy

Fast and sensitive CCD Cameras and flashed fluorescence excitation embedded in a digital control setup open new fields in intravital microscopy.

- Fast and accurate particle tracking
- Fast Ca²⁺ imaging
- Low light imaging
- High resolution imaging even with largest FOV
- Long term investigations with significantly lower bleaching rates
- Flexible adaptation and synchronization to the experimental setup (i.e. heartbeat, breath, neuronal activity/activation...)

Digital experiment control

LaVision BioTec's digital video microscopes deliver a new overall concept for flexible and adapted image acquisition. Flashed illumination, electronics and delay lines, motorized mechanics, CCD cameras and LaVision BioTec's ImSpector Software are all integrated in an digital environment.



Digital Video Microscope Setup:
2 CCDs
2 flash lamps
Olympus BX 61 WI
Burleigh Gibraltar stage

Application

*Particle tracking – blood flow
 Adhesion and flow characteristics
 of leucocytes in small blood vessels*

Applicant

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CCD Cameras

Microscopy systems from LaVision BioTec utilize latest generation digital CCD cameras that deliver

- 2 M pixel resolution,
- 55% quantum efficiency,
- excellent signal to noise ratio,
- 14 bit dynamic,
- more 30 frames/s at 1600x1200 pixel resolution and
- direct access to image data.

Flashed Illumination

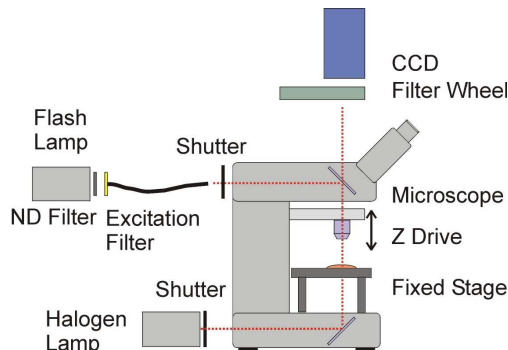
Fluorescent molecules bleach if they are excited for long periods. Therefore, bleaching is a fundamental problem in fluorescence microscopy. Particularly in intravital microscopy bleaching has to be minimized as specimen have to be observed for long periods.

To overcome this problem – bright light sources/minimized bleaching rate - LaVision BioTec equips digital video microscopes with flash lamps. Flash lamps deliver various advantages compared to continuous Hg burner or Xe lamp.

Advantages

- First, photo bleaching is low as the fluorophores are just excited when the camera grabs the image. LaVision BioTec synchronizes the flash lamps exactly to the digital CCD cameras.
- Next, the integrated overall intensity is low even if the flash is very bright. Flash lamps are almost off as the repetition rate is ca. 70 Hz and the flash is less than a one μ s.
- Last, images of fast objects are sharp because short flashes freeze the motion within the image.

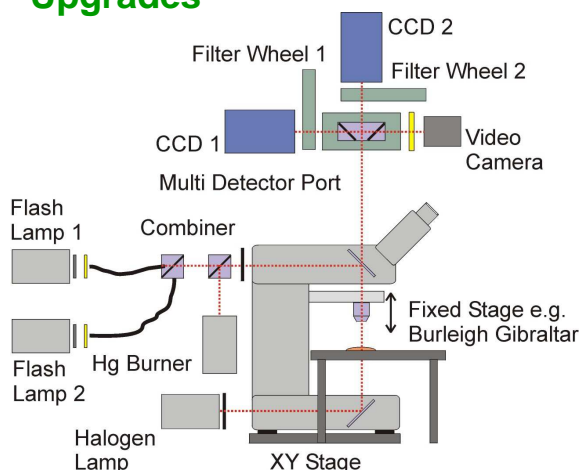
Standard Setup



LaVision BioTec digital video microscope comes with:

- scientific microscope (Leica, Nikon, Olympus or Zeiss),
- CCD camera,
- fast filter wheel,
- flash lamp,
- advanced computer and
- LaVision BioTec's ImSpector Software.

Upgrades



Each digital video microscope can be updated with:

- second CCD camera for simultaneous detection of two colors,
- second flash lamp,
- electronic delay lines to synchronize CCDs and Flash lamps for particle tracking purposes,
- video cameras/recorders,
- advanced 3rd party stages (e.g. Burleigh Gibraltar)
- PiFoc objective lens z-drives,
- and custom made equipment.