Olympus cellSens

Installed 2015. Inverse widefield microscope unit with solid state LED light source and filter sets to image all conventional dyes. TIRF (405/488/561 nm) and single-point FRAP option (405 nm). Equipped with a 4 Megapixel sCMOS camera for fast high-resolution imaging, sensitive EM-CCD for TIRF and low-light applications, or color CMOS camera. Motorized stage for 5D-data acquisition, full environmental control for long-term live imaging. Microfluidics device for mammalian cells, yeast and bacteria. (Last update April 2019)

Frame

Olympus IX-83, inverse, fully motorized, ZDC z-drift compensator (hardware autofocus)

Objectives

<table>
<thead>
<tr>
<th>Type</th>
<th>Working Distance (mm)</th>
<th>ZDC Fluorescence</th>
<th>ZDC DIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPlanSApo 4x/0.16</td>
<td>13.0</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>UPlanSApo 10x/0.4</td>
<td>3.10</td>
<td>Search/Cont²</td>
<td>No</td>
</tr>
<tr>
<td>UPlanSApo 20x/0.75</td>
<td>0.60</td>
<td>Search/Cont</td>
<td>Search</td>
</tr>
<tr>
<td>UApo/340 40x/1.35 Oil Iris³</td>
<td>0.10</td>
<td>Search/Cont</td>
<td>Search</td>
</tr>
<tr>
<td>PlanApo N 60x/1.42 Oil</td>
<td>0.15</td>
<td>Search/Cont</td>
<td>Search</td>
</tr>
<tr>
<td>UApo N 100x/1.49 Oil TIRF Corr²</td>
<td>0.10</td>
<td>Search/Cont</td>
<td>Search</td>
</tr>
</tbody>
</table>

²Search: focus search/single-shot mode; Cont: continuous focusing
³UV transmission down to 340 nm, iris to lower NA to 0.7
⁴For TIRF, cover glass thickness correction 0.13-0.19 mm (23/37°C)

Widefield Illumination

- White LED
- Lumencor SpectraX light engine (hybrid solid state LED) with 6 excitation bands

TIRF Lasers

- 405 nm (100 mW laser diode, TIRF or FRAP)
- 488 nm (100 mW laser diode, TIRF)
- 561 nm (100 mW DPSS laser, TIRF)
- Laser combiner with clean-up filters (405/20 and 488/10) and laser-grade dichroics (LP 430, LP 525, LP 595)
Olympus cellSens

Filters

<table>
<thead>
<tr>
<th>Pos.</th>
<th>SpectraX</th>
<th>Reflector Turret</th>
<th>Filter Wheel sCMOS</th>
<th>Filter Wheel EM-CCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DAPI 390/22</td>
<td>DAPI/FITC/TRITC/Cy5</td>
<td>DAPI 442/46</td>
<td>DAPI 450/50</td>
</tr>
<tr>
<td>2</td>
<td>CFP 438/24</td>
<td>CFP/YFP/mCherry</td>
<td>CFP 480/40</td>
<td>GFP 525/50</td>
</tr>
<tr>
<td>3</td>
<td>GFP 475/34</td>
<td>GFP/mCherry</td>
<td>GFP 520/35</td>
<td>DsRed 600/50</td>
</tr>
<tr>
<td>4</td>
<td>YFP 510/25</td>
<td>Cy3</td>
<td>YFP 535/30</td>
<td>mCherry 645/75</td>
</tr>
<tr>
<td>5</td>
<td>Red 555/55</td>
<td>DIC</td>
<td>mCherry 641/75</td>
<td>Cy5 655lp</td>
</tr>
<tr>
<td>6</td>
<td>Cy5 631/28</td>
<td>M4TIR</td>
<td>Empty</td>
<td>Empty</td>
</tr>
</tbody>
</table>

*May be replaced by Cy3 (549/15) or mCherry (575/25)*

*Quadband TIRF dichroic*

Cameras

- Hamamatsu ORCA-Flash4.0 V2 sCMOS, 2048 x 2048 pixel, 6.5 x 6.5 µm pixel size, up to 100 fps
- Hamamatsu ImagEM X2 EM-CCD, 512 x 512 pixel, 16 x 16 µm pixel size, up to 70 fps, EM gain 4-1200
- Olympus SC50 color CMOS camera, 2560 x 1920 pixel, 2.2 x 2.2 µm pixel size, up to 15 fps (full frame; 77 fps at 480 x 270 pixel)

Stage/Inserts

- M-MS-I3-2 scanning stage (120 x 80 mm, 10 nm step size, 3 µm positioning accuracy, repeatability 1 µm)
- Stage inserts for slides, 35 mm dishes and multiwell plates

Software

- Olympus cellSens 2.2 running on Windows 7 (64-bit). Modules: Multidimensional Acquisition, Stage Navigator, Well Navigator, Count and Measure, TIRF

Environmental Control

- Olympus cellVivo system for temperature control, PeCon CO₂ controller

Additional Devices

- CellASIC™ ONIX microfluidic platform consisting of an EV262 microfluidic system and a MIC230 microincubator controller for temperature and gas control. Suitable for bacteria, yeast and mammalian cells (microfluidic plates to be provided by the users).
Reflector Turret - Filter Cubes

**Excitation:** blue, **dichroic:** green, **emission:** red

- **Quad DA/FI/TR/Cy5**
  - Semrock LED-DA/FI/TR/Cy5-A-000

- **Triple CFP/YFP/mCherry**
  - Chroma 69008

- **Dual GFP/mCherry**
  - Chroma 59022

- **Single Cy3**
  - Chroma ET545/25x,
  - Chroma T565lp xr,
  - Chroma ET605/70m
M4TIR – TIRF dichroic
Excitation clean-ups in laser combiner
Chroma ZT405/488/561/640rpc-UF2