CLAIMS

1. A biological sample processing system comprising an imaging unit (2) comprising a digital image processing system and at least one microscope including at least one lens (14), a sample processing station (3) comprising a handling platform (3) including a support (17) and a displacement mechanism for moving the support (17), and a sample processing unit (7) mounted on the handling platform (5), the sample processing unit (7) comprising a tissue slide holder (11) for mounting thereon a tissue slide (34) with a biological sample (36) fixed thereon and a microfluidic cartridge holder (9) for mounting a microfluidic cartridge (4) thereon, the tissue slide holder (11) coupled to the microfluidic cartridge holder (9) via a coupling (13) allowing the microfluidic cartridge and the tissue slide to be mounted and removed from the sample processing unit in an opened position and for the tissue slide (34) to be in sealing contact with the microfluidic cartridge (4) in a closed position, **characterized in that** the sample processing station comprises a plurality of the sample processing units mounted on the handling platform (5), each of the plurality of sample processing units being moveable by moving the support by the displacement mechanism from a position allowing mounting of the tissue slide, respectively microfluidic cartridge, or removal thereof, to a position in which a viewing window (19) in the microfluidic cartridge holder (9) is positioned in alignment with the lens of the at least one microscope, in which each sample processing unit (7) is coupled to at least one reagent supply tube and at least one reagent outlet tube.

2. A biological sample processing system according Claim 1, in which the microfluidic cartridge holder viewing window (19) comprises a recess (43) within which the lens (14) is partially inserted in the imaging position.

3. A biological sample processing system according Claim 1 or 2, in which the sample processing station (3) comprises at least three, preferably four or more sample processing units (7).

4. A biological sample processing system according to Claim 1, 2 or 3, in which the handling platform (5) comprises a rotating displacement mechanism for rotating the support (17) between positions.

5. A biological sample processing system according to any preceding claim, in which each sample processing unit comprises a clamping mechanism (15) including a locking mechanism (16) and a pressure actuator (18) configured to apply pressure on the tissue slide (34) against

the microfluidic cartridge (5) in a closed position, the clamping mechanism comprising a compressed gas piston.

6. A biological sample processing system according to any preceding claim, in which each sample processing unit comprises a temperature control system including a cooling and heating system coupled to the tissue slide holder (11).

7. A biological sample processing system according to any preceding claim, in which the microfluidic cartridge holder (9) and tissue holder (11) are pivotally coupled together via a hinge coupling (13).

8. A biological sample processing system according to any preceding claim, in which the microfluidic cartridge holder is in a form of a moveable lid and the tissue slide holder (11) in a form of a base statically fixed to the support (17) of a handling platform (5).