IREC Imaging Platform (2IP): annual report- 2016

The 2IP multi-user platform was created in 2011 thanks to the sharing of imaging equipment present among the IREC research groups. 2IP gradually acquires new equipment and is now recognized as a UCL platform. 2IP is composed of a research logistician (Caroline Bouzin) and two technicians (Chantal Fregimilicka and Michele De Beukelaer).

2IP offers access to:

- **Sample preparation services:**
  - Paraffin & cryo-sectioning
  - Histological stainings
  - Immunostainings

- **Image acquisition:**
  - Slide digitalization in brightfield with a 384 slides capacity scanner (Leica SCN400)
  - Structured illumination fluorescence microscopy (Zeiss AxiosImager.z1 + ApoTome1 module) which allows optical sections and 3D reconstruction
  - Polarized light microscope (Zeiss Axioskop40)
  - Histological scanner (FF-OCT technology; Light-CT scanner from LLTech)

- **Support for image analysis:**
  - TissueIA (Leica)
  - Author (Visiopharm)
  - ImageJ
  - Axiovision (Zeiss)

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2IP equipment use in 2016

Based on the online booking system, the use of the equipment in 2016 has been analyzed and the main trends are detailed here below.

- The use of the SCN400 scanner is stable as compared to 2015 (~1500 hours/year). This device is shared by multidisciplinary users (25 poles from 4 institutes, 80% of them being part of IREC, and external companies). 12 poles scanned on a regular basis (more than 40h in 2016). Given the absence of update of DIH and TissuelA since 2015, it has been decided not to renew the maintenance contract for this year.

- The AxioImager is used between 1000 and 1200 hours/year since 2014. User diversity is increasing; 7 poles used the microscope more than 40 hours in 2016 (versus 4 in 2014). Two external interventions were required in 2016 (control card, fluorescence shutter replacement; transmission shutter removal). Another high quality fluorescence microscope is needed soon to anticipate failures of this microscope. A confocal would perfectly suit the majority of current applications.
• Given the very limited booking of the Axioskop40 and AxiovertS100 microscopes, a restitution of these microscopes the FATH pole has been proposed.

• No statistics are available for the Light-CT scanner, this device being not booked online.

• The 2 microtomes of the platform were used by researchers coming from diverse research poles (more than 20h for 12 poles in 2016). The knife holder of one microtome is presenting recurrent issues which required several interventions in 2016. 2IP will invest in a new microtome in order to replace this defective one.
• The use of cryostat is stable over the last three years and is shared by different research groups (8 poles used it more than 20h in 2016).

• This first year of evaluation shows that Visiopharm software is attractive for researchers from different topics inside and outside IREC. For financial reasons, it has been decided not to renew maintenance contract for this year. This will be re-evaluated next year.
**2IP services in 2016**

2IP performed more than 12 000 sections (paraffin & cryo), 2000 stainings and 1700 immunostainings in 2016.

**Communication tools**

Beside support for sample preparation, acquisition and analysis, 2IP also enhances communication with and between users through:

- a new website providing information about equipment and services, technical tips, validations,…
- an online booking system (currently ~240 2IP users),
- a diffusion mailing list (“IREChelpme”),
- technological seminars organization (Multipex IHC, presented by Bioke, 11/10/2016).

An antibody database is under construction and will be available in 2017.

**2IP acquisitions in 2016**

No acquisitions were performed within 2IP in 2016.

Notes:

- A processor for paraffin inclusion has been acquired by MC Many (IREC) for teaching purposes and is open to researchers.
- A fluorescent scanner (3DHistech Pannoramic 250 Flash III) has been acquired in DDUV Institute (information: nicolas.vanbaren@bru.licr.org).

**2IP management**

The management committee evaluated the 2IP usage statistics and financial report for 2016* and approved (1) the proposition of fees adaptation for 2017, (2) the purchase of a new microtome from 2IP account, (3) the creation of an internal histo shop. The committee also suggested (1) to invite representatives from CHEX and MIRO poles to join the user committee, (2) to evaluate the priorities in term of new acquisitions during the user
committee and (3) to submit to the IREC bureau a budget for the 2IP laboratory development at floor 55+2.

* Meeting 16-02-2017 – attendees: JL Balligand, O Feron, M Van Hassel, C Mougin, C Bouzin

The current services and equipment proposed by the platform were presented to the user committee** together with the usage statistics for 2016 and updated fees for 2017. Information available on the new website were exposed to the committee as well as the current version of the IREC antibody database (almost finalized). The need for additional equipment was also discussed based on the results of an internal survey which shows a need for (1) confocal or structured illumination fluorescence microscopy (23/30 votes), (2) automated slide stainer - coverslipper (16/30 votes), (3) laser capture microdissection (13/30 votes). Funding options to cover those needs will be discussed in the IREC bureau.

2IP publications and collaborations in 2016

Through sustained collaborations, 2IP has been involved in the following projects published in 2016:

The Blood Flow Shutdown Induced by Combretastatin A4 Impairs Gemcitabine Delivery in a Mouse Hepatocarcinoma.
Fruytier AC, Le Duff CS, Po C, Magat J, Bouzin C, Neveu MA, Feron O, Jordan BF, Gallez B.

Lactate Dehydrogenase B Controls Lysosome Activity and Autophagy in Cancer.

Paracrine nitric oxide induces expression of cardiac sarcomeric proteins in adult progenitor cells through soluble guanylyl cyclase/cyclic-guanosine monophosphate and Wnt/β-catenin inhibition.

Biodistribution of (125)I-labeled anti-endoglin antibody using SPECT/CT imaging: Impact of in vivo deiodination on tumor accumulation in mice.

αVβ3 integrin-targeted microSPECT/CT imaging of inflamed atherosclerotic plaques in mice.

An Appraisal of Proliferation and Apoptotic Markers in Papillary Thyroid Carcinoma: An Automated Analysis.
Lamba Saini M, Bouzin C, Weynand B, Marbaix E.

Digital pathology: elementary, rapid and reliable automated image analysis.
Bouzin C, Saini ML, Khaiing KK, Ambroise J, Marbaix E, Grégoire V, Bol V.