APPENDIX. LATEST VERSION OF THE TWO-PHOTON INFRASTRUCTURE REPORT (2021)

Name of infrastructure: **Two-photon microscopy**

Infrastructure manager: Karsten Ruscher

PI contact person: Karsten Ruscher & Angela Cenci Nilsson

1. Short description of the infrastructure.

This infrastructure comprises two complementary setups, each consisting of a two-photon (2P) microscope (supplier: Zeiss) hosting a near-infrared femtosecond-pulsed tunable laser (supplier: Azpect). One setup provides the opportunity to study either brain slices or other thick specimens (e.g. biopsies). This system is referred to as the "ex vivo 2P microscope", it is integrated with micromanipulators and electrophysiology recording equipment, and it is located in room BMC F0936. The other setup is used to investigate the cerebral cortex of living mice, it is located within the BMC animal house (room BMC D09074), and it is referred to as the "in vivo 2P microscope". The two setups were purchased and installed together in 2009-2010 (the purchase being funded by an infrastructure grant from the Swedish Research Council).

Accessory lab

The ex vivo system is complemented by an adjacent lab for brain slice preparation (lab F0938). All the equipment in this lab has been purchased – and is maintained - by Cenci Nilsson's research grants.

2. Is this infrastructure receiving support also from other Strategic Research Areas (SRAs) or organizations at Lund University (e.g. Medical faculty, LBIC). If yes, please specify the type of support and its amount.

No, this infrastructure is not supported by any other organization.

Note that there is not any equivalent infrastructure elsewhere within BMC or LBIC.
Yet, two-photon microscopy has distinctive functions that cannot be provided by other microscopy setups. In particular, two-photon microscopy enables in-depth dynamic visualization of cellular and subcellular morphology in situ under physiological conditions. Because cells are visualized under physiological conditions, and while they are still embedded in their natural environment, the techniques allows for combining the image acquisition with physiological recordings (calcium imaging, patch-clamp electrophysiology) even under prolonged or repeated sessions.

3. Number and names of MultiPark senior researchers using the infrastructure in the period 2018-2020[1]

Five: Karsten Ruscher, Angela Cenci Nilsson, Jia Yi Li, Niklas Marklund, Tadeusz Wieloch.

Moreover, additional **three** groups have used the lab for slice preparation (Iben Lundgaard, Malin Parmar, Daniella Rylander).

[1] If the infrastructure was first established in 2020, please include this information.

4. Number and names of senior researchers outside of Multipark and/or non-academic partners using the infrastructure 2018-2020.

None during the given period.

5. Does the infrastructure have a steering document accessible to the users? If yes, when was it last updated?[2]

Yes; last updated in 2020

6. **Is the infrastructure charging user fees? If yes, state the amount and what is covered by the user fees.**

Yes, 600-700 kr/hour for LU internal users, 1200-1400 kr/hour for external users (but we have never had any external users). Further details in the below Table:

Two photon microscopes	Introduction* and Staff support (per hour)	Price per hour
LU user	600 SEK	700 SEK
External user	1200 SEK	1400 SEK

Slice preparation lab (F0938)	Introduction* and Staff support /hour	Price/hour vibratome	Price/hour vibratome & other devices
LU user	600 SEK	250 SEK	350 SEK
External user	1200 SEK	500 SEK	700 SEK

7. List publications generated with the help of this infrastructure during the past 3 years (2018-2020). Do not include manuscripts in preparation and please give the full reference (i.e., complete author list, complete title, journal name with year, volume, pages)[3].

Fieblinger T, Zanetti L, Sebastianutto I, Breger LS, Quintino L, Lockowandt M, Lundberg C, **Cenci MA.** (2018) Striatonigral neurons divide into two distinct morphological-physiological phenotypes after chronic L-DOPA treatment in parkinsonian rats. *Sci Rep*; 8(1):10068

Talhada, D., Feiteiro, J., Costa, A. R., Talhada, T., Cairraõ, E., **Wieloch, T**., Englund E, Santos CR, Gonçalves I, **Ruscher K** (2019). Triiodothyronine modulates neuronal plasticity mechanisms to enhance functional outcome after stroke. Acta Neuropathol. Commun. 7. doi:10.1186/s40478-019-0866-4.

Haggman Henrikson J, Pombo Antunes AR, **Wieloch T**, **Ruscher K**. (2020) Enhanced functional recovery by levodopa is associated with decreased levels of synaptogyrin following stroke in aged mice. *Brain Res Bull*.;155:61-6.

[2] Note that the Multipark leadership may ask to see this document with a very short notice.

[3] If the infrastructure was first established in 2020, please include this information here too.

Sebastianutto I, Goyet E, Andreoli L, Font-Ingles J, Moreno-Delgado D, Bouquier N, Jahannault-Talignani C , Moutin E, Di Menna L, Maslava N, Pin JP, Fagni L, Nicoletti F, Ango F, **Cenci MA*** and Perroy J*. (2020) D1-mGlu5 heteromers mediate non-canonical dopamine signaling in Parkinson's disease. *J Clin Invest*; 130: 1168-1184