Accepted Manuscript

Title: SRRF: Universal Live-cell Super-Resolution Microscopy

Authors: Siân Culley, Kalina L. Tosheva, Pedro Matos Pereira, Ricardo Henriques

PII: S1357-2725(18)30126-2
DOI: https://doi.org/10.1016/j.biocel.2018.05.014
Reference: BC 5371

To appear in: *The International Journal of Biochemistry & Cell Biology*

Received date: 14-3-2018
Revised date: 21-5-2018
Accepted date: 23-5-2018

Please cite this article as: Culley S, Tosheva KL, Pereira PM, Henriques R, SRRF: Universal Live-cell Super-Resolution Microscopy, *International Journal of Biochemistry and Cell Biology* (2018), https://doi.org/10.1016/j.biocel.2018.05.014

SRRF: UNIVERSAL LIVE-CELL SUPER-RESOLUTION MICROSCOPY

Siân Culley[1-3], Kalina L. Tosheva[1,2], Pedro Matos Pereira[1-3], Ricardo Henriques[1-3 *]

[1]MRC Laboratory for Molecular Cell Biology, University College London, Gower Street, London WC1E 6BT, UK
[2]Department of Cell and Molecular Biology, University College London, Gower Street, London, WC1E 6BT, UK
[3]The Francis Crick Institute, 1 Midland Road, London, NW1 1AT, UK

E-mail: r.henriques@ucl.ac.uk

KEY FACTS

- SRRF is a purely analytical super-resolution microscopy approach that is available as an open-source easy-to-use plugin for ImageJ.
- SRRF is compatible with any fluorophore, including conventional fluorescent proteins such as GFP.
- SRRF can be used to retrieve super-resolution information from most common fluorescence microscopes.

ABSTRACT

Super-resolution microscopy techniques break the diffraction limit of conventional optical microscopy to achieve resolutions approaching tens of nanometres. The major advantage of such techniques is that they provide resolutions close to those obtainable with electron microscopy while maintaining the benefits of light microscopy such as a wide palette of high specificity molecular labels, straightforward sample preparation and live-cell compatibility. Despite this, the application of super-resolution microscopy to dynamic, living samples has thus far been limited and often requires specialised, complex hardware. Here we demonstrate how a novel analytical approach, Super-Resolution Radial Fluctuations (SRRF), is able to make live-cell super-resolution microscopy accessible to a wider range of researchers. We show its applicability to live samples expressing GFP using commercial confocal as well as