

## **Low resolution is often sufficient**

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For a long time microscopy was limited by the so-called Abbe limit, and science had to find ways to work with existing methods or resort to non-optical techniques. The development of SRM (super-resolution light microscopy) has succeeded in circumventing these limitations[1]. However, access to these technologies is often limited, either by the high costs of commercial instruments or by the long measurement times compared to classical microscopy. On the other hand, SRM, if available, is sometimes used regardless of the necessary resolution required to answer biological or medical questions, even for statistical sample sizes.

Parallel to the development of SRM, the possibilities of processors and algorithms, such as deconvolution, have also made significant progress. In particular, it is possible to automatically analyse many three-dimensional images in a reasonable time.

Here we discuss the possibility of using low resolution microscopy to identify qualitative changes below the resolution of the corresponding technique by using statistically relevant sample sizes and simple algorithms for the respective problem.

We have tested this on the one hand by means of a simulation and on the other hand by means of a cell culture experiment which was subsequently examined by means of WF microscopy and corresponding algorithms. In both cases we were able to detect qualitative changes.

Furthermore, we show that results obtained by SRM can also be confirmed by low resolution if the algorithms are based on the hypotheses generated according to the results of SRM experiments.

[1] Cremer C., Masters B. R. (2013). Resolution enhancement techniques in microscopy.