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# Correlative light and electron microscopy (CLEM) and its applications in the life sciences.

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## Résumé

Correlative light (fluorescence) and electron microscopy (CLEM) is a relatively new technique developed to integrate two types of information obtained from biological samples. On one side, light/fluorescence microscopy allows studying biological events on living cells, giving precious functional data; on the other side, electron microscopy offers a highest resolution and the visualization of the cellular ultrastructure. The real asset of CLEM is that the same cell(s) of interest can be studied using two different microscopy methods, giving unique information about the relation between structure and function at the nanometer resolution. Moreover, three dimensional and immunocytochemical studies are possible giving the opportunity to study organelle shape and protein distribution in the cellular volume.

Many methods for room temperature and cryo CLEM have been developed to answer different questions on a broad variety of samples, from cultured cells to little organisms such as zebrafish embryos. In addition, CLEM can be applied also in studies on material sciences, with a special interest for those materials used at the interface with living cells (e.g. nanoparticles to deliver drugs). Here, we show the CLEM methods we have developed so far at the Centre Technologique des Microstructures (CT $\mu$ ) in the field of biology using confocal and transmission electron microscopy. In addition, we will discuss about the future perspectives and further applications.

**Mots-Clés:** correlative light and electron microscopy (CLEM), confocal microscope, transmission electron microscope, cellular ultrastructure

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