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Cell-to-cell DNA transfer in bacteria
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Lab webpage: <https://mmsb.cnrs.fr/en/team/cell-to-cell-dna-transfer-in-bacteria/>



Visualization of acquisition and establishment of drug resistance in bacteria

Understanding how a commensal bacterium becomes multidrug resistant through horizontal gene transfer is a central issue in microbiology and human health. Using live-cell microscopy, we reveal the dynamics of resistance acquisition by transfer of the F conjugative plasmid encoding the tetracycline-efflux pump TetA. We show that the entry of the ssDNA plasmid into the recipient cell is rapidly followed by complementary strand synthesis and expression of newly acquired genes. TetA production is enhanced by zygotic induction resulting in the optimized establishment of resistance. In the presence of protein synthesis-inhibiting antibiotics, acquisition of resistance becomes strictly dependent on AcrAB-TolC multidrug efflux pump. We demonstrate that AcrAB-TolC is required for maintenance of protein synthesis activity and therefore TetA production following plasmid acquisition. This work uncovers a novel essential role of multidrug efflux systems in the acquisition of drug-specific resistance by horizontal gene transfer and helps to understand the dissemination of antibiotic resistance in bacteria

