Faculté de pharmacie
Séminaire de l'axe

« Pharmacométrie et pharmacothérapie »

« The Good, the Bad, and the Ugly : Mathematical Models of Biofilm Exposure to Antibiotics »

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Bacterial biofilms are complex microbial depositions on surfaces and interfaces. After bacteria colonize the surface they start producing a layer of extracellular polymeric substances that protects them from harmful environmental impacts. Biofilms have been implicated for example in urinary tract infections, catheter infections, middle-ear infections, dental plaque, gingivitis cystic fibrosis pneumonia, and infections of prostheses and heart valves; it has also been observed that bacterial biofilms may impair wound healing. It is estimated that more than 60% of nosocomial infections are due to biofilms. Biofilm bacteria are known to be much more difficult to treat with antibiotics than planktonic bacteria. Several mechanisms for this increased resistance have been suggested. In this talk we will review some of these from a modelers perspective and show how mathematics can help to better understand the limitations of biofilm exposure to antimicrobial agents. To this end we will go over several modeling strategies with various levels of mathematical sophistication, from simple ordinary differential equations to highly nonlinear partial differential equations.