SUPRAMOLECULAR APPROACHES TO DESIGN NOVEL ANTIVIRALS

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Viral infections are among the main causes of death in the world. When prevention is not an option, antiviral drugs are the last resort to prevent the spread and the mortality of these infections. There are only a few effective drugs on the market, for the most part they prevent intracellular viral replication. Unfortunately, they are too few when compared to the many viruses that threaten humans. In this talk, I will show a new design rule to achieve drugs that fight viruses extracellularly by irreversibly inhibiting their infectivity, i.e. I will show how to create virucidal compounds. The design of these macromolecular virucidal agents starts by a bio-mimic approach and is characterized by the limited toxicity towards host cells that one would expect from such compounds. Yet, I will demonstrate that the multivalent binding to the viruses, coupled with a large hydrophobic contact between the compounds and the virus leads to a loss of integrity of the virion that obviously leads to an irreversible loss of infectivity. Results in and ex-vivo will be illustrated especially for the cases of influenza, herpes, and respiratory syncytial virus.