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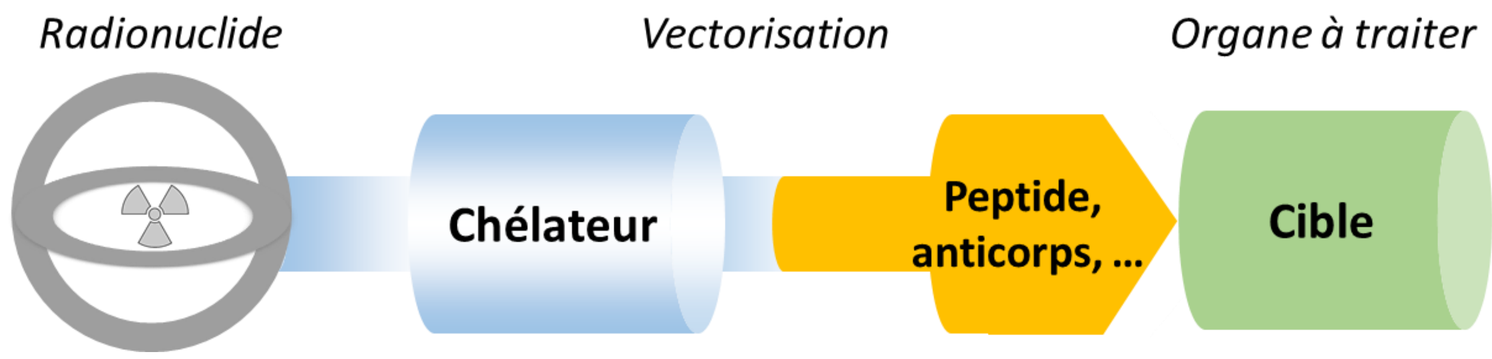

Effective Development of DNA Aptamers, which can serve as Vehicles for Targeted Delivery of Radiotherapeutics and Chemotherapeutics to Tumors

Sergey N Krylov

Distinguished Research Professor
Director, Centre for Research on Biomolecular Interactions

Department of Chemistry and Centre for Research on Biomolecular Interactions, York University, Toronto, Ontario, Canada

Cytotoxic agents, such as chemotherapeutics and radiotherapeutics, are major modalities of treating inoperable cancers. Such agents do not have high selectivity for cancer cells and, therefore, require high doses to reach therapeutic concentrations in tumors. Accordingly, their side effects are severe, and these side effects limit the maximum tolerable dose. The use of molecules that can (*i*) bind to tumor cells, (*ii*) be internalized, and thus (*iii*) accumulate in tumors, as vehicles for targeted delivery on cytotoxic agents to tumors is highly attractive.

There are two major types of affinity molecules – antibodies and aptamers – which can bind specifically to some proteins on the cell surface of cancer cells. Such target proteins are indicative of tumor cells (an example is HER2 – Human Epithelial growth-factor Receptor 2 – which is overexpressed on some breast cancer cells).

Aptamers have a set of advantages over antibodies. Unlike antibodies (which are proteins), aptamers are oligonucleotides (DNA or RNA). They are not immunogenic and cannot trigger immune response. They are synthetic molecules and, therefore, are easier to produce in large amounts and to modify, e.g., for use as delivery vehicles. Aptamers also have a major limitation; they are more difficult than antibodies to develop (discover and validate).

My group uses highly efficient separation tool – capillary electrophoresis – to drastically improve the efficiency of aptamer development. In this lecture, I will overview our major achievements, resulting from two decades of research, in advancing the aptamer-development technology (see references below). I will place our technology in the context of classic approaches. I will also outline the remaining challenges and potential way of resolving them.

20 octobre à 14 h
IJCLab, Auditorium Joliot Curie,
Bât.100, 15 rue Georges Clémenceau, 91405 Orsay

Contacts:
Vladimir Sladkov: sladkov@ijclab.in2p3.fr
Charles-Olivier Bacri: bacri@ijclab.in2p3.fr