

## Regulating, probing, sensing with oligonucleotide aptamers.

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Aptamers are oligonucleotides identified in large randomly synthesized libraries containing up to  $10^{15}$  different oligomers, through in vitro selection, a process known as SELEX (Systematic Evolution of Ligands by EXponential enrichment). Aptamers have been successfully raised against a wide range of targets: amino acids, nucleic acid bases, proteins, intact viruses and live cells. They generally display a high efficiency of binding thanks to their 3D shape originating in intramolecular interactions.

We raised aptamers against many different target molecules, such as foldamers or biomarkers of human tumors (1,2). Following physico-chemical characterization, structural investigation, truncation and optimization these aptamers were converted into biotechnological tools such as probes for imaging brain tumors. We also developed methodologies for improving in vitro selection, a tedious and slow process. The use of functional screening speeds up the identification of aptamers (3). Recently we developed aptasensors signaling the presence of nucleoside derivatives through kissing aptamers.

### References

1. Da Rocha Gomes, S., Miguel, J., Azema, L., Eimer, S., Ries, C., Dausse, E., Loiseau, H., Allard, M. and Toulmé, J.J. (2012) (99m)Tc-MAG3-Aptamer for Imaging Human Tumors Associated with High Level of Matrix Metalloprotease-9. *Bioconjug Chem*, **23**, 2192-2200.
2. Delaurière, L., Dong, Z., Laxmi-Reddy, K., Godde, F., Toulmé\*, J-J., Huc\*, I. (2012) Deciphering oligoamide foldamer-DNA interactions. *Angewandte Chemie* **51**, 473-477.
3. Dausse, E., Taouji, S., Evade, L., Di Primo, C., Chevet, E. and Toulmé, J.J. (2011) HAPIScreen, a method for high-throughput aptamer identification. *J Nanobiotechnology*, **9**, 25.

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