

Název:

MicroRNA electrochemical detection in connection with specific magnetic separation

Školitel:

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Reg.č.projektu: CZ.1.07/2.3.00/20.0148

Název projektu: Mezinárodní spolupráce v oblasti "in vivo" zobrazovacích technik



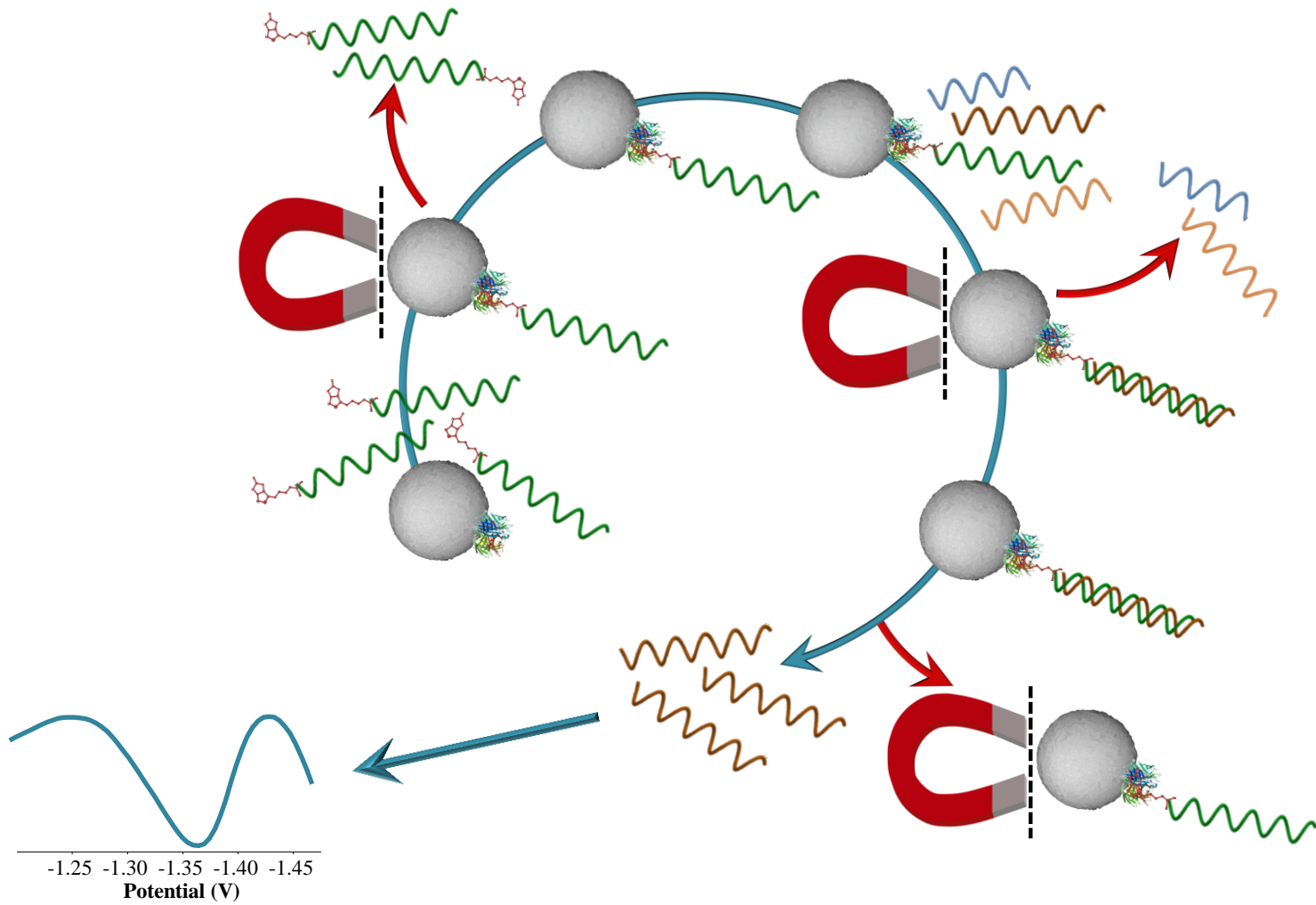
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miR-124

- expressed in developing nervous system (brain 25 %)
- contributes to neural differentiation of neurons
- downregulated in several types of cancers
 - glioblastoma
 - breast cancer
 - hepatocellular carcinoma
 - lymphoblastic leukemia
 - colorectal cancer
 - prostate cancer

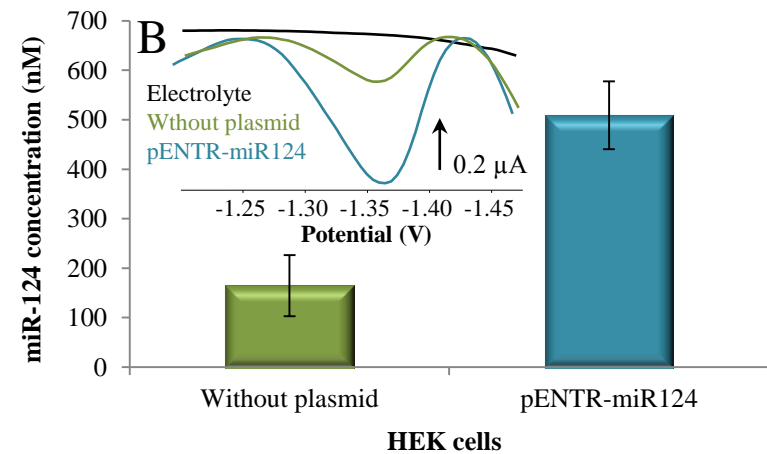
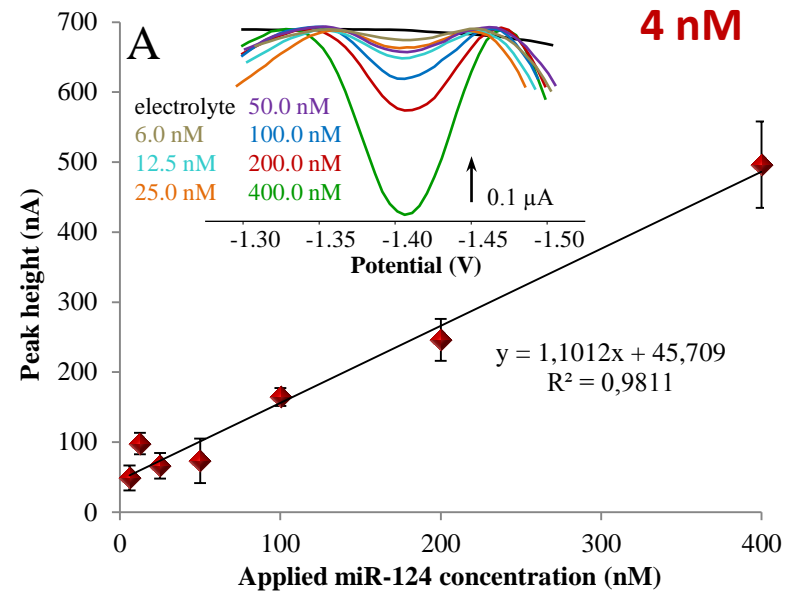
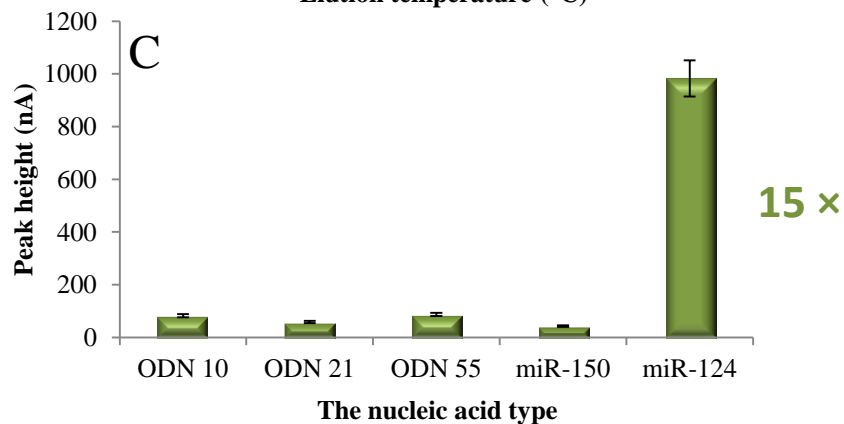
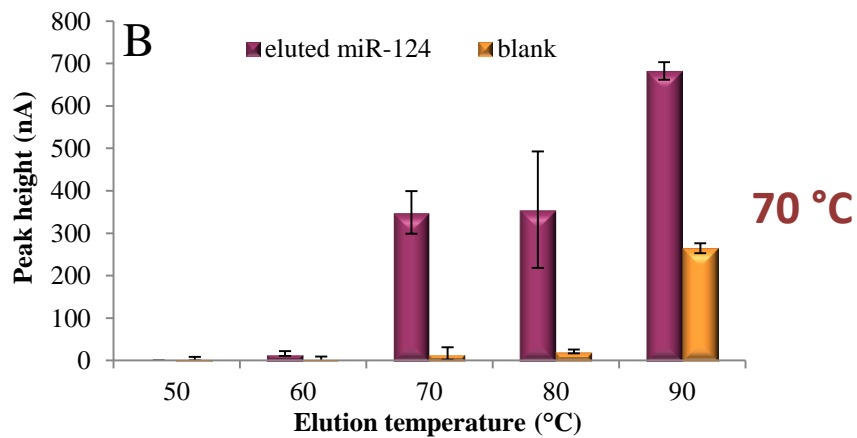
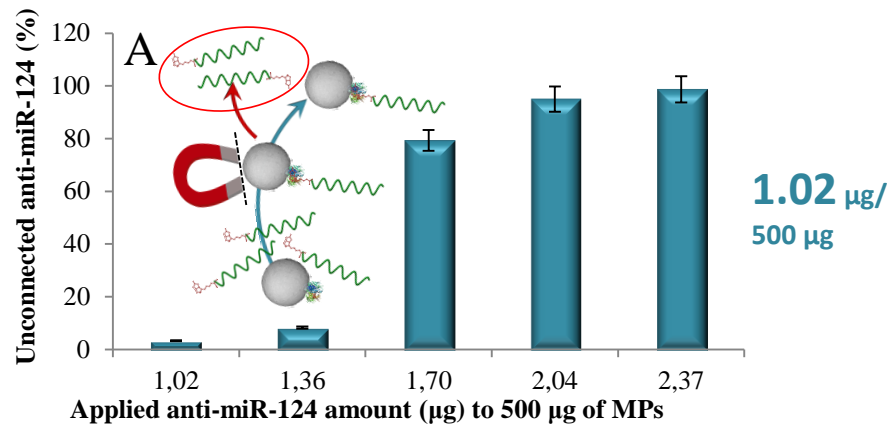
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Magnetic separation connected with electrochemical detection

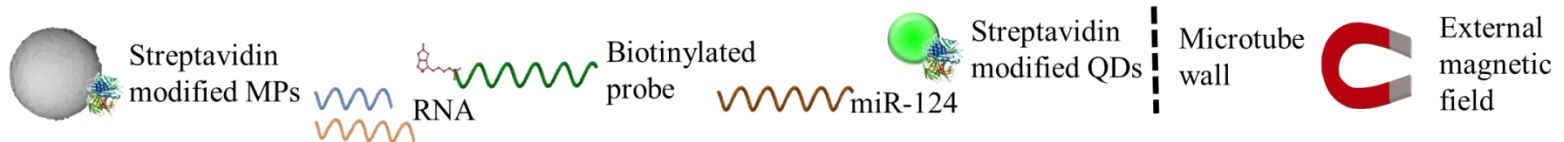
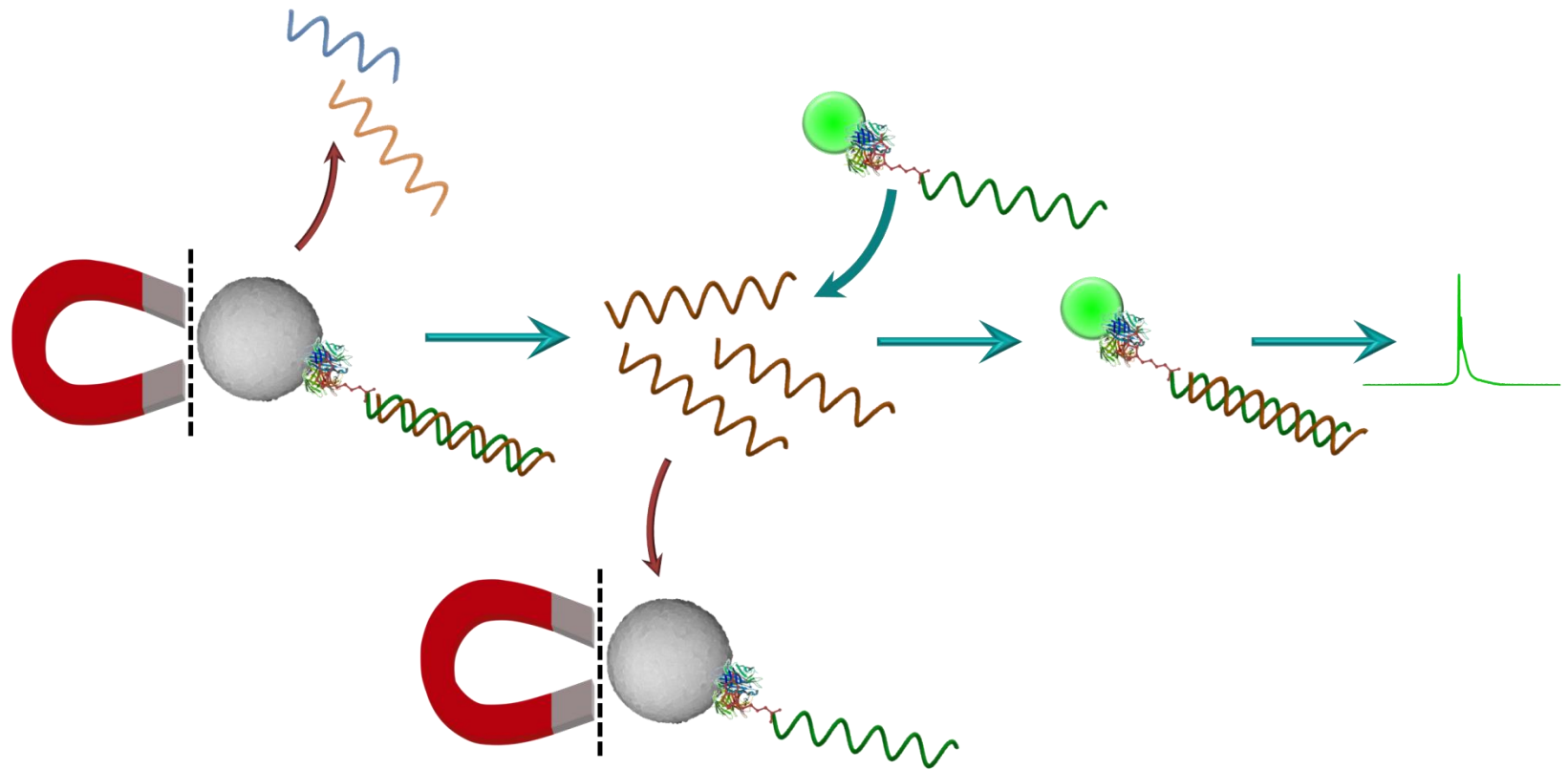


- Streptavidin modified MPs
- RNA
- Biotinylated anti-miR-124
- miR-124
- External magnetic field
- Microtube wall

miR-124 detection in human cells

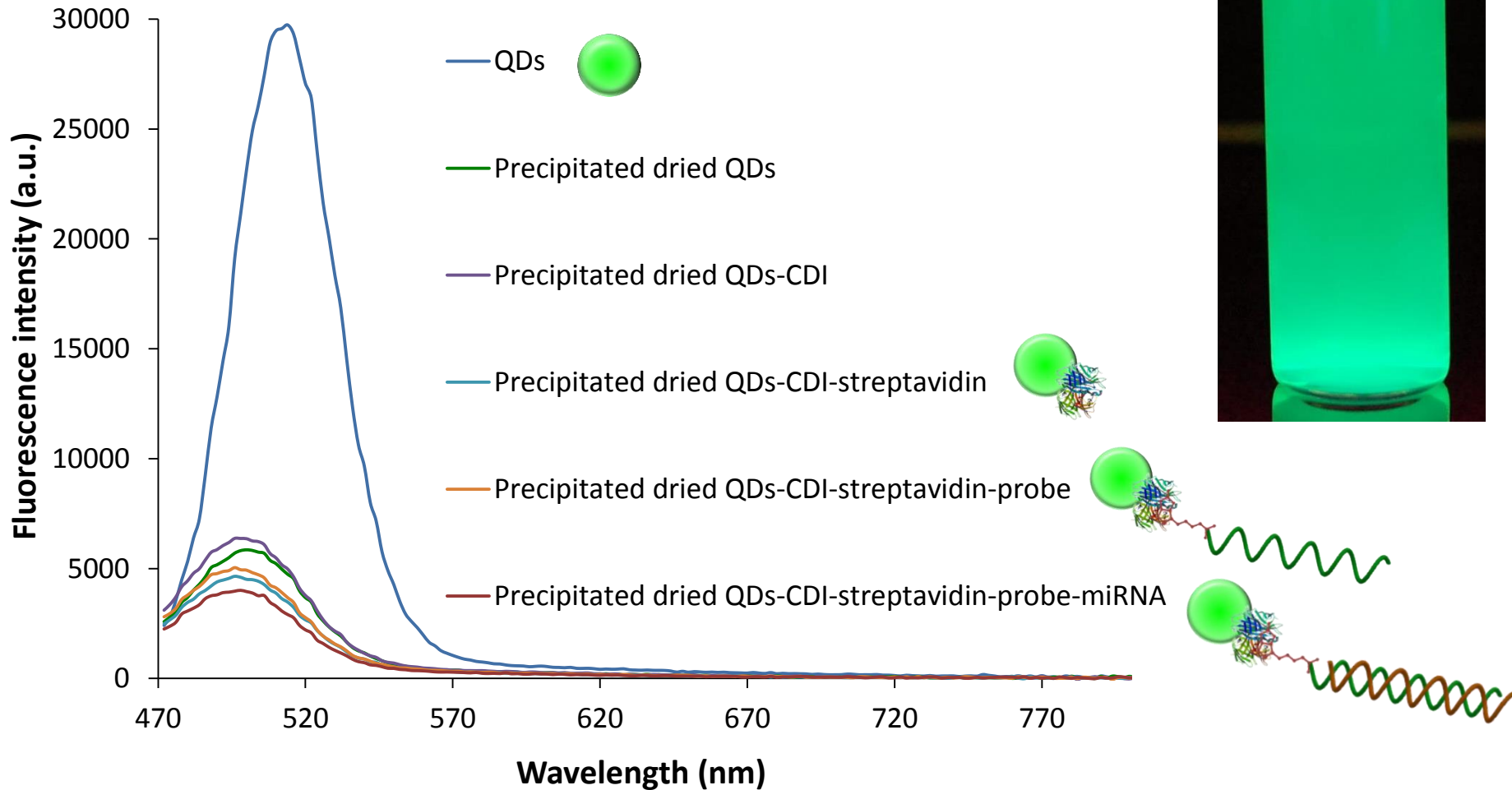


Magnetic separation connected with CE-LIF



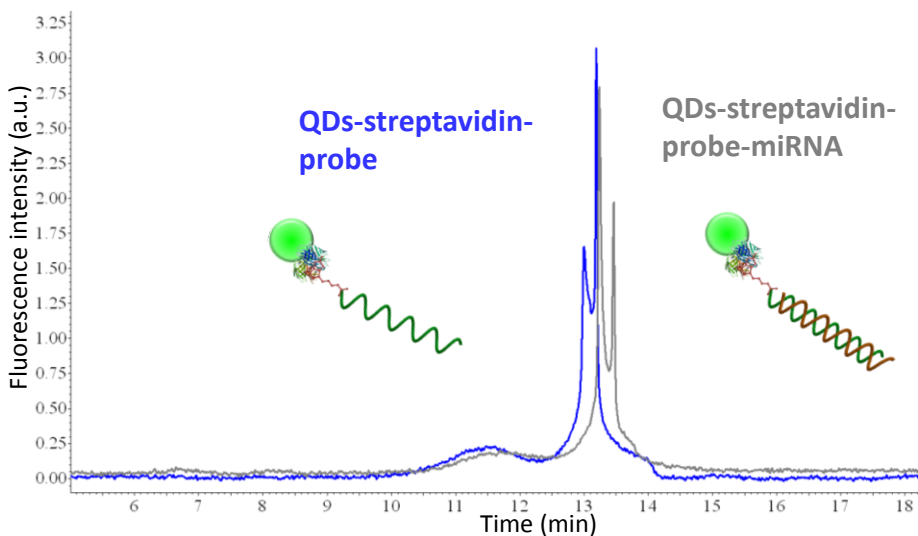
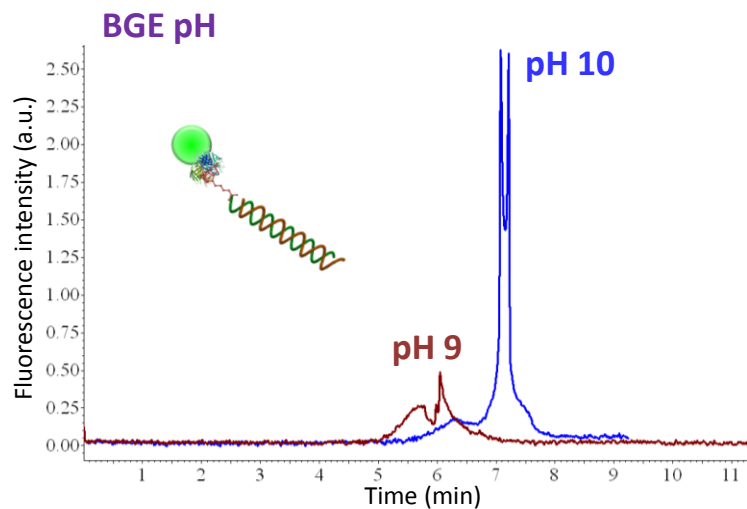
Fluorescence characterization

Ex: 440 nm

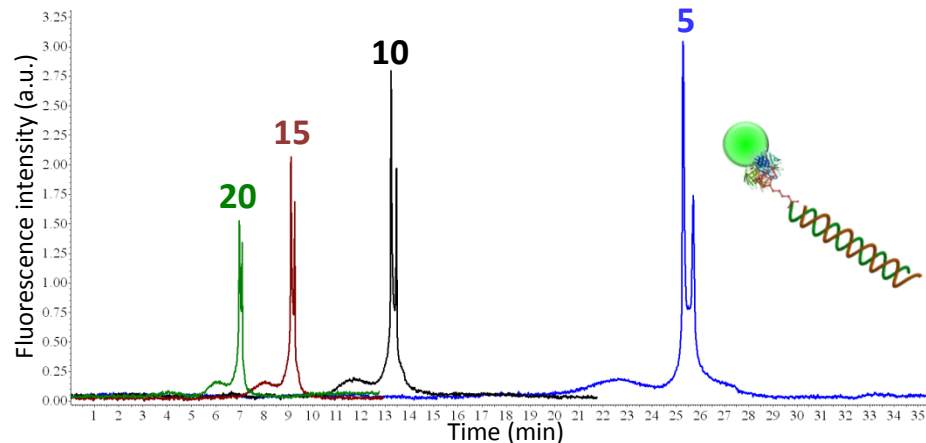
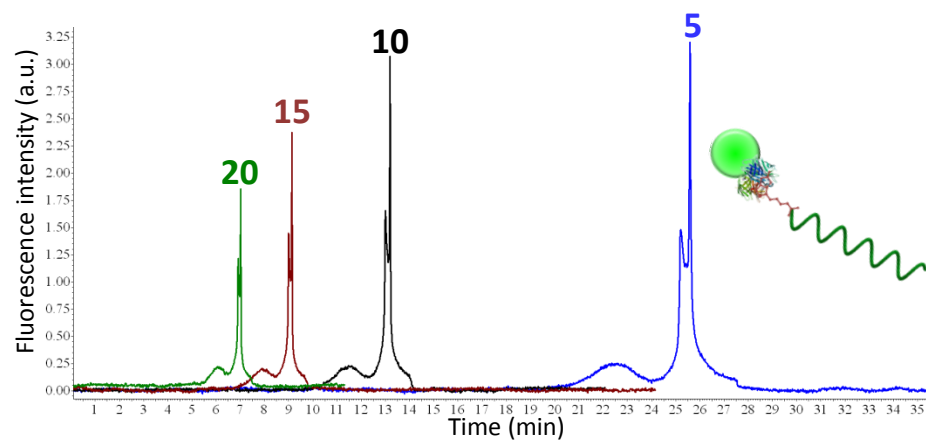
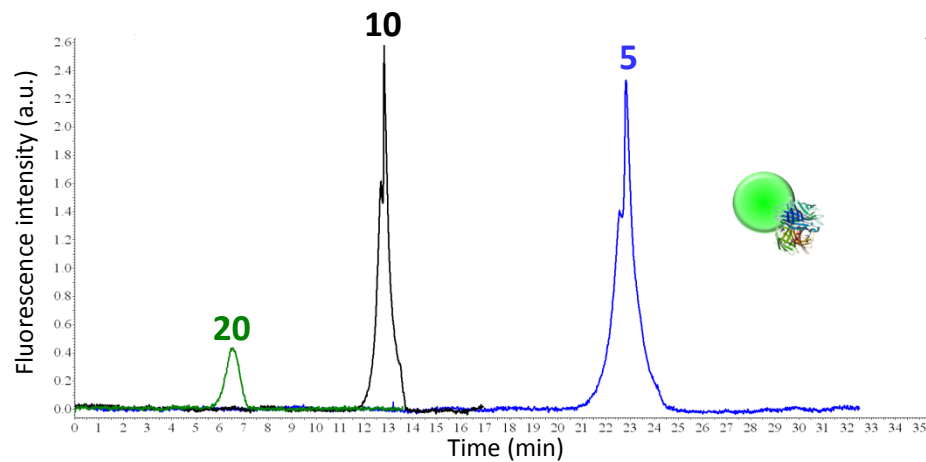


CE-LIF

- detection – LIF – excitation 488 nm
- capillary 63.5/53.5 cm, ID 75 μm
- BGE – 20 mM sodium borate buffer (pH 9 and 10)
- separation voltage of +5, 10, 15 and 20 kV
- sample injection 5 psi 5s



Separation voltage (kV)



Conclusion

- miRNAs are becoming a very important group of molecules especially since their connection to numerous diseases has been revealed
- nanomaterials have found their position in miRNA isolation and detection
- the combined advantages of magnetic particle-based separation, sensitive electrochemical/optical detection and separation method (CE)

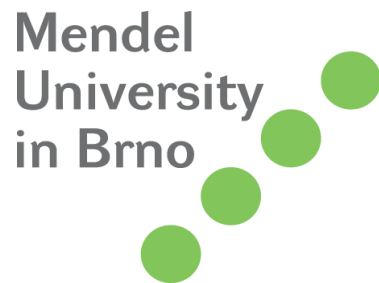
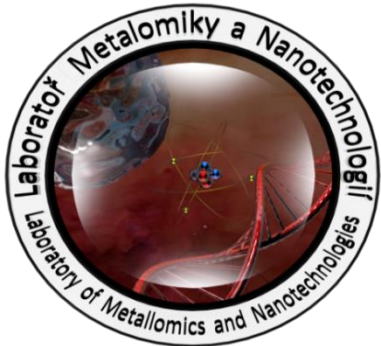
Acknowledgments

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To all colleagues from Laboratory of
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Thank you for your attention!



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ