evropský sociální fond v ČR
EVROPSKÁ UNIE
MINISTERSTVO ŠKOLSTVÍ, MLÁDEŽE A TĚLOVÝCHOVY
OP Vzdělávání pro konkurenceschopnost
INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Název: ISOLATION AND DETECTION OF INFLUENZA VIRION 2012-2014

Školitel: MVDr. Ludmila Krejčová

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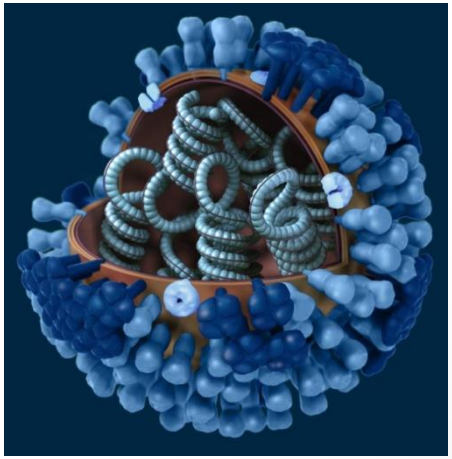
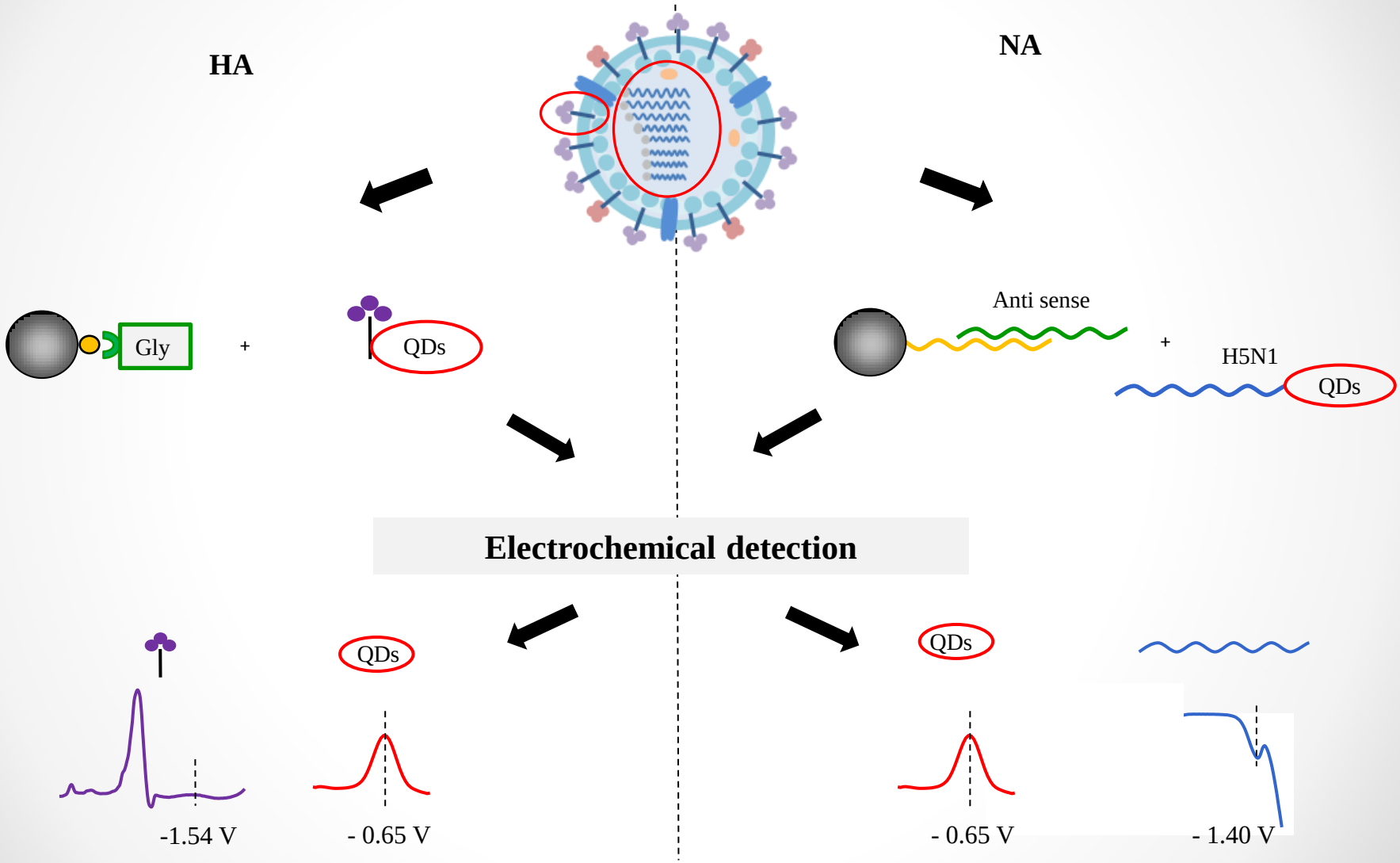
Reg.č.projektu: CZ.1.07/2.4.00/31.0023
Název projektu: Partnerská síť centra excelentního bionanotechnologického výzkumu
NanoBioMetalNet

CONTENT

- Target parts of influenza virion for detection strategies
- Isolation and detection of Hemagglutinin
- Isolation and detction of influenza derived oligonucleotide
- Conclusion
- Future prospects

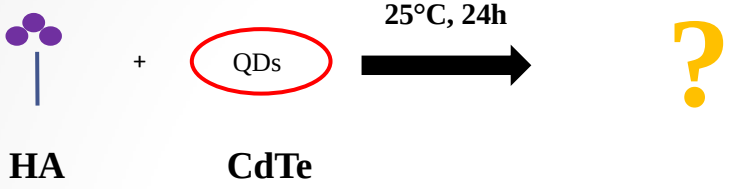


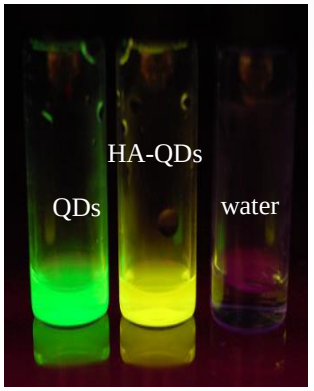
TARGET PARTS OF INFLUENZA VIRION FOR DETECTION STRATEGIES

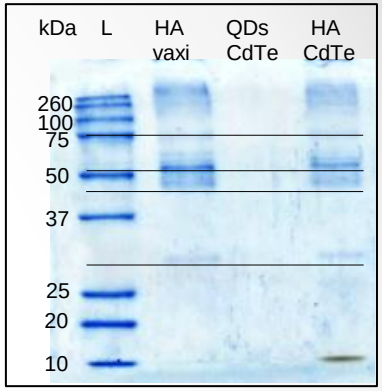


Krejcova, L., D. Hynek, et al. (2012). "Electrochemical Sensors and Biosensors for Influenza Detection." International Journal of Electrochemical Science 7(11): 10779-10801.

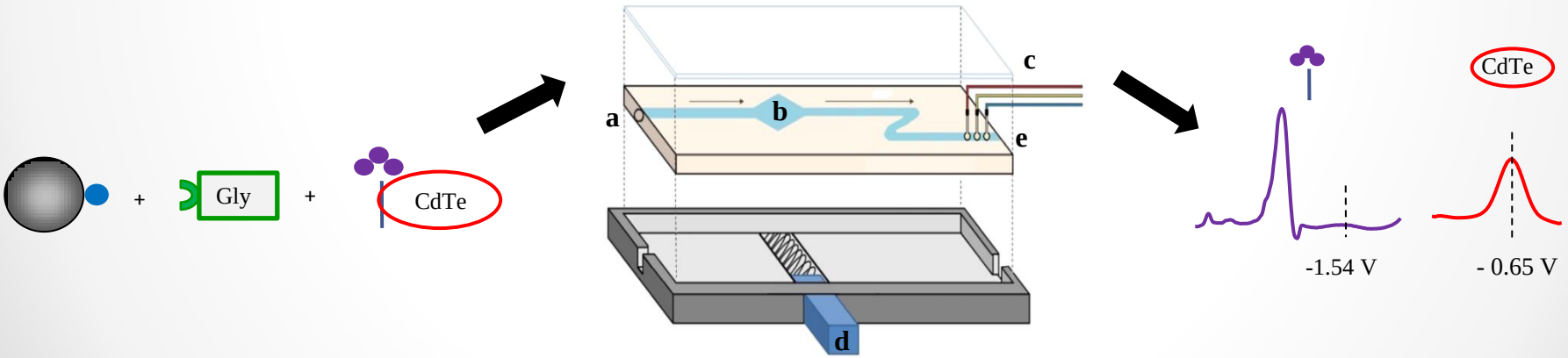
ISOLATION AND DETECTION OF HA LABELED BY QDs (CdTe)





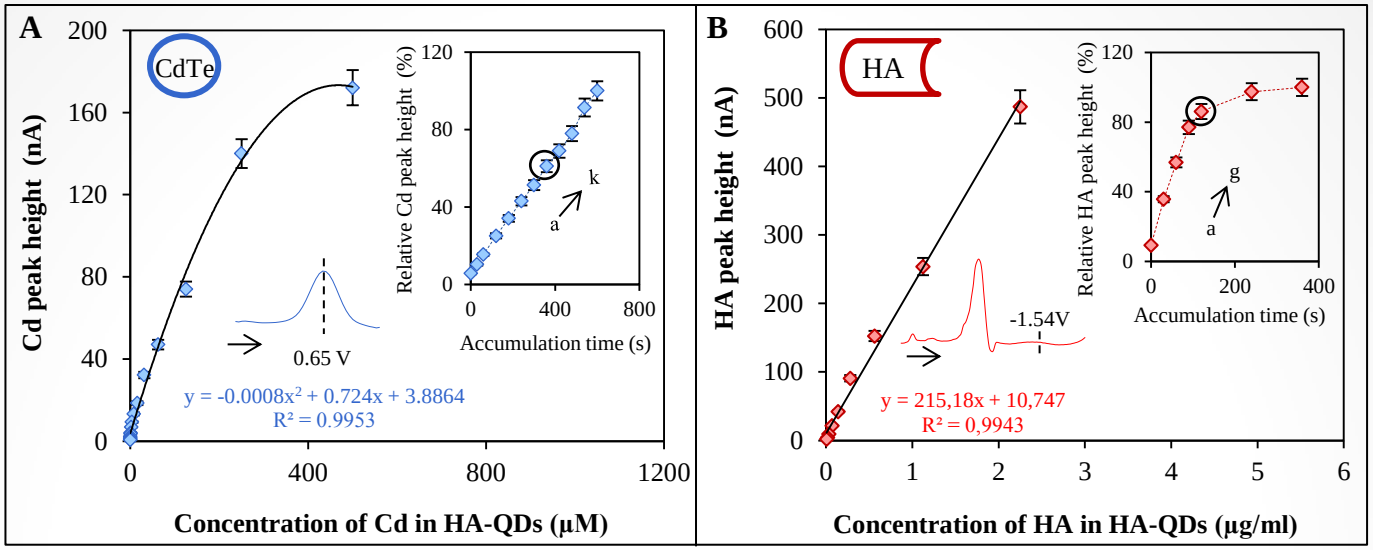


Isolation of HA (Vaxigrip ®) using glycan modificated MPs

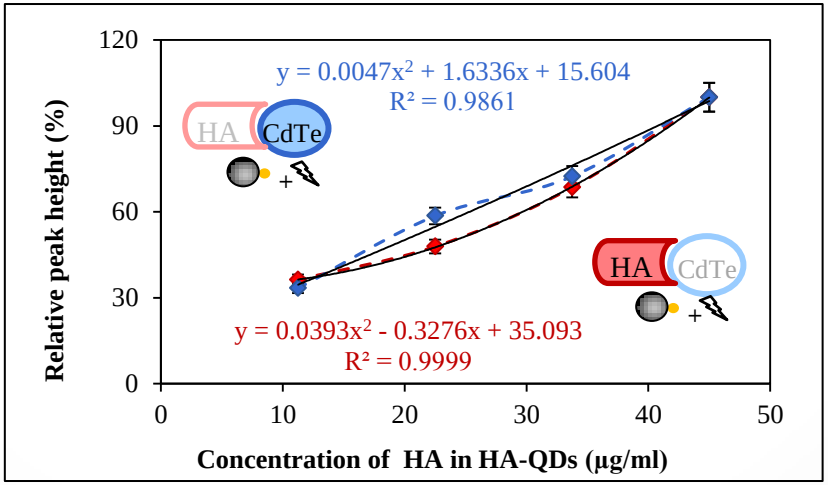


a) input, b) reaction chamber, c) three-electrode set up, d) magnetic pad, e) output

RESULTS



Electrochemical characterisation of HA-QDs complex by differential pulse voltametry (DPV). **A** Dependence of Cd peak height on cadmium concentration present in complex HA-CdTe measured by ASV DPV. **B** Dependence of HA peak height on HA concentration present in complex HA-CdTe measured by AdT DPV.

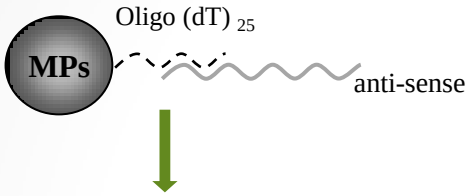


Dependence of relative peak heights (related to maximum values for individual peaks) on concentration of vaccine HA in HA-CdTe (µg/ml).

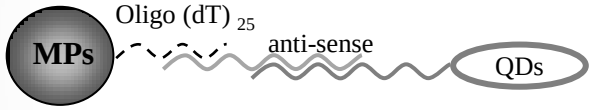
Krejcova, L., D. Dospivova, et al. (2012). "Paramagnetic particles coupled with an automated flow injection analysis as a tool for influenza viral protein detection." Electrophoresis **33**(21): 3195-3204.

ISOLATION AND DETECTION OF INFLUENZA DERIVED ODNS USING THREE DIFFERENT QDs (CdS, PbS, ZnS)

Hybridisation of anti-sense on $(dT)_{25}$ modified MPs

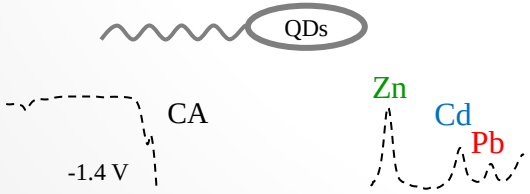


Hybridisation of ODN bounded withQDs



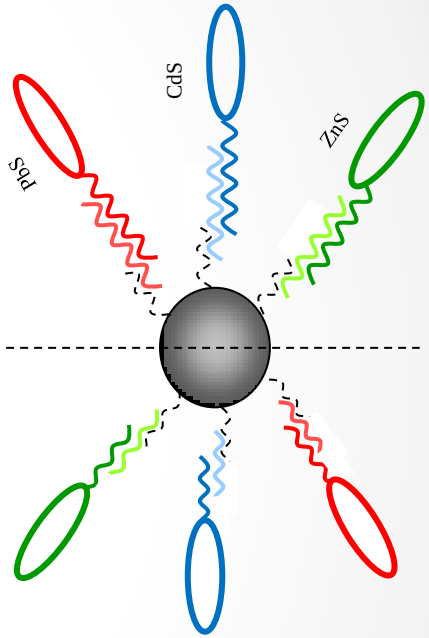
Elution

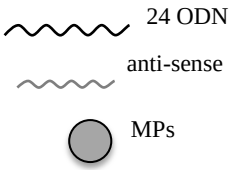
Electrochemical detection of ODN a QDs

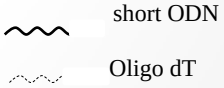


BAR CODE
long (24) ODN

BAR CODE
short (12) ODN

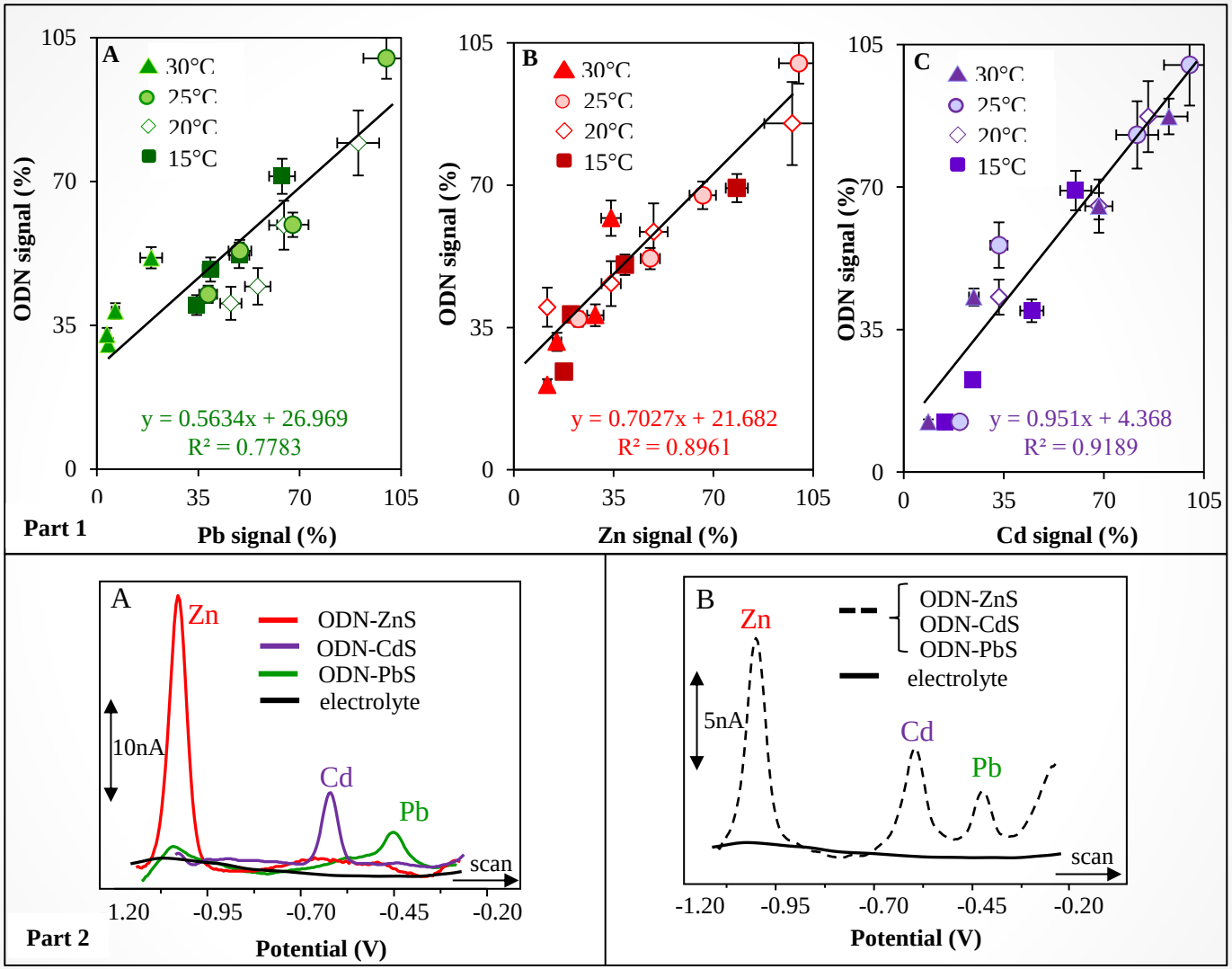






Krejcova, L., D. Hynek, et al. (2013). "Development of a Magnetic Electrochemical Bar Code Array for Point Mutation Detection in the H5N1 Neuraminidase Gene." Viruses-Basel **5**(7): 1719-1739.

RESULTS



Part 1: Correlation between the relative peak height of ODN and metal ions (both related to individual maximum values) for hybridisation temperatures: 30°C, 25°C, 20°C and 15°C and concentration of ODN-QDs: 2.5; 5; 10 a 20 µg/ml. **Part 2**: A: voltamograms of Zn, Cd and Pb from complex ODN-ZnS (-); ODN-PbS (-) and ODN-CdS (-), measured by DPV (concentration of ODN was 2µg/ml); B mixture of ologonucleotides (from 2/A) (1:1:1).

Krejcova, L., D. Huska, et al. (2013). "Using of Paramagnetic Microparticles and Quantum Dots for Isolation and Electrochemical Detection of Influenza Viruses' Specific Nucleic Acids." International Journal of Electrochemical Science 8(1): 689-702.

FUTURE PROSPECTS

- Characterisation of HA-Cd QDs complex
- Immunoassay and subtipisation of Influenza A (beads based)
- Optimization of 3D chip fabrication
- Anti-sense therapy of influenza

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Thank you for your attention

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