

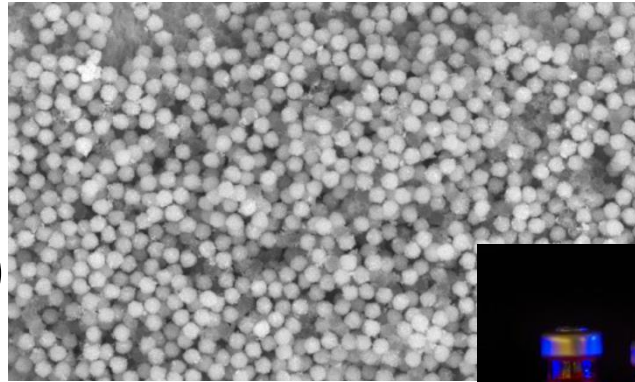
Název: **Platinové nanočástice a jejich
interakce s DNA polymerázou**

Školitel: **Kristýna Šmerková**

Datum: **06. 09. 2013**

Metal nanoparticles

- Au, Ag
- Fe_xO_y
- QDs (CdTe, CdS...)

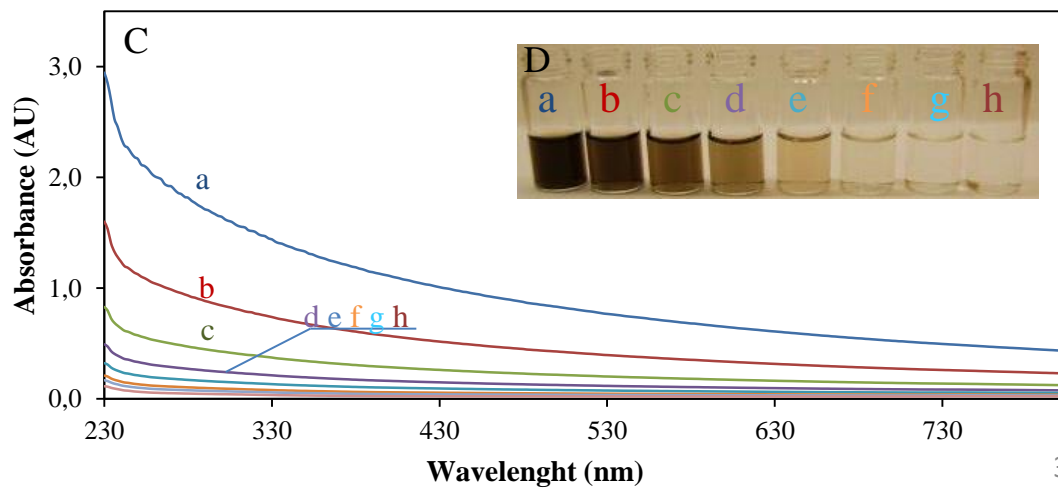
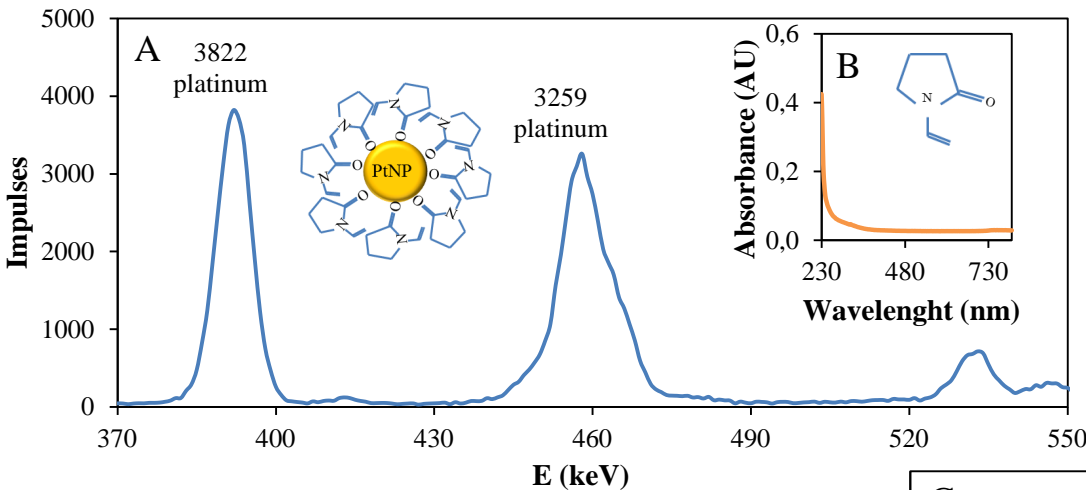
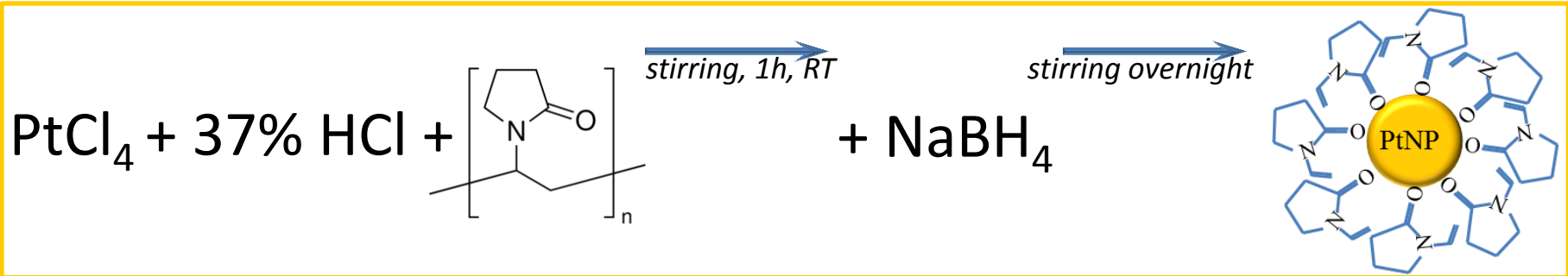


Biomedical applications

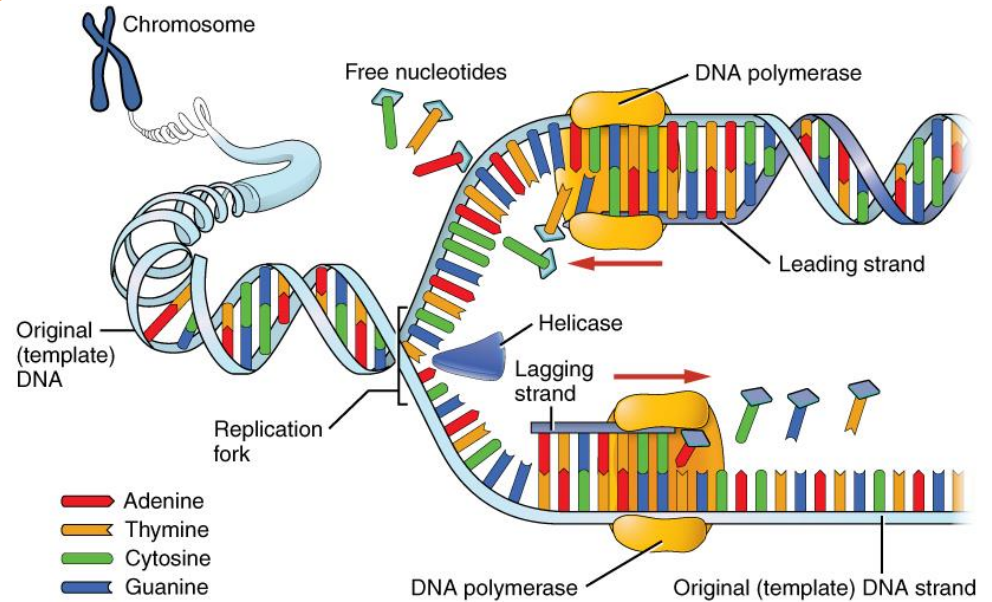
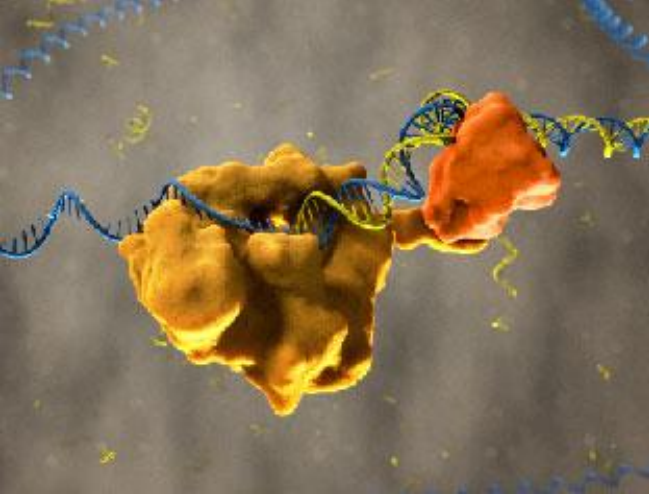
- Visualization
 - ✓ MRI
 - ✓ Labeling
- Therapy
 - ✓ Drug delivery
 - ✓ Hyperthermia



Pt nanoparticles



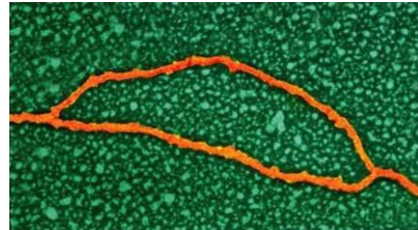
Polymerase



- Enzyme
- Synthesis of NA polymers

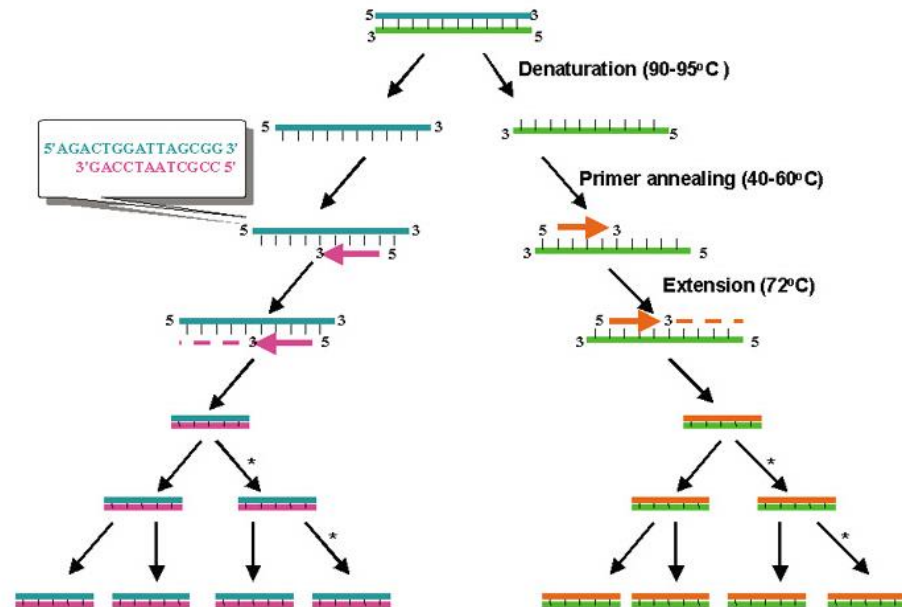
In vivo

- Replication
- Semiconservative process
- Replication forks



In vitro

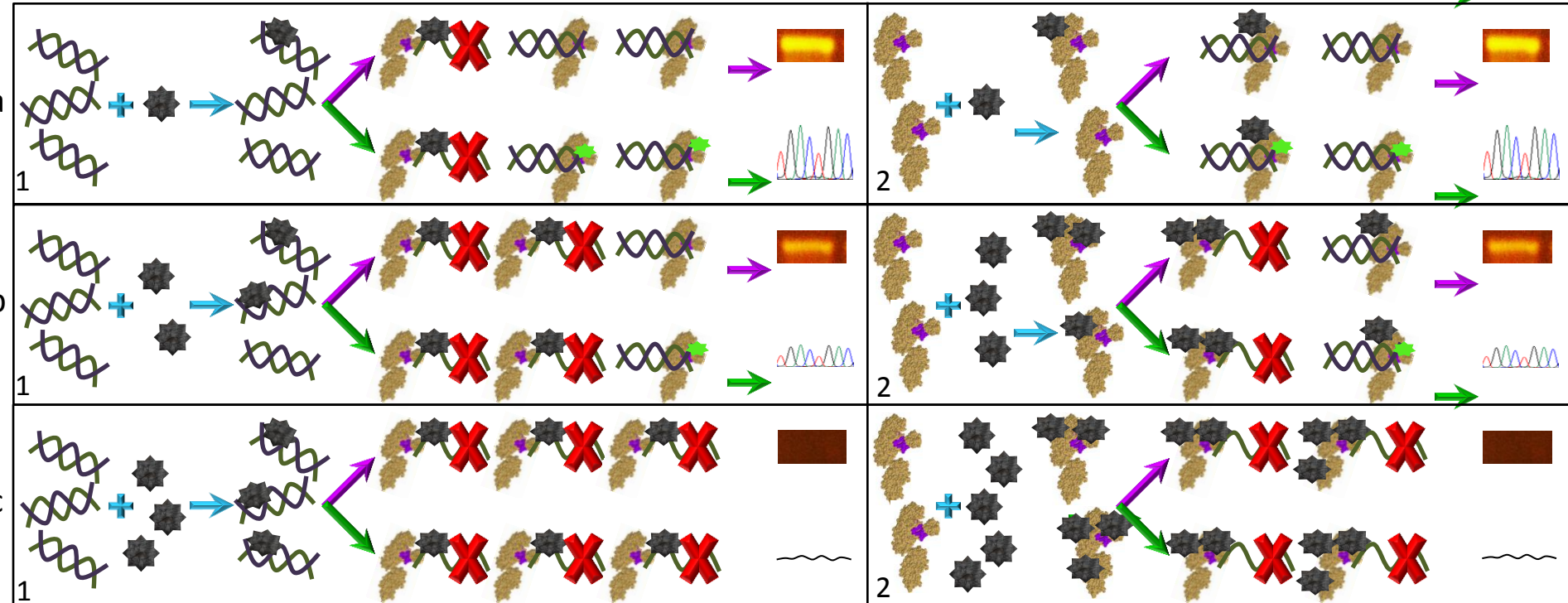
- PCR
- 1983 Kary Mullis



Interaction of Pt nanoparticles with DNA/polymerase

A) DNA

B) Polymerase



XXXX DNA

Nanoplatin

Taq DNA Polymerase

PCR

Sequencing reaction

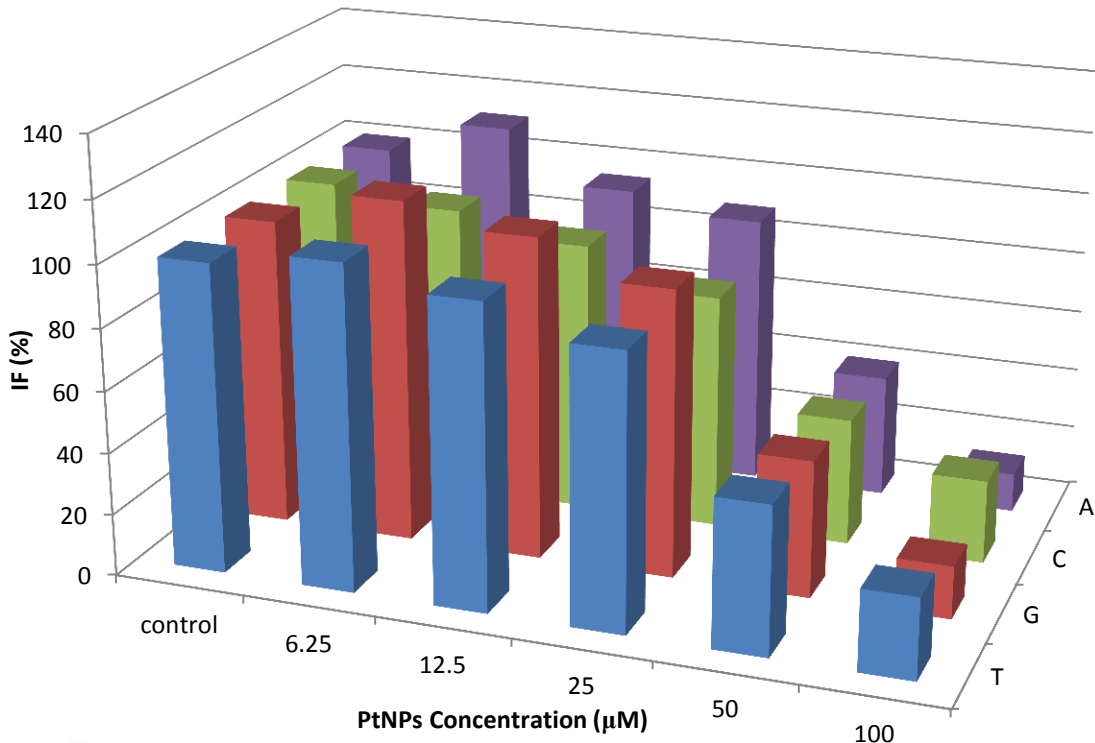
Fluorescently-labeled DNA strand

DNA band in agarose gel electrophoresis

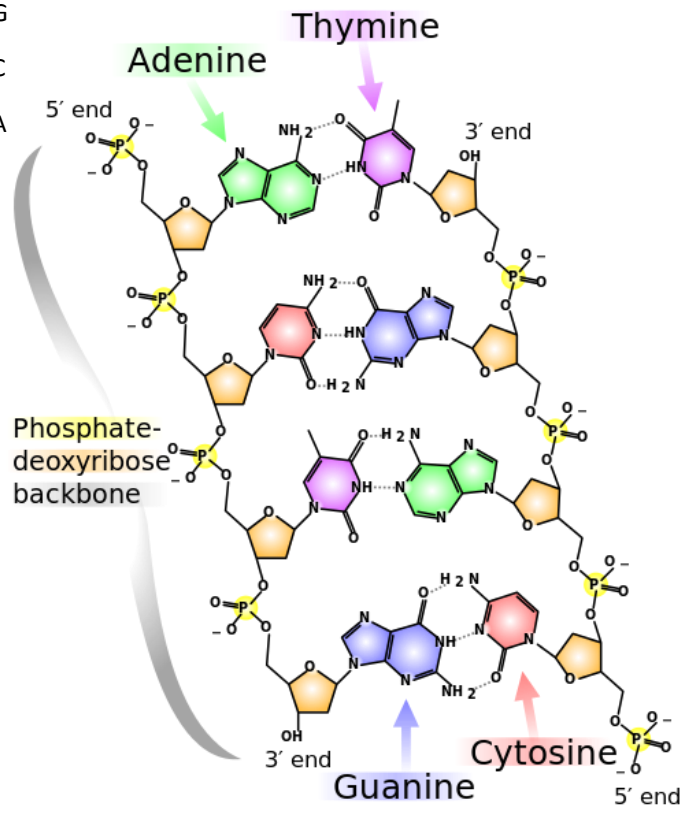
DNA sequencing electropherogram

A) Interaction of Pt nanoparticles with DNA

Influence of Pt nanoparticles addition on sequencing reaction

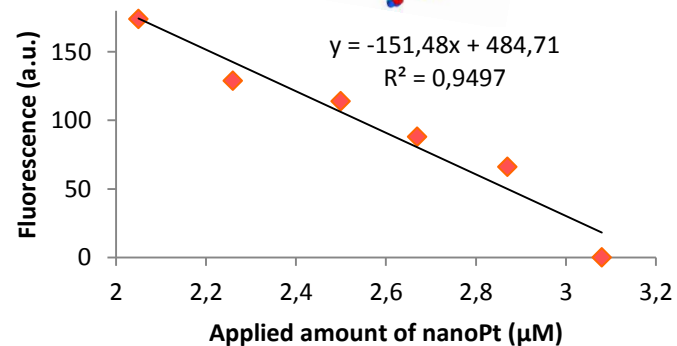
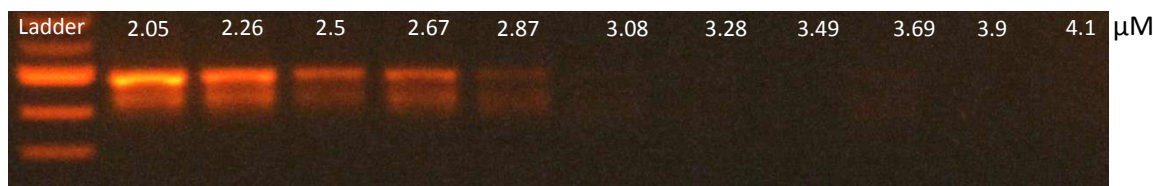
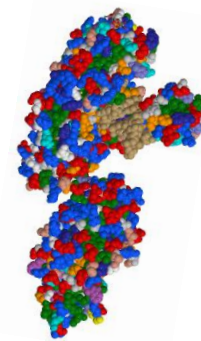
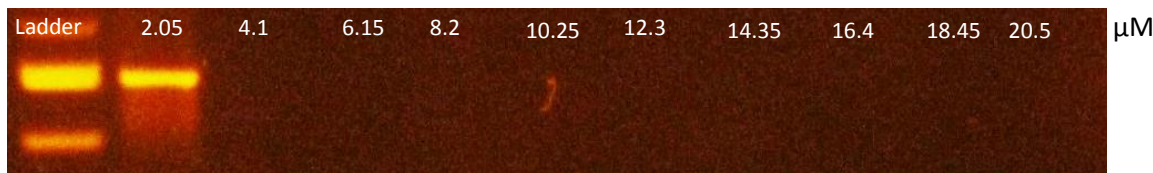
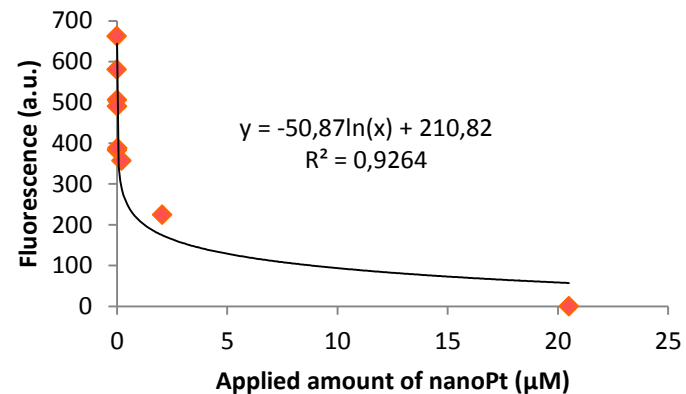


- T
- G
- C
- A

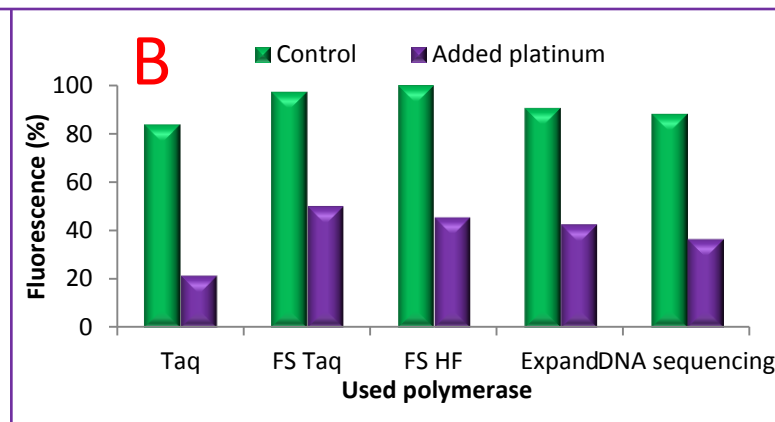
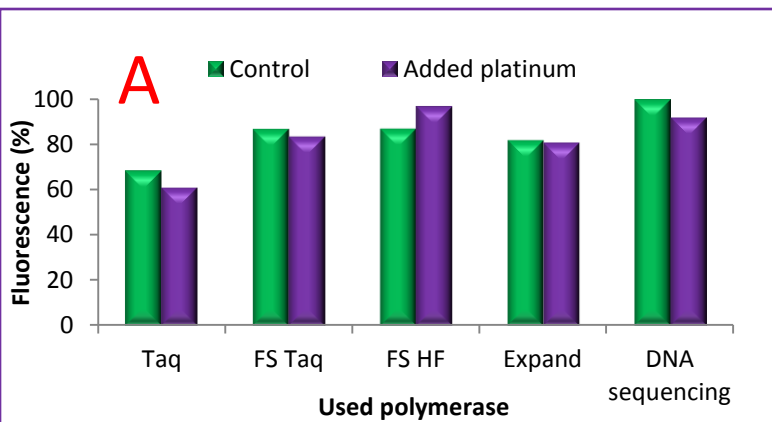
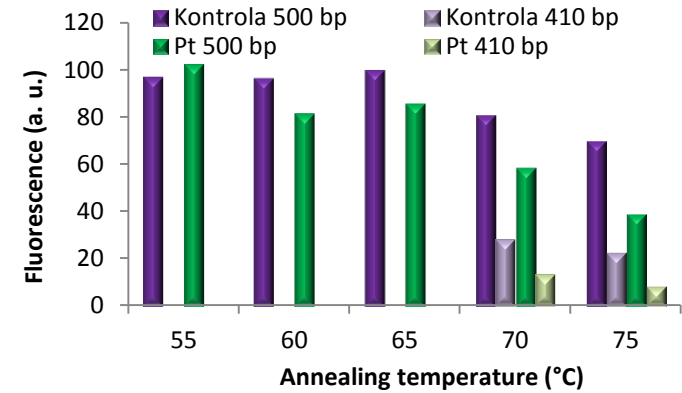
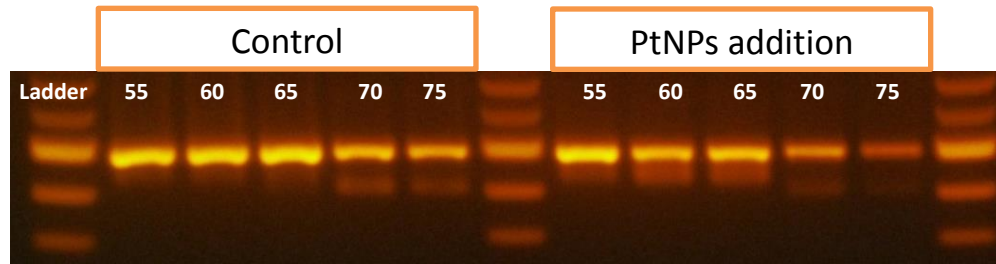


B) Interaction of Pt nanoparticles with polymerase

Influence of Pt nanoparticles addition on PCR



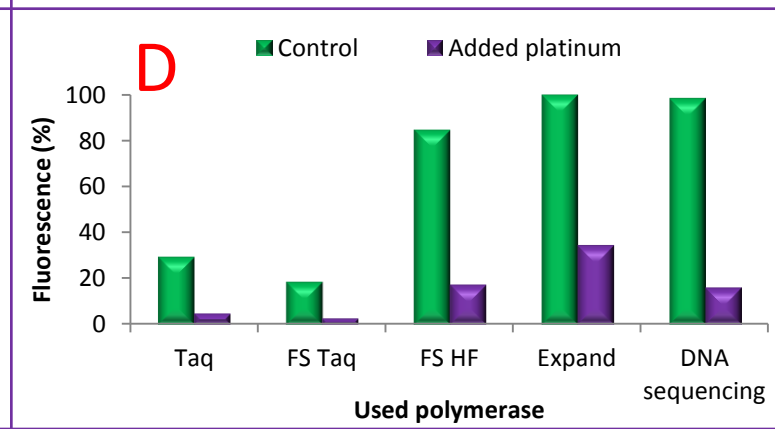
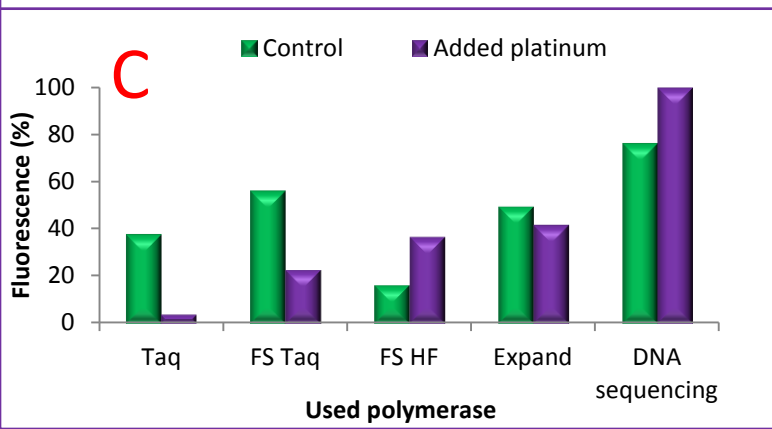
Influence of Pt nanoparticles addition on PCR – conditions modification



Taq polymerase

Expand High Fidelity Polymerase
proofreading activity
high yield and fidelity

FastStart High Fidelity Polymerase
proofreading activity
high fidelity
inactive below +75°C



FastStart Taq DNA Polymerase
inactive below +75°C

DNA Polymerase for sequencing

Conclusion

- With increasing Pt nanoparticles concentration the DNA signal decreases
- Pt nanoparticles influence polymerase reaction and sequencing reaction → interaction with DNA and polymerase
- What are Pt nanoparticles doing during denaturation?

Acknowledgments



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-
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INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Thank you for your attention

Reg.č.projektu: CZ.1.07/2.4.00/31.0023

Název projektu: Partnerská síť centra excelentního bionanotechnologického výzkumu

