

  
INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Name: Apoferritin as a targeted drug delivery system  
Author: Simona Dostalova  
Date: 15. 11. 2013

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

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### NANO-WORLD

- 1959 – Feynman’s „There is plenty of room at the bottom“
- Encapsulation in nanocarrier – nanomedicine
- Theranostics = diagnostics + therapy
- Effectivity enhanced using antibodies



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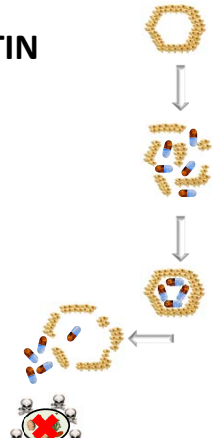
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## APOFERRITIN

- Storage system for iron ions
- Interior cavity 8 nm
- Exterior surface 12 nm
- 480 kDa
- Isoelectric point: pI 4.0
- pH dependent opening




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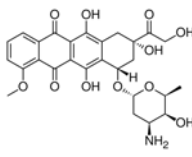
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## AIMS OF THE STUDY

- Design a nanocarrier based on apoferritin with encapsulated doxorubicin (APODOX)
- Prove the binding of nanocarrier components
- Test the created nanocarrier on healthy and cancer prostate cells



Doxorubicin

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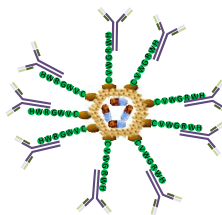
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## NANOCARRIER DESIGN



-  APODOX
-  IgG antibody
-  Gold
-  Heptapeptide His-Trp-Arg-Gly-Trp-Val-Cys (HWR)

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## RESULTS

- Proof of gold bound to APODOX
- Modification with 2 types of gold:
  - Gold nanoparticles – 3 nm (Nano)
  - Gold<sup>(III)</sup> chloride hydrate (HAu)
- Proof of binding of nanocarrier peptide/protein components
- Test of nanocarrier with anti-PSMA antibody on prostate cells

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**Ambient + UV light**

**Absorbance**

**Fluorescence**

**PAGE, pH 7.4**

**Au concentration**

	APODOX	APODOX-Nano	APODOX-HAu
Applied (µM)	0	25	200
Solution measurement (µM)	0	12.75	130.9
Gel measurement (ng/g of gel)	0	1.98	12.42

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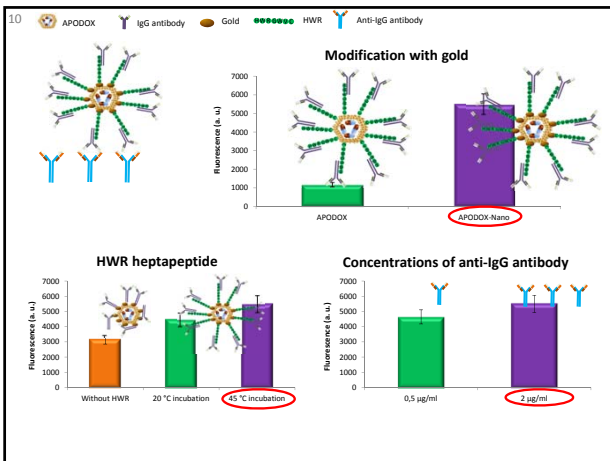
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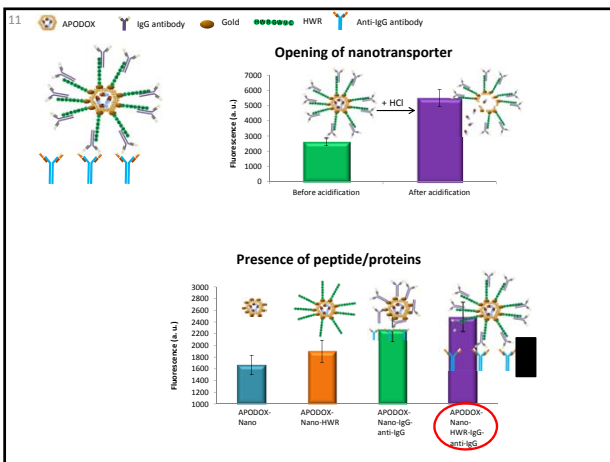
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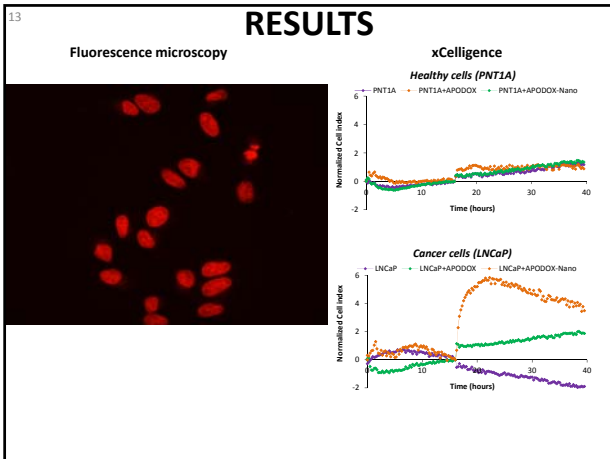
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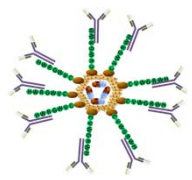
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14

## CONCLUSION

- Proven binding of each component of nanocarrier
- Nanocarrier can selectively target cancer prostate cells



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## Thank You for Your attention

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