
  
INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

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## Changes in expression levels of metallothionein in earthworms forming quantum dots

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30.1.2014

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

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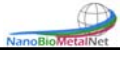
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- Metallothionein gene expression is induced by a high variety of stimuli, as metal exposure, oxidative stress, glucocorticoids, hydric stress ...
- The level of the response to these inducers depends on the MT gene

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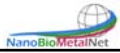
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- MT expression is induced by metals (Cu, Zn, Au, Cd, Hg...)
- The expression of metallothionein occurs after binding of the metal-responsive transcription factor-1 (MTF-1) to promoters containing a metal-responsive element (MRE)
- MTF-1 is the main activator of metallothionein genes

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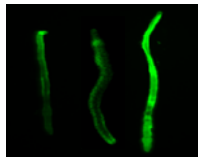
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**RT-PCR of MT**

- The earthworms (*Eisenia fetida*) were kept for 11 days in the 30% moisture soil containing CdCl<sub>2</sub> and Na<sub>2</sub>TeO<sub>3</sub>
- PrimeScript One Step RT-PCR Kit (TaKaRa) was used for RT-PCR

- MT gene primer**
- F primer: CGCAAGAGAGGGATCAACTT
- R primer: TATTCAATGCCTGGCTCT
- PCR length : 228bp

- β-Actin primer**
- F primer: TCATCGTCCACAGAAAG
- R primer: AAATGTCTCTCCGCAAGCT
- PCR length: 149 bp



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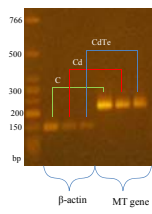
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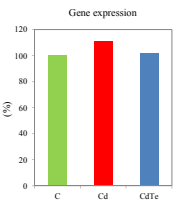
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**Changes in expression levels**

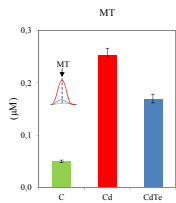


Gene expression

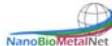


Condition	β-actin (%)	MT (%)
C	100	~0.05
Cd	~110	~0.25
CdTe	~100	~0.15

MT



Condition	MT (pM)
C	~0.05
Cd	~0.25
CdTe	~0.15

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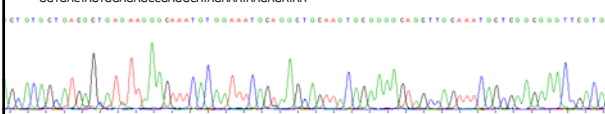
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**Sequence alignment and chromatogram**

- Control [96% identical sequence of *Eisenia foetida* mRNA for metallothionein]**  
 ACTGCAGATGTTTGA...AAAGTGA...GATGCTTGC...CAGGCTGCA...AAAAGCTTTGCTGTGCTGATGCTGAGAAGGCAAATGTGGA  
 AATGCAGGCTGCAAGTGC...GGGCGAGCTTCA...ATGCTCGGCGGTTGCTGCGCCGAGGATGCAAGAAGGGATGCTGTG  
 GTGACTAGTTGAGAGCCGAGGCATTGAAATAAATAA
- Cd [95% identical sequence of *Eisenia foetida* mRNA for metallothionein]**  
 ACTGCAGATGTTTGA...AAAGTGA...GATGCTTGC...CAGGCTGCA...AAAAGCTTTGCTGTGCTGATGCTGAGAAGGCAAATGTGGA  
 AATGCAGGCTGCAAGTGC...GGGCGAGCTTCA...ATGCTCGGCGGTTGCTGCGCCGAGGATGCAAGAAGGGATGCTGTG  
 GTGACTAGTTGAGAGCCGAGGCATTGAAATAAATAA
- CdTe [95% identical sequence of *Eisenia foetida* mRNA for metallothionein]**  
 ACTGCAGATGTTTGA...AAAGTGA...GATGCTTGC...CAGGCTGCA...AAAAGCTTTGCTGTGCTGATGCTGAGAAGGCAAATGTGGA  
 AATGCAGGCTGCAAGTGC...GGGCGAGCTTCA...ATGCTCGGCGGTTGCTGCGCCGAGGATGCAAGAAGGGATGCTGTG  
 GTGACTAGTTGAGAGCCGAGGCATTGAAATAAATAA



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**Thank you for your attention**

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