

Opportunities for digitally encoded microcarriers in pharmacy and cell based assays

Ghent University
Faculty of Pharmaceutical Sciences
Ghent Research Group on Nanomedicine (GRGN)

Farzaneh Fayazpour

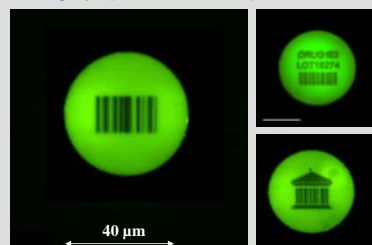
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Overview

- Aim of the study
- Introduction
- Results
- Conclusions

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Encoding by spatial-selective photobleaching

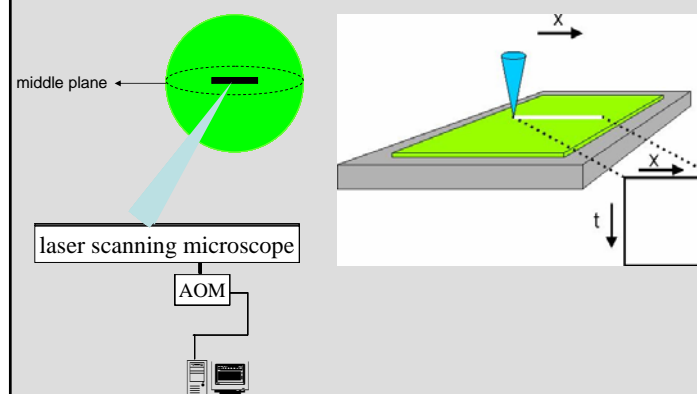


Confocal images of Memobead

1. Braeckmans K. et al., Nat. Rev. Drug. Disc. 2002, 1, 447-456.
2. Braeckmans K. et al., Nat. Mat. 2003, 2, 169-173.

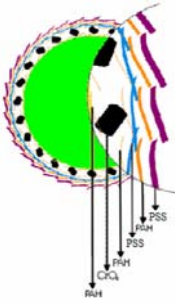
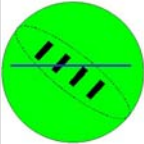

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Photobleaching by means of laser microscope

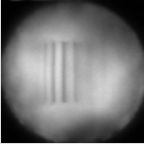
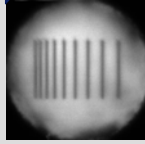


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Positioning and Orientation

a correct orientation and position is required at readout time

magnetic microspheres oriented in magnetic field



Magnetic coating of Memobeads

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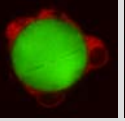
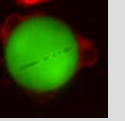
Aim of study

- 1. In-Drug Labelling**
 1. Use of encoded microcarriers (Memo beads) for in-Tablet labelling

This research published in Advanced Materials. 2007, 19, 3854.

- 2. Multiplex assays**
 2. Use of encoded microcarriers (Memo beads) as cell carriers and reverse transfection

This research has accepted to publish in Advanced Materials


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Introduction

What is counterfeit drug

Wrong labels
6%



Wrong ingredients
7%

Low content
21%

Poor quality
24%

No active ingredient
43%

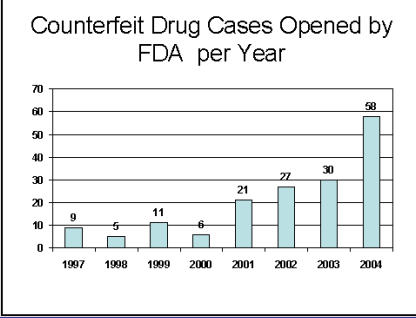
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Introduction

- 10% of global medicine market
- 20-50% in parts of Africa and Asia

Counterfeit Drug Cases Opened by FDA per Year



Year	Cases
1997	9
1998	5
1999	11
2000	6
2001	21
2002	27
2003	30
2004	58

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Introduction

Anti Counterfeiting Strategies

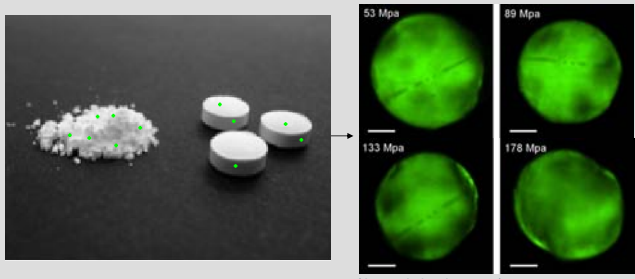
1. Securing the supply chain
2. Security technology strategies
 - On the package of drug
 - in drug labelling

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Results

Dot-encoded beads as obtained from tablets made by direct compression of the powder mixture



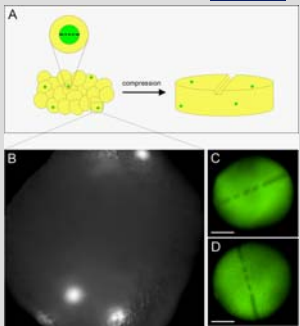
(the scale bar is 20 μ m)

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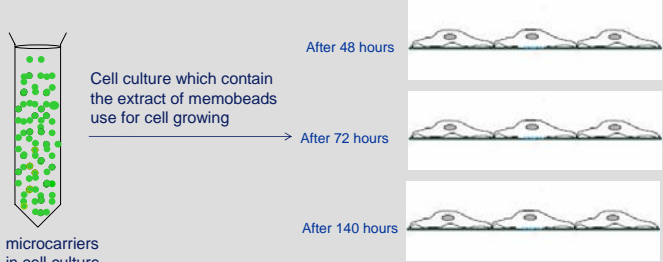
Results

Dot-encoded beads as obtained from tablets made by compression of HPMC/starch granules



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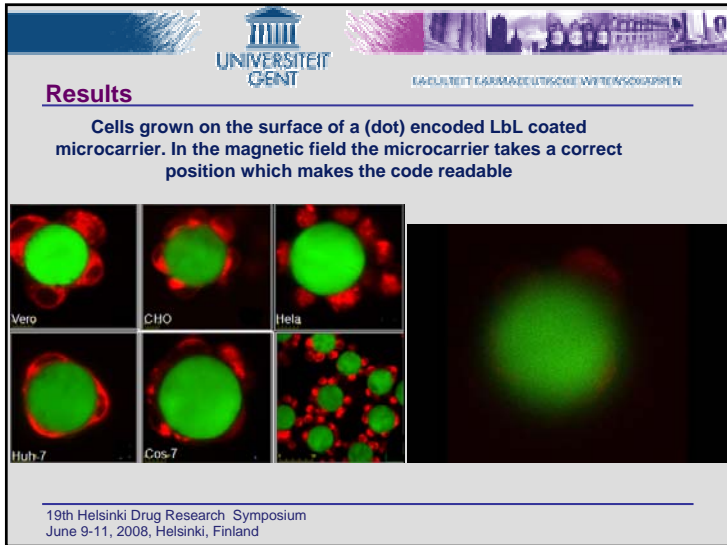
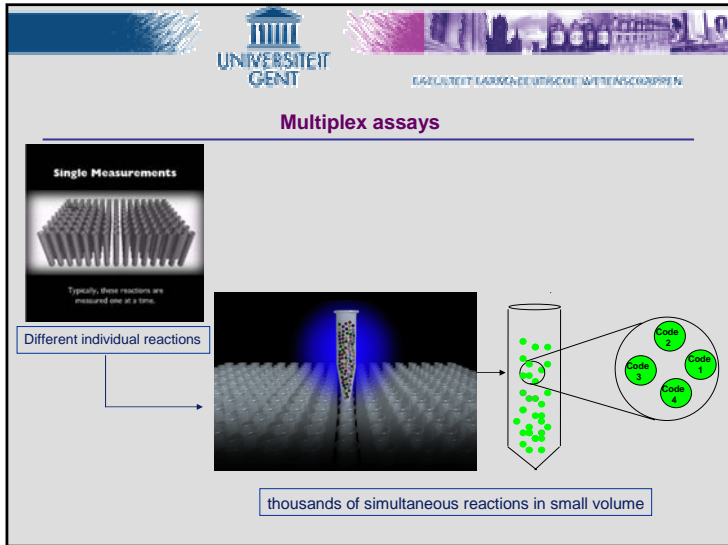
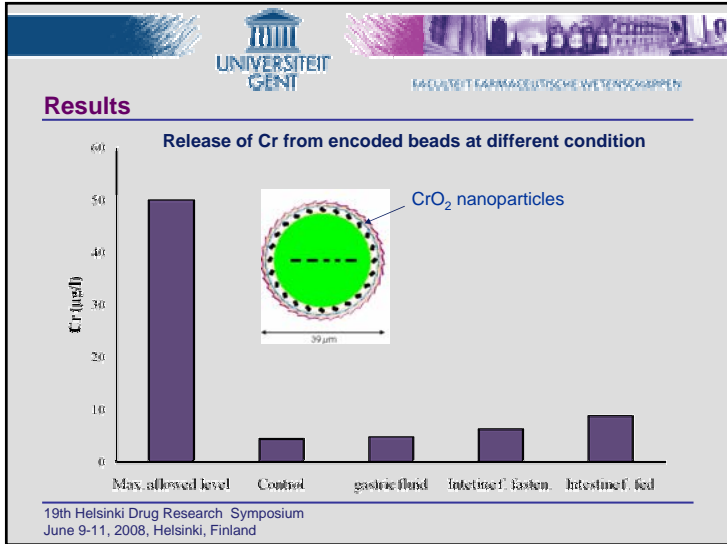
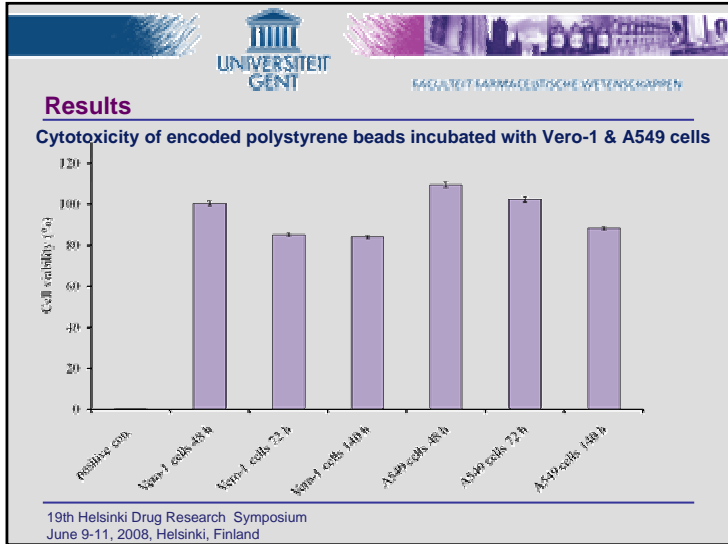


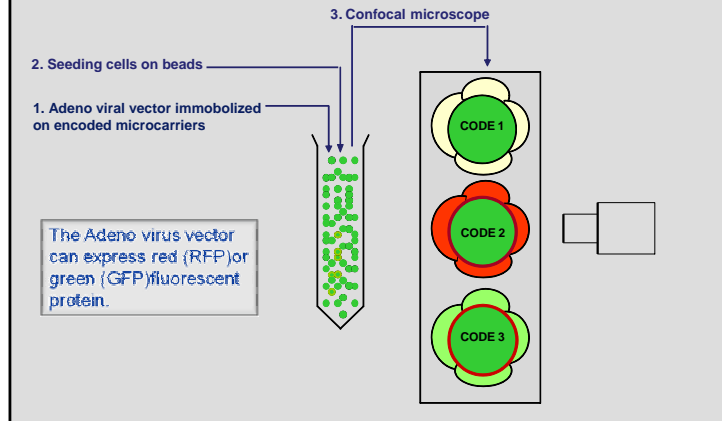
Cell culture which contain the extract of memobeads use for cell growing

microcarriers in cell culture medium

After 48 hours
 After 72 hours
 After 140 hours

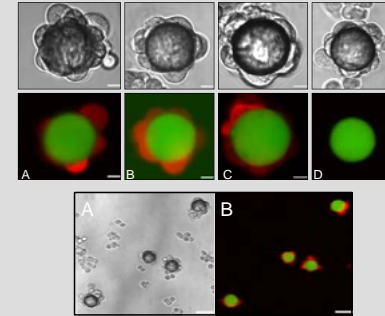
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Results

The cells growing on the polyelectrolyte layer can become transduced with adenoviral particles hosted by the polyelectrolyte layer



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Conclusion

1. Incorporated in tablets, making by direct compression or granulation
2. Low toxicity
3. Ingestion of Memobead is highly unlikely toxic for human
4. Digitally encoded microparticles are promising tools for cell-based multiplexing

1. Fayazpour F. et al., Turning to digitally encoded drug tablets to combat counterfeiting, *Advanced Materials* 2007, 19, 3854.
2. Fayazpour F. et al., Evaluation of digitally encoded layer-by-layer coated microparticles as cell carriers, *Advanced Functional Materials*, 2008 (accepted).

Acknowledgement

- Dr. B. Lucas
- Dr. N. Huyghebaert,
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- Prof. J. Demeester
- Prof. S.C. De Smedt

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Thanks for your attention...

Questions?