

# **Micro & Nanotechnology transforming the Market in Medical Applications**

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# Technology For Industry



**Bridging the gap  
between industry and  
revolutionary technology  
from academia and  
research institutes**



## **TFI provide solutions for industry leaders to address their greatest technology challenges and achieve long term growth**

- **TFI is the market leader in the medical Micro and Nanotechnology consultancy sector**
- **Unrivalled team of experts**
- **Independent and effective**
- **Produce tailored solutions not ‘one size fits all’**

# Contents of Presentation

- Overview of the Market & Market Drivers
- Technology Push – Hot R&D Topics
- Drug Discovery
- Drug Delivery
- Monitoring & Diagnosis
- Implanted Devices

## Present Major Medical Applications of MNT

- Cardiovascular
- Drug delivery & Therapy
- Genetics
- Neurology
- Oncology
- Point of care diagnostics
- Surgery
- Tissue engineering
- Prostheses
- Pathology

*....but what are the largest or fastest growing markets?*

## Size of Markets

▪ Drugs & Drug Delivery	\$80 billion
▪ Blood Analysis	\$22 billion
▪ Heart Pacemakers & Other Implants	\$16 billion
▪ Endoscopy & MIS Tools	\$5 billion
▪ Hearing Aids	\$4 billion
▪ DNA / Lab on Chip	\$1.2 billion

*....and the MNT based Products account for \$7 billion  
or at the component level about \$363 million*

## Drivers in healthcare

- Ageing population
- Personalized health
- Earlier diagnosis
- Cost of healthcare
- Global travel (epidemics)
- Food safety
- Monitoring of individuals (glucose, cholesterol)
- Ethics (eg stem cell research, animal testing)

## Hot R&D Topics

- Lab on Chip
- Retinal Implants
- Non Invasive Blood Glucose Monitoring
- The 'Electronic Rat'

*...but what are realistic timescales?*

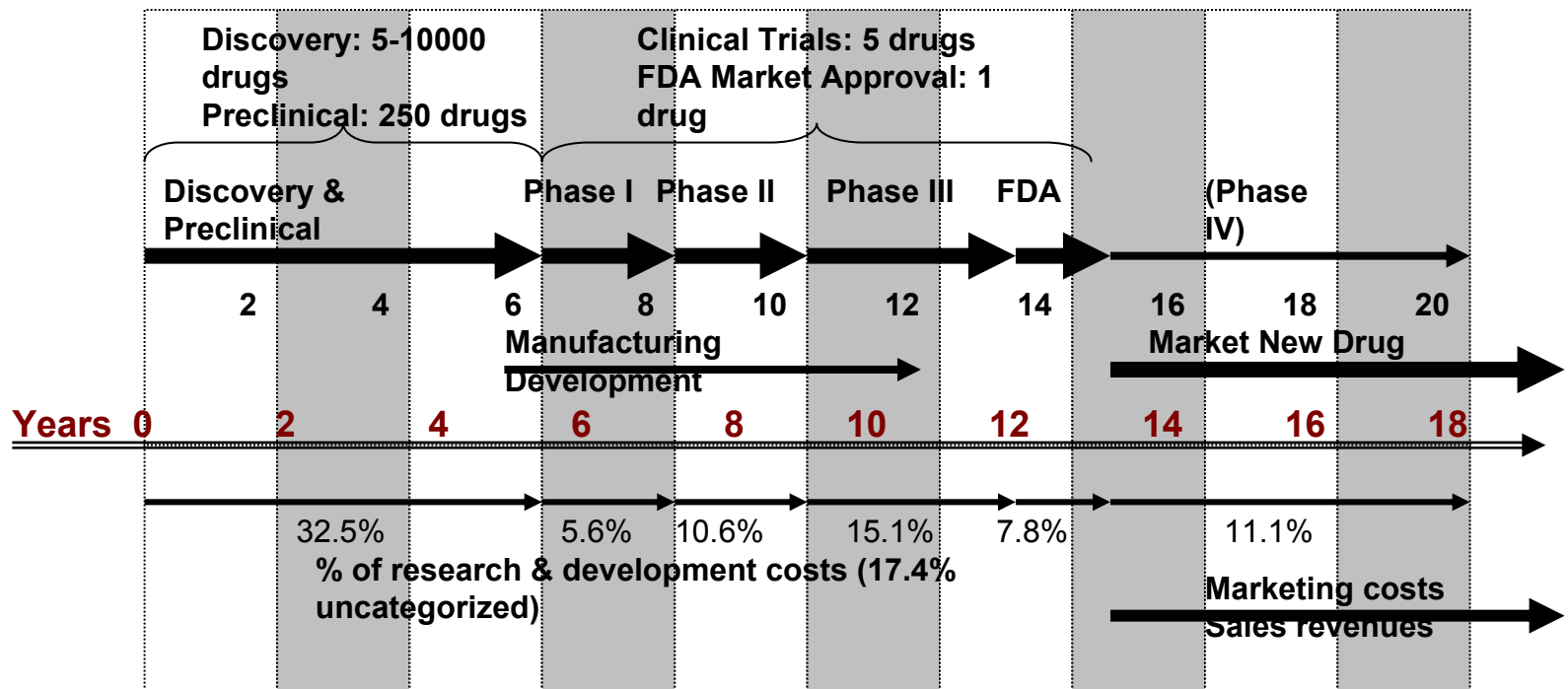
## Timescales?

- Roadmaps based on
  - current status of R&D
  - Future vision
  - Past experience
- Balance market drivers against barriers

# Drug Discovery & Development



# Drug Discovery & Development Process



© Dr George Adamson

# Drug Discovery & Development

## Issues

- How to speed up the process
- Faster removal of poor candidates from the pipeline
- Reducing screening costs
- Reducing the need for animal testing

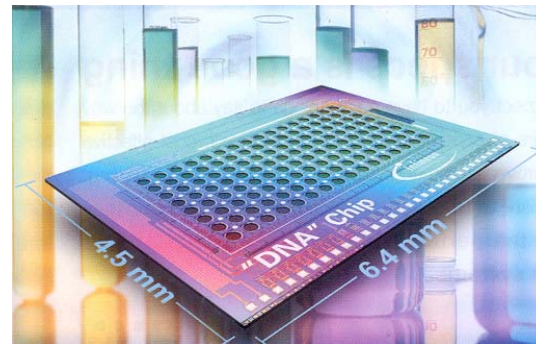
## Potential for Micro & Nanotechnology

- Massively parallel screening
- Automation of the process
- Building the 'electronic rat'

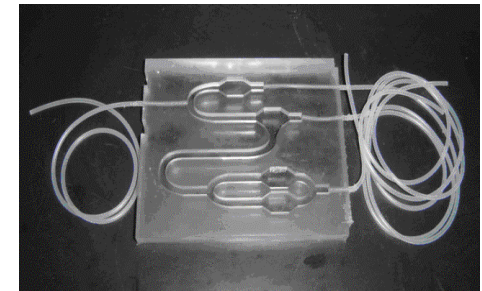
# Drug Discovery & Development



**Caliper DNA Chip**

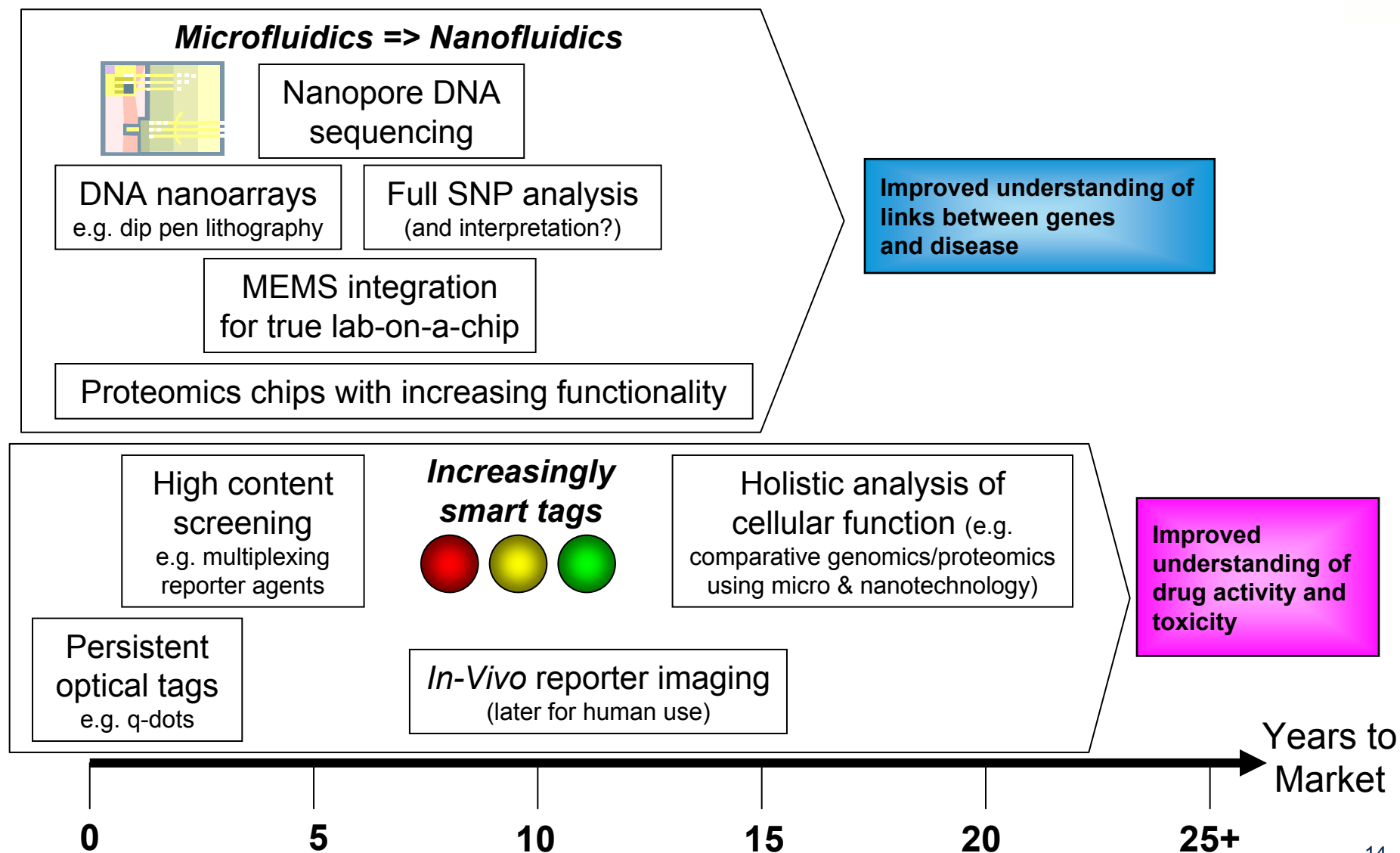


**Infineon DNA Chip**

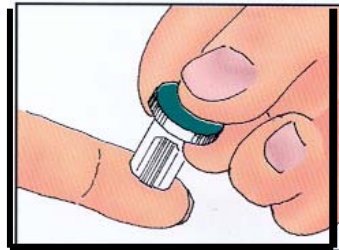
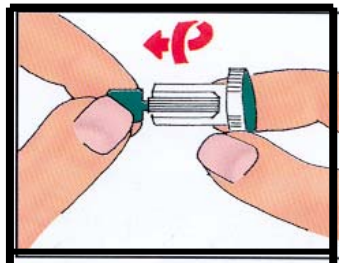


**Multi - Chamber BioReactor**

# Roadmap of MNT in Drug Development



# Blood Glucose Monitoring



Fingerstick



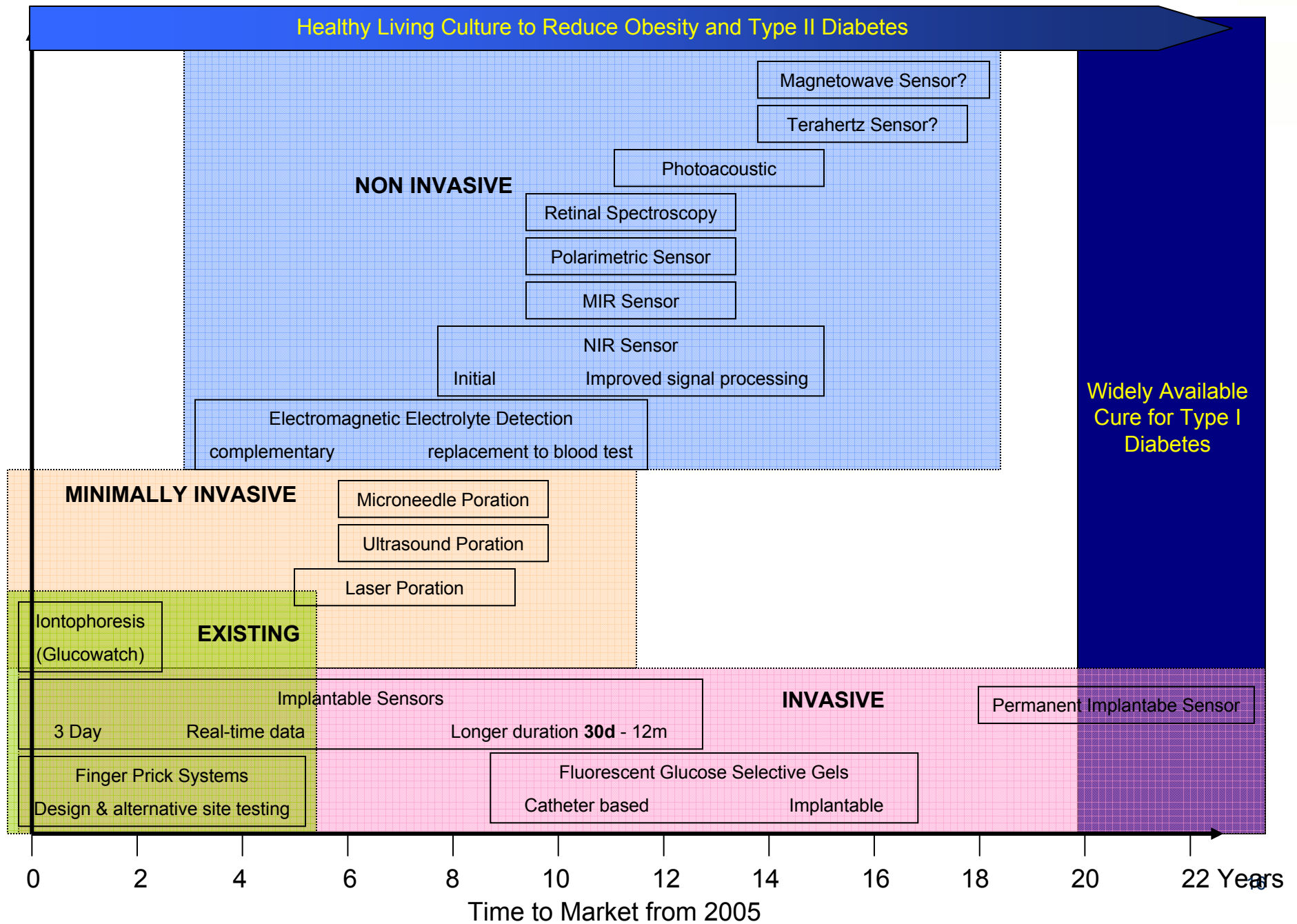
Source: Glucowatch



Source: Lein Applied diagnostics

Invasive → Minimally Invasive → Non Invasive

# Blood Glucose Monitoring

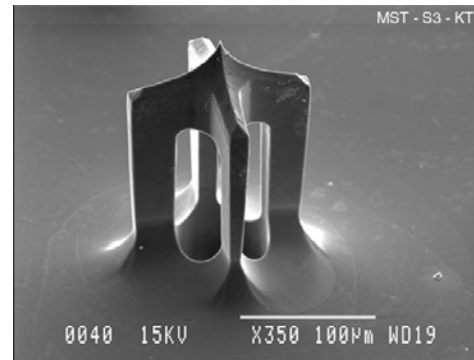


# Drug Delivery



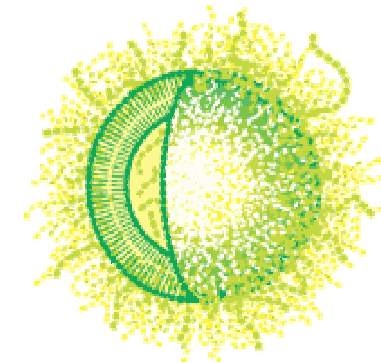
MICROPARTS

Micronozzle in nebuliser, Microparts



KTH

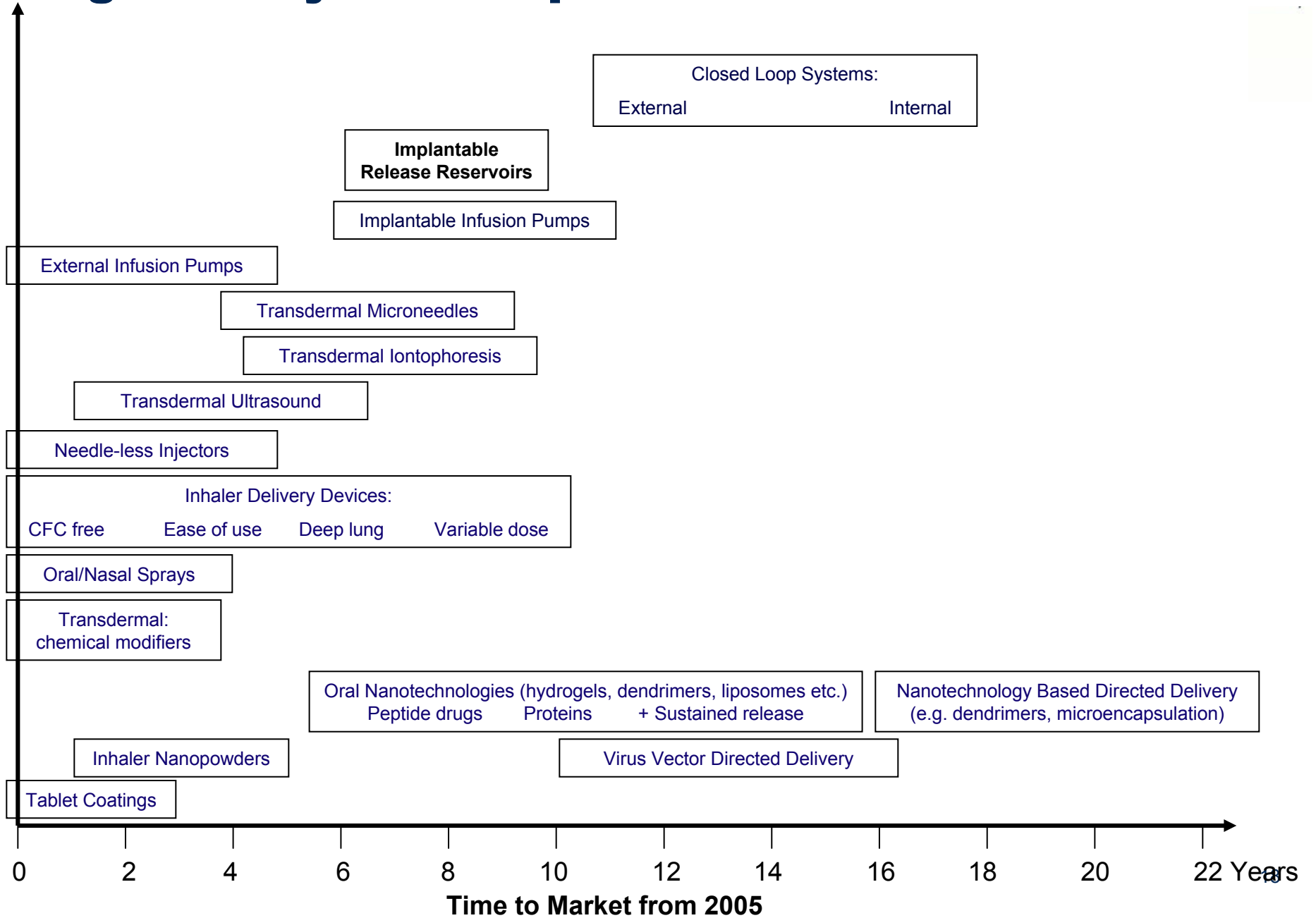
Microneedles development, KTH



ALZA CORP

Stealth technology, lipid nanoparticle, Alza Corp.

# Drug Delivery Roadmap for MNT



# Implanted Devices

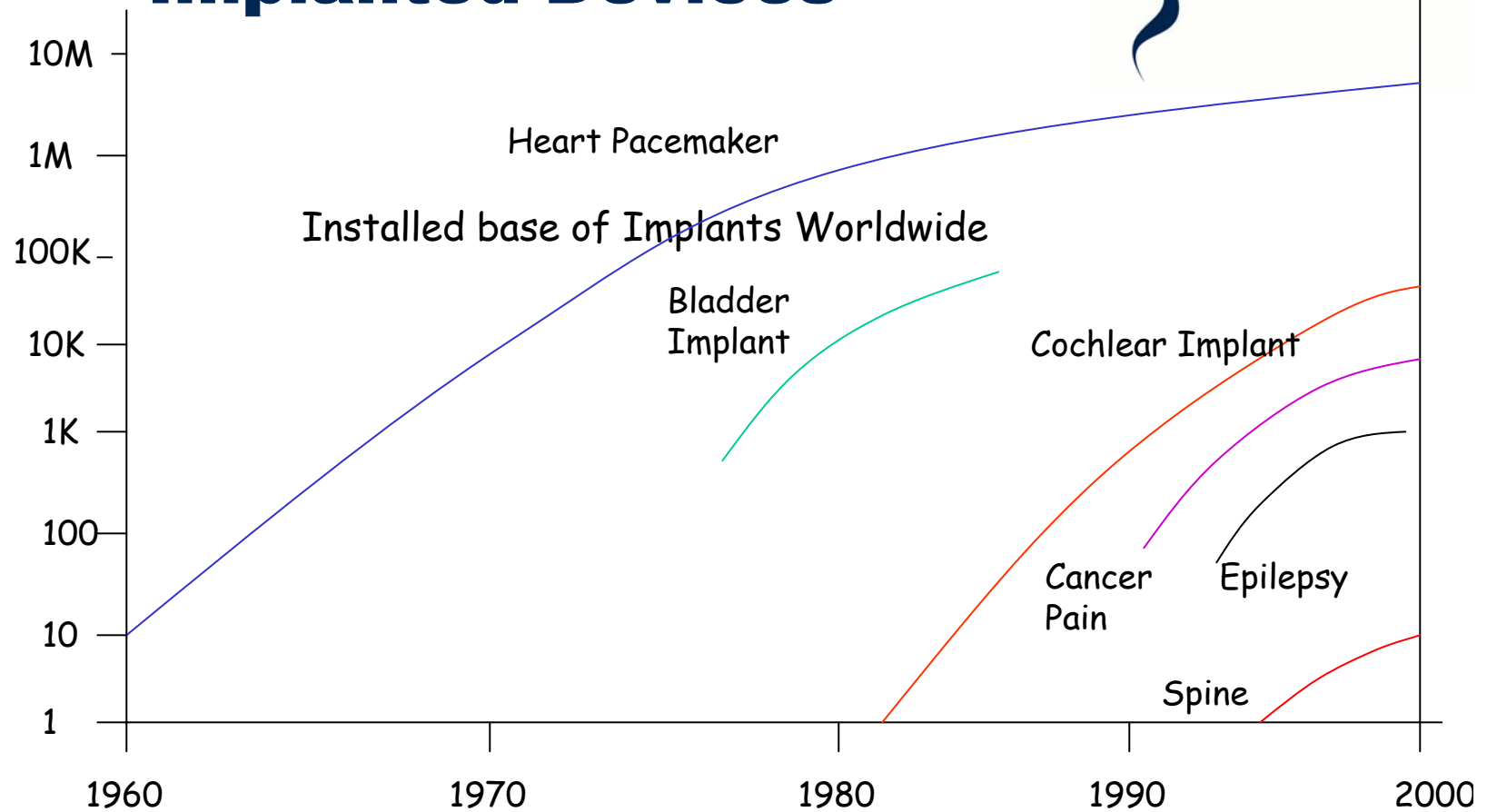


pacemakers



stents

# Implanted Devices



...but cardiovascular stents do not fit this model

# Today

- Start feeling sick
- Get a Doctor's appointment and wait or go to the ER (and wait)
- One treatment fits all



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**From Housecalls to House Calls**

Tomorrow, your  
house will call the  
doctor

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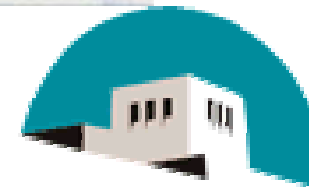
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## **TFI Roadmaps**

Further Roadmaps, Market Analysis and Technology Trends will be available within next few months. Check [www.tfi-ltd.co.uk](http://www.tfi-ltd.co.uk) for further details.

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