

DIANA: enzyme detection and screening of inhibitors

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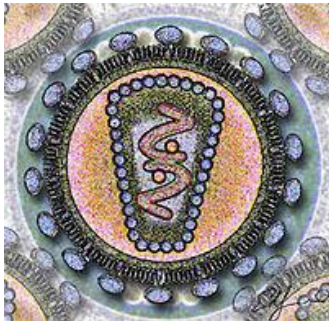
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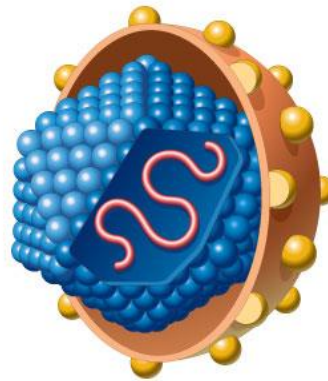
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Human diseases

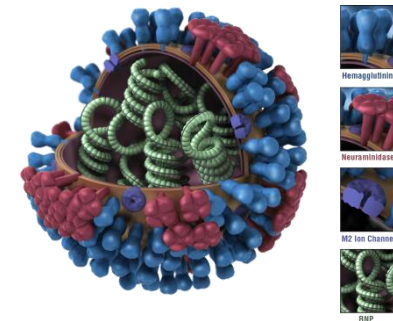
HIV/AIDS



Hepatitis C



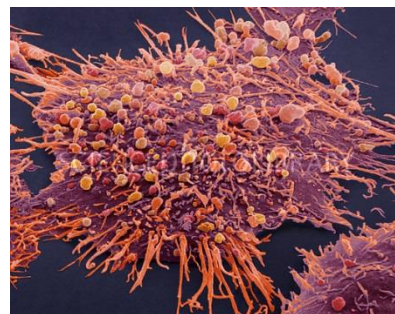
Influenza



High blood pressure



Cancer

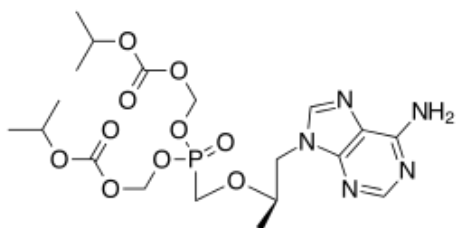


Depression

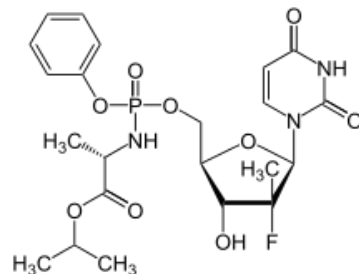


Treatment by small molecules

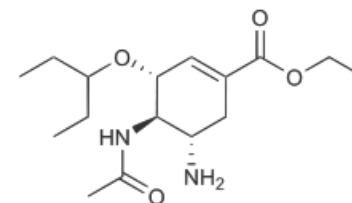
HIV/AIDS



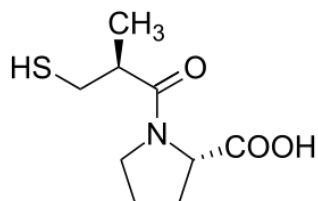
Hepatitis C



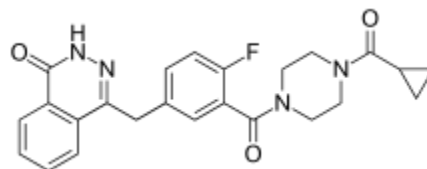
Influenza



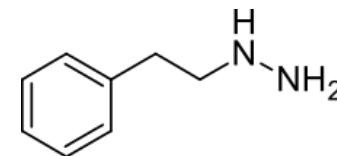
High blood pressure



Cancer



Depression

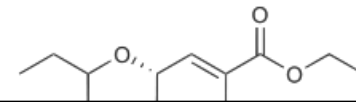
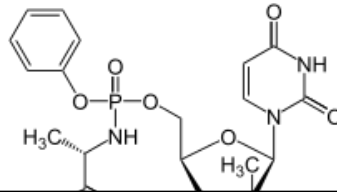
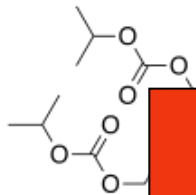


Enzyme are key players

Hepatitis C

HIV/AIDS

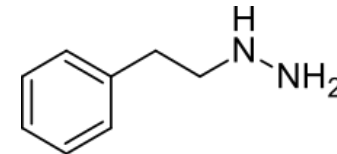
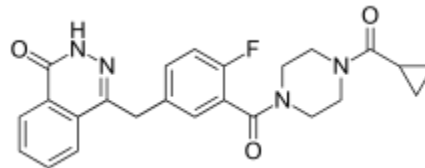
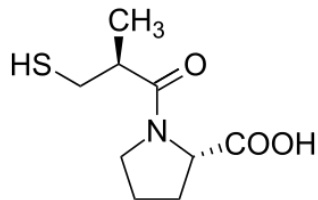
Influenza



1. Human: Thousands enzymes
2. Changed level/activity: **disease**
3. Enzymes of **human pathogens**

High
pressure

Cancer



Targeting enzymes

1. Enzyme detection in *in vitro* diagnostics
2. Screening for enzyme inhibitors in small molecule libraries in **drug discovery**

Targeting enzymes

1. Enzyme detection in *in vitro* diagnostics
global market \$15 billion annually (CAGR ~10%)

2. Screening for enzyme inhibitors in small molecule libraries in **drug discovery**
global market \$14 billion annually (CAGR ~7%)

>1/2 CZE annual household, ~300 Airbus A320

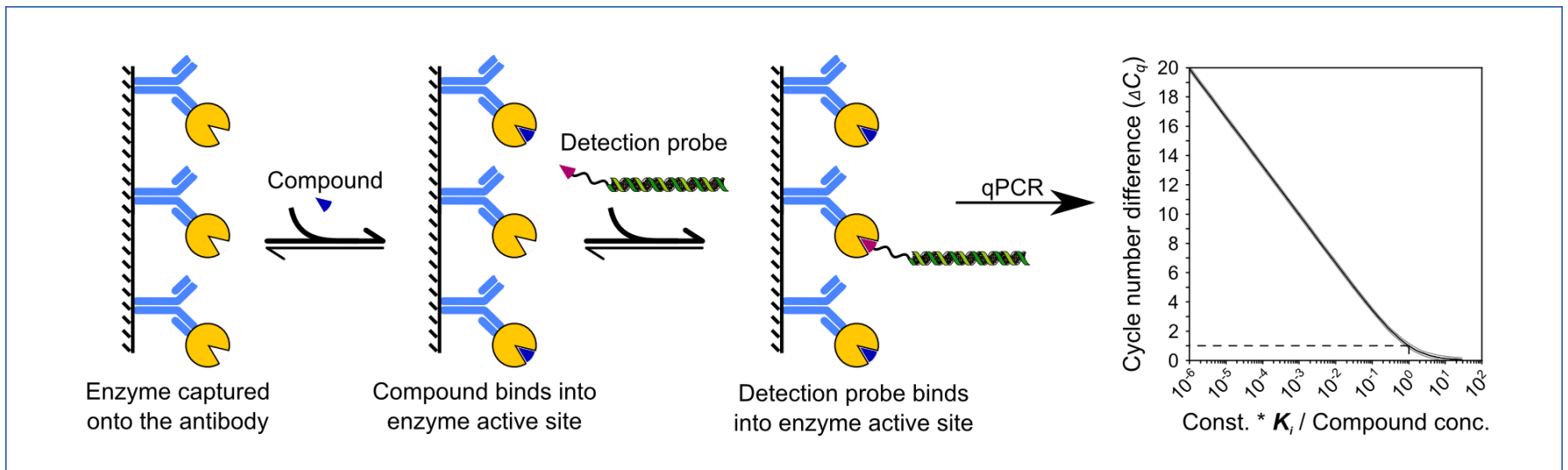
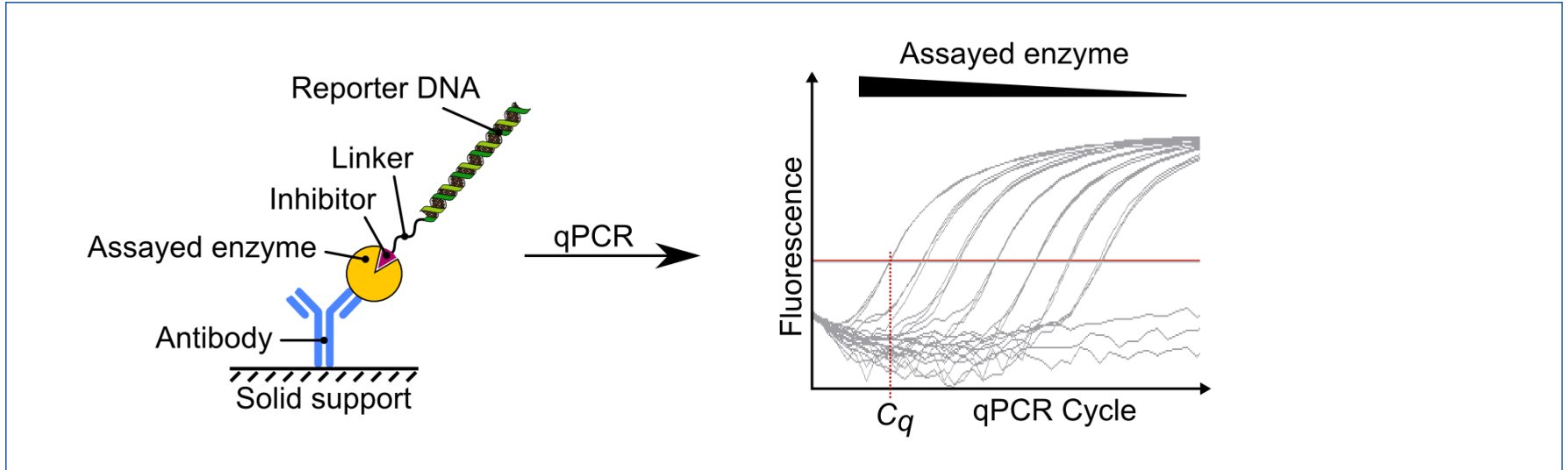
1. Enzyme detection in *in vitro* diagnostics

- ❑ Low sensitivity
- ❑ Low reliability (false positives)
- ❑ Narrow dynamic range

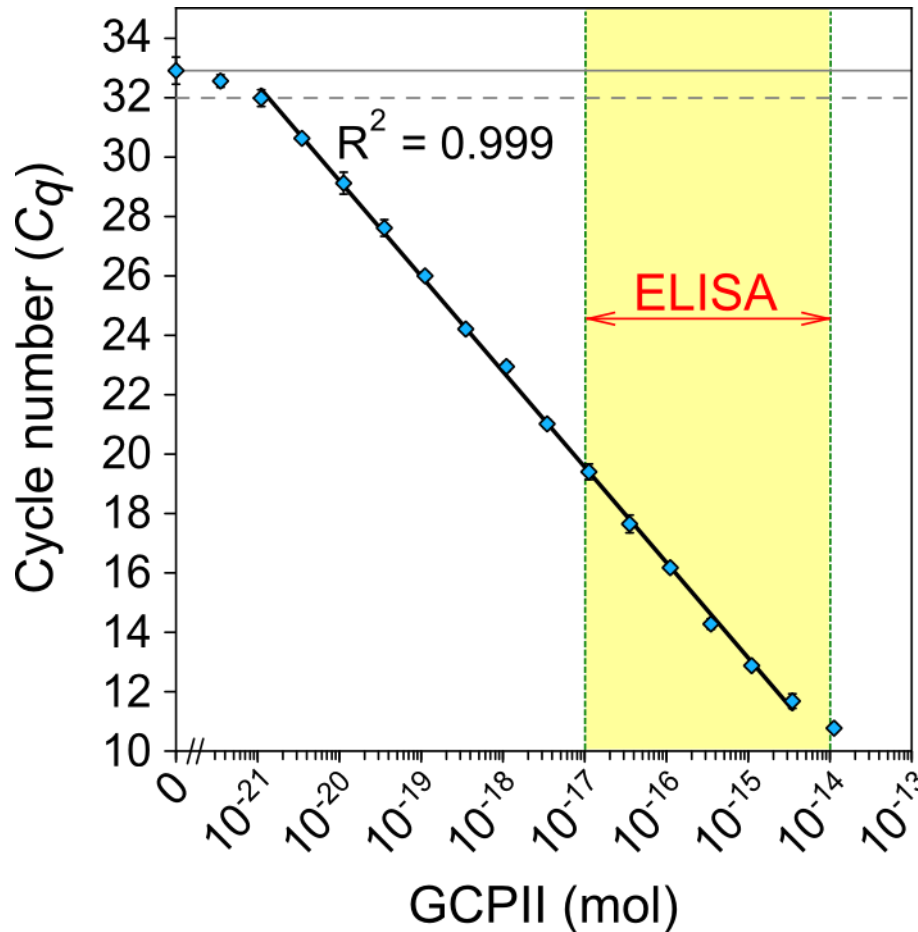
2. Screening for enzyme inhibitors in small molecule libraries in **drug discovery**

- ❑ Difficult preparation of samples (purified enzymes)
- ❑ Low sensitivity (false negatives)
- ❑ Not quantitative

DIANA: The principle



DIANA: Enzyme detection



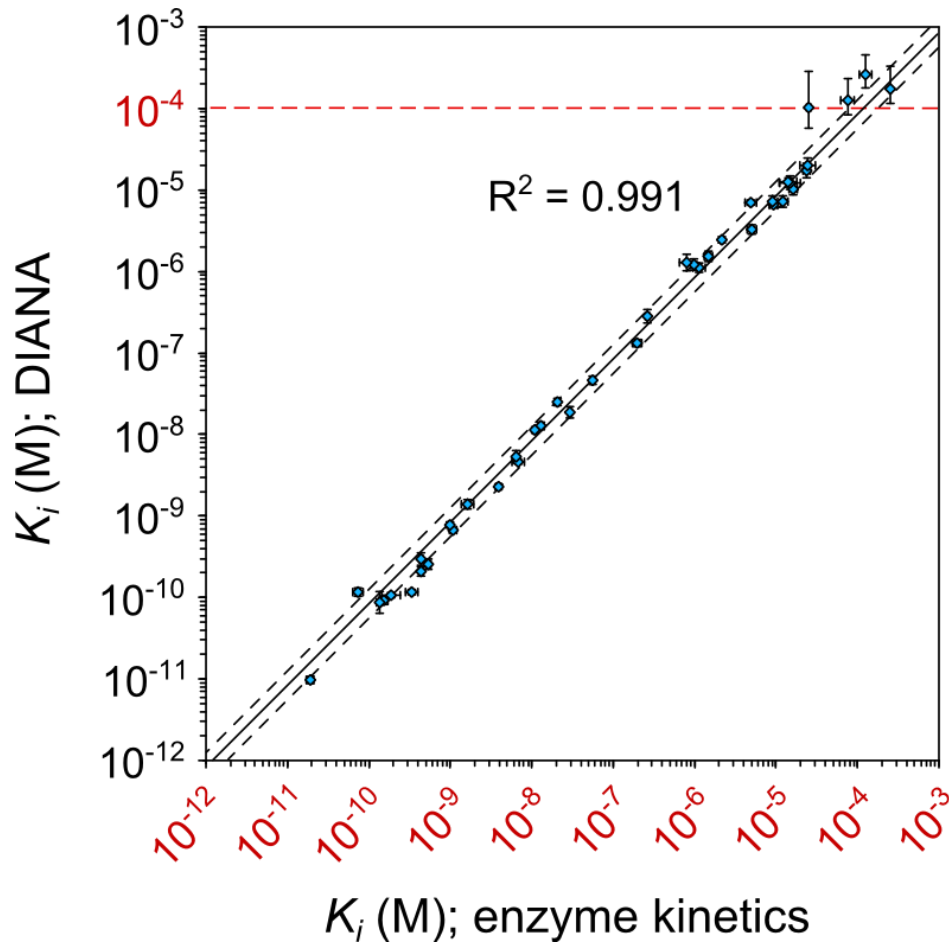
Quantitative
Ultrasensitive
Selective

Blood, Cells, Tissues,
Urine...

Potential benefit:
Better diagnostics

GCPII Limit of detection: 100 ag (10⁻²¹ mol); ~ 0.001 ng/ml by consuming 1 µl human sera;

DIANA: Inhibitor screening



**Potential benefit:
Safer and more
efficient drugs**

1 μ l of human blood serum containing 5 pg of GCPII (0.05 ppm of total protein)

DIANA: Current status

- **Validated for several targets** (PSMA, CA-IX, GCP11, Influenza neuraminidase, HIV-protease)
- **IP protection:** WO 2016019929 A2, priority 5.8.2014
- **Publication:** Navratil et al. (2016): DIANA for sensitive and selective enzyme detection and inhibitor screening. *Nucleic Acids research*.
- **Small interdisciplinary team at IOCB**
(automation, novel applications, develop products)

DIANA: Planned products

- Kits for enzyme detection (**R&D, diagnostics**)
- Kits for screening of enzyme inhibitors (**R&D**)
- Custom assay development (**drug discovery**)
- High-throughput or selectivity screen services (**industrial drug discovery**)

Acknowledgement



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