



FACULTY OF MEDICINE IN PILSEN  
CHARLES UNIVERSITY

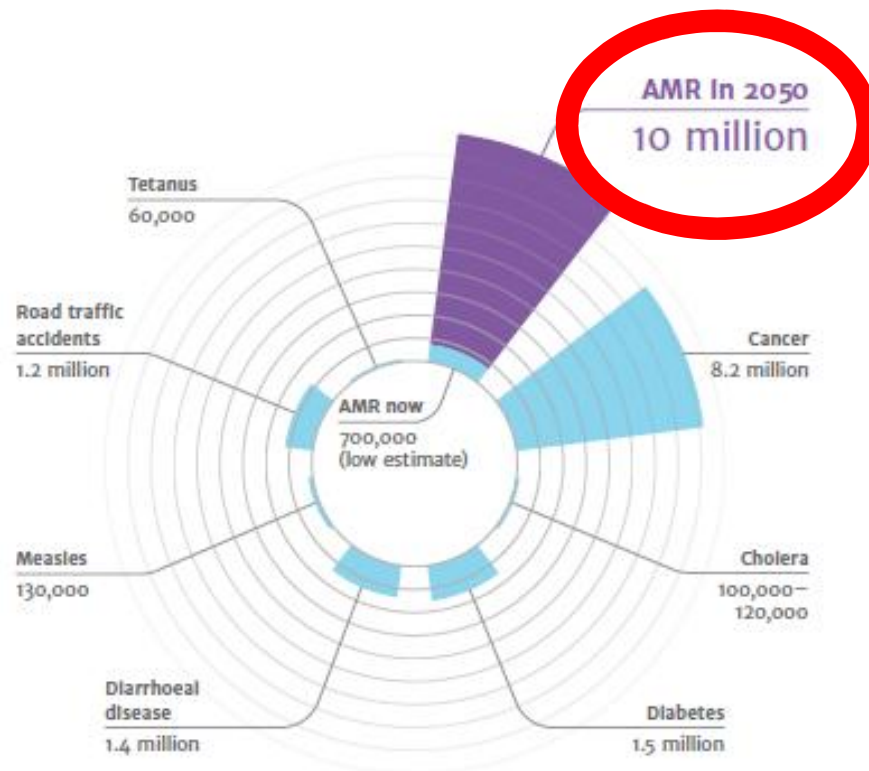


# Development of Diagnostic Assays for Rapid Detection of Antibiotic Resistance

Jaroslav Hrabák, Adam Šoukal, **Evžen Ondráček**

# Antibiotic Resistance

## DEATHS ATTRIBUTABLE TO AMR EVERY YEAR

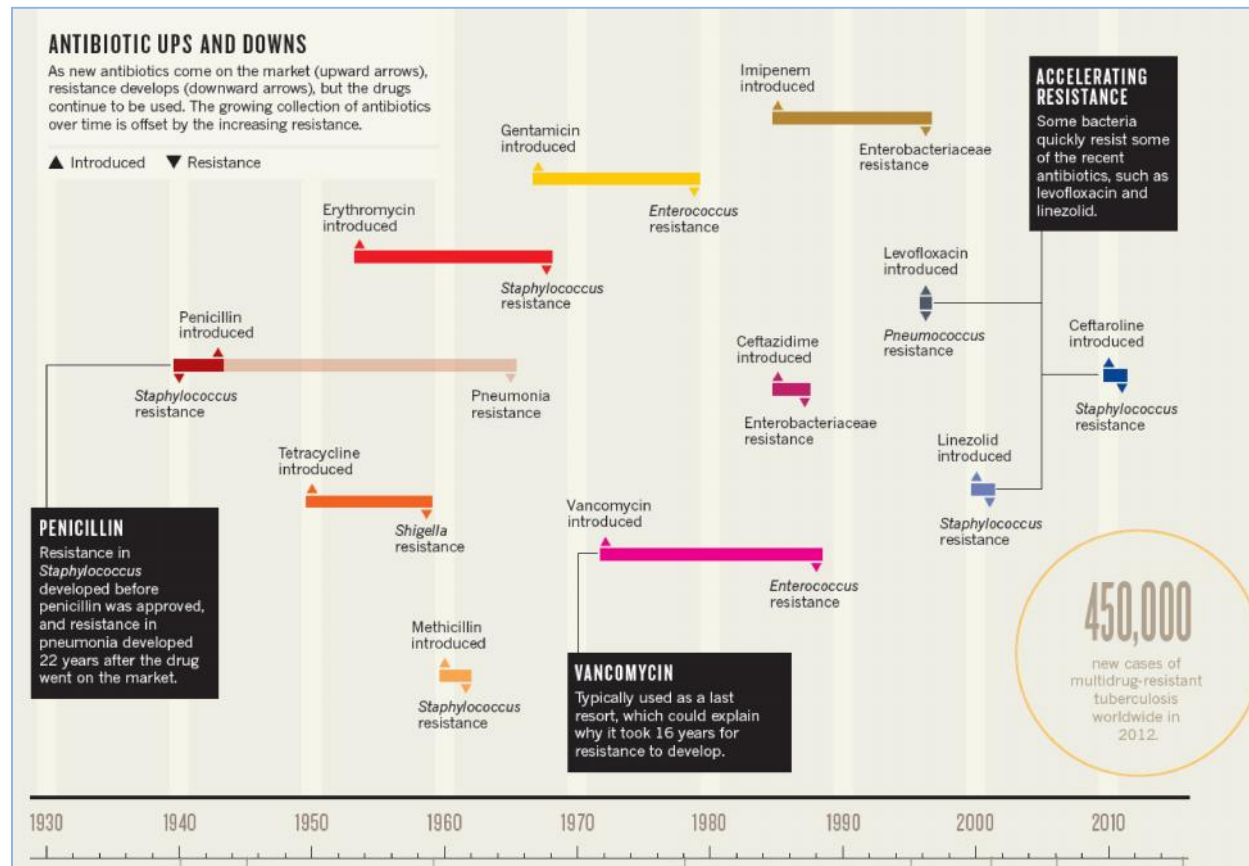


O'Neill, 2016

- More deaths caused by infectious diseases than cancer in 2050
- Only few antibiotics introduced to the market in the last decade
- **Over 2 billions US\$ required for introduction of new antibiotic to the market**

# Antibiotic Resistance

- “Survival time” of newly developed antibiotics is very short – loss of investments



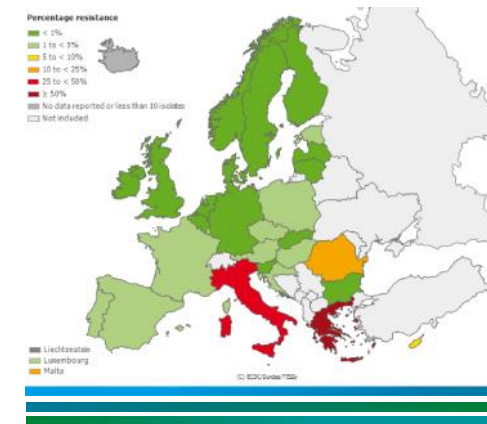
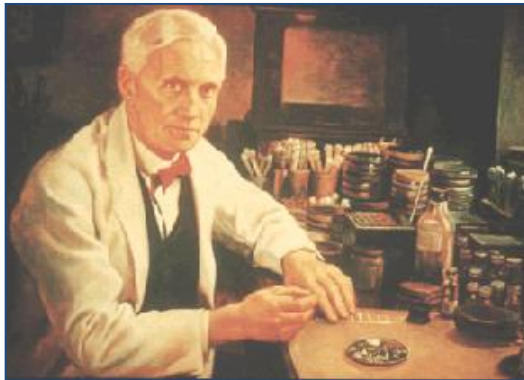
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# Antibiotic Resistance

- Complication of therapy of other diseases in many clinical branches (e.g., cardiology/cardiosurgery, intensive medicine, transplantology)
- Bacterial strains resistant to all available antibiotics have been already described

→ coming back to “pre-antibiotic era”



# Antibiotic Resistance – what can we do?

- To understand spread of resistant microbes
- To set up proper hygienic measures
- To decrease use of antibiotics (selection pressure)
- To develop new antibiotics

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# Market definition

- **All microbiological laboratories in developed countries**
- **193 countries have signed up the declaration to tackle the threat of high levels of antibiotics**

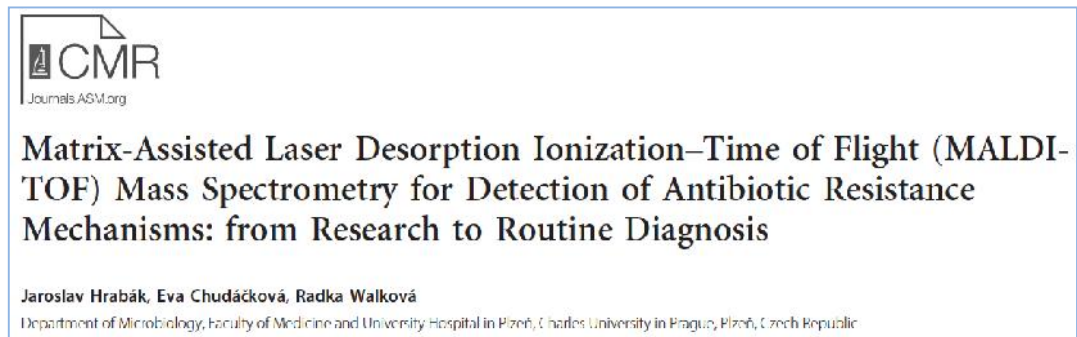
# Our Portfolio



# Detection of $\beta$ -Lactamases - Typing of Bacteria

# Development of Rapid Assays for Detection of Resistance Mechanisms based on MALDI-TOF MS

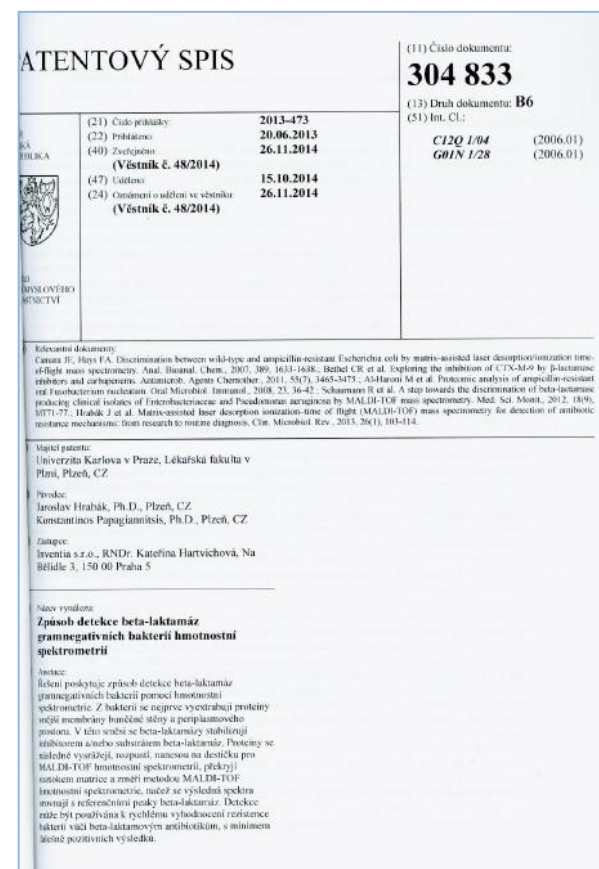
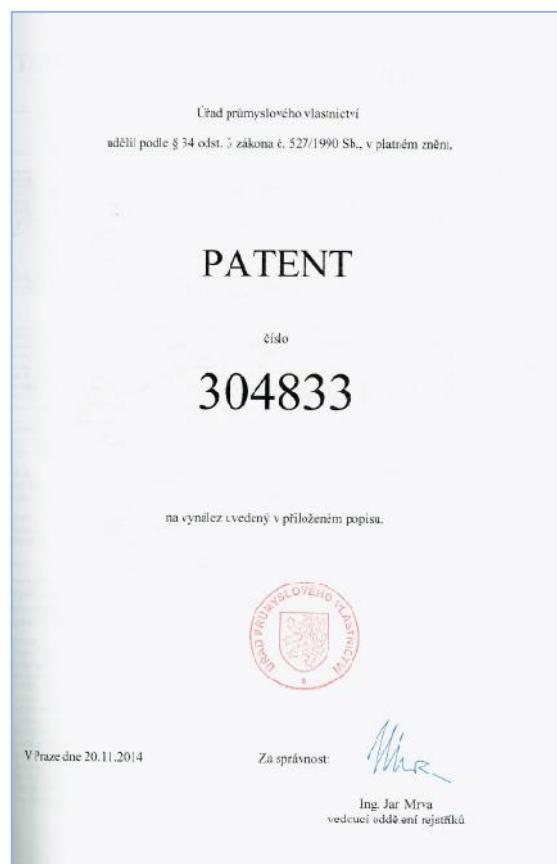
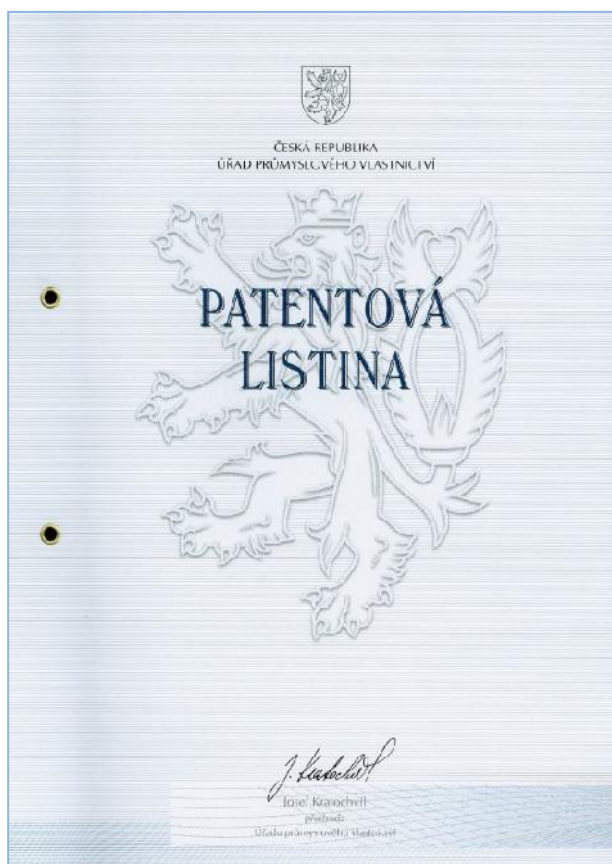
- Rapid technique
- Precise detection of molecular mass
- Available in many microbiological diagnostic laboratories all over the world (Europe, USA, Asia,...)



# Development of Rapid Assays for Detection of Resistance Mechanisms based on MALDI-TOF MS

- MALDI-TOF MS available in hundreds of diagnostic laboratories in Europe and the USA
- **IVD kits are required** by the law of many countries (validation of home-made kits is expensive)

# Determination of Specific Enzymes ( -lactamases) for Typing Purpose



## What we can offer

- *In vitro* validated kit for detection of resistant bacteria
  - It includes all the components ready to use
  - Some parts of the kit can be directly provided

## What we need

- Support for CE-IVD validation of our kit in European countries and the USA
- Company with strong experiences in the medical market

# Conclusions

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1. We developed and patented an assay for detection of enzymes responsible for degradation of common antibiotics ( $\beta$ -lactams)
  - Typing (comparison) of bacteria
2. We developed a kit for functional detection of carbapenemases (the most danger resistance currently)
3. All the assays are validated on our robust collection of resistant bacterial isolates (>1000)

# Biomedical Center Faculty of Medicine in Pilsen Charles University

Jaroslav Hrabák, Ph.D.  
[Jaroslav.Hrabak@lfp.cuni.cz](mailto:Jaroslav.Hrabak@lfp.cuni.cz)  
alej Svobody 76  
323 00 Plzeň  
Czech Republic  
+420 603 113 354

