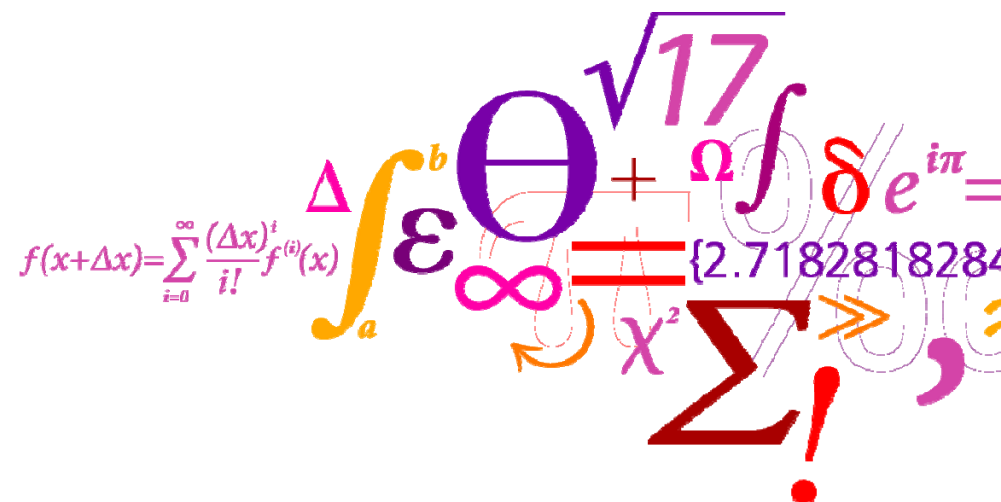


# EURL-AR training course on genotypic characterization of antimicrobial-resistant bacteria

7 – 11 November 2011  
Kgs. Lyngby, Denmark

DTU Food  
National Food Institute

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# Who I am...

## **Valeria Bortolaia**

DVM, University of Pisa, IT (2004)

PhD in Microbiology, University of Copenhagen, DK (2010)

### **Main research interest:**

Origin and epidemiology of plasmids harboring beta-lactamase-encoding genes in Gram-negative bacteria

### **Main responsibilities within the EURL-AR:**

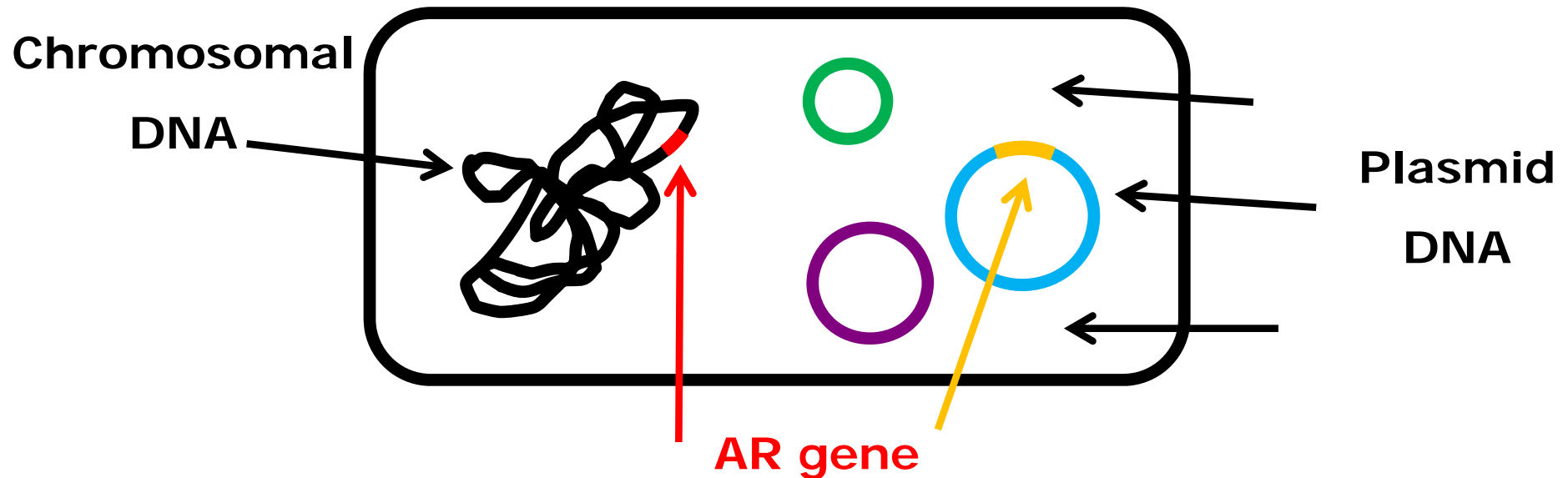
- EQAS for staphylococci, enterococci and *Escherichia coli*
- EQAS follow-up: site visit to NRL-AR
- workshop/training course

# ...and who are you?



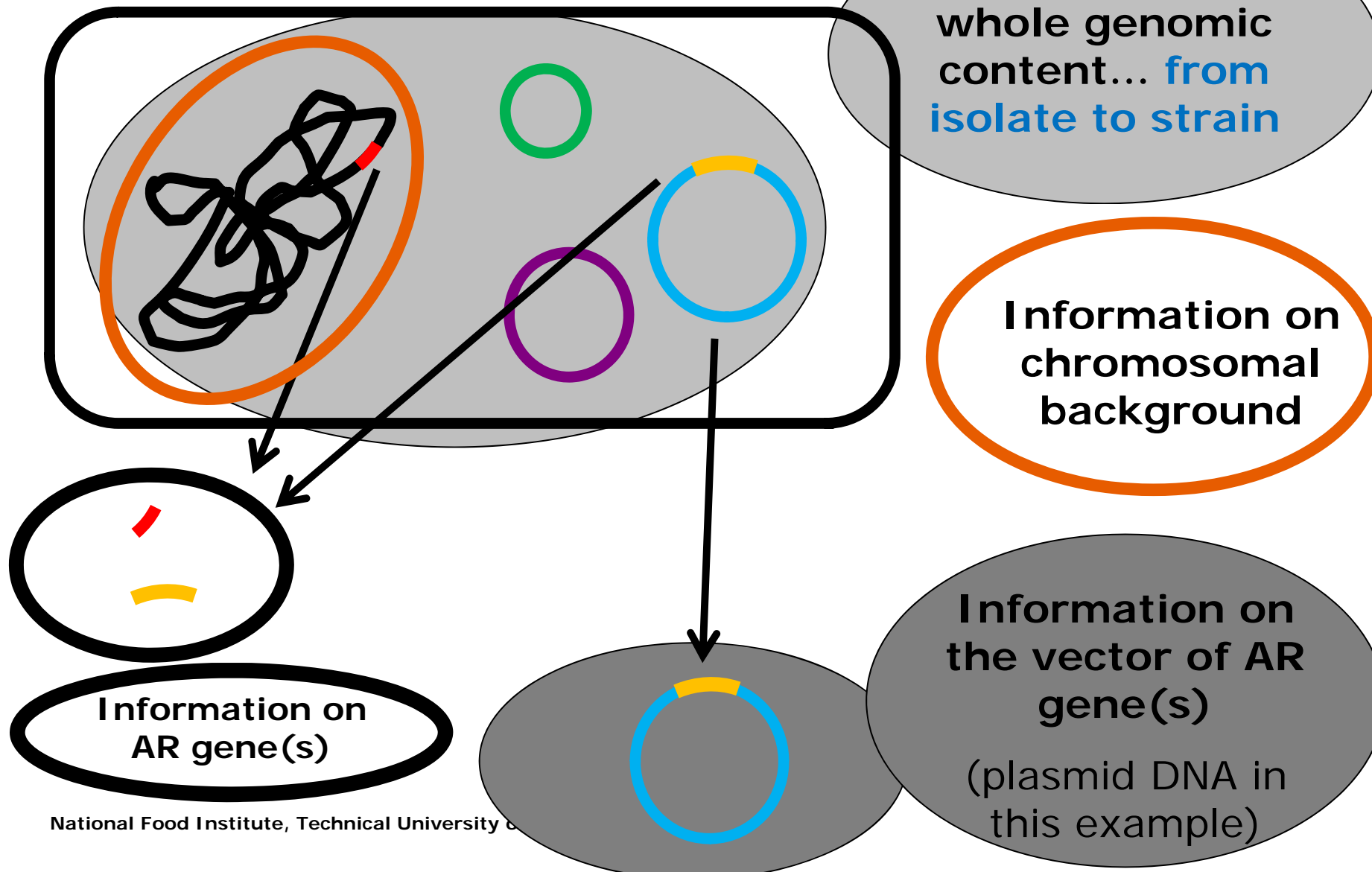
Please introduce briefly yourself....

# What is genotypic characterization?



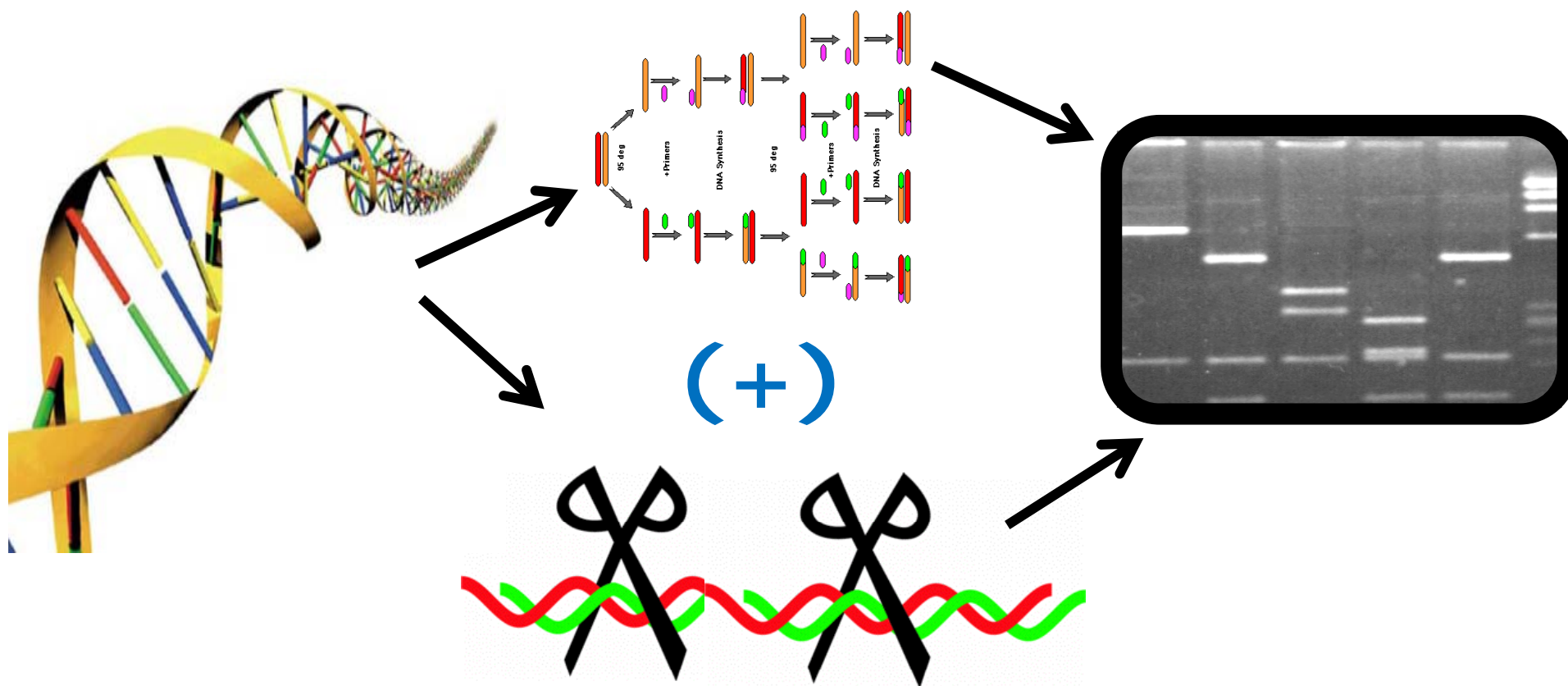
Description/analysis of genetic content...

# Description/analysis of genetic content



# Genotyping methods: three main categories (1/3)

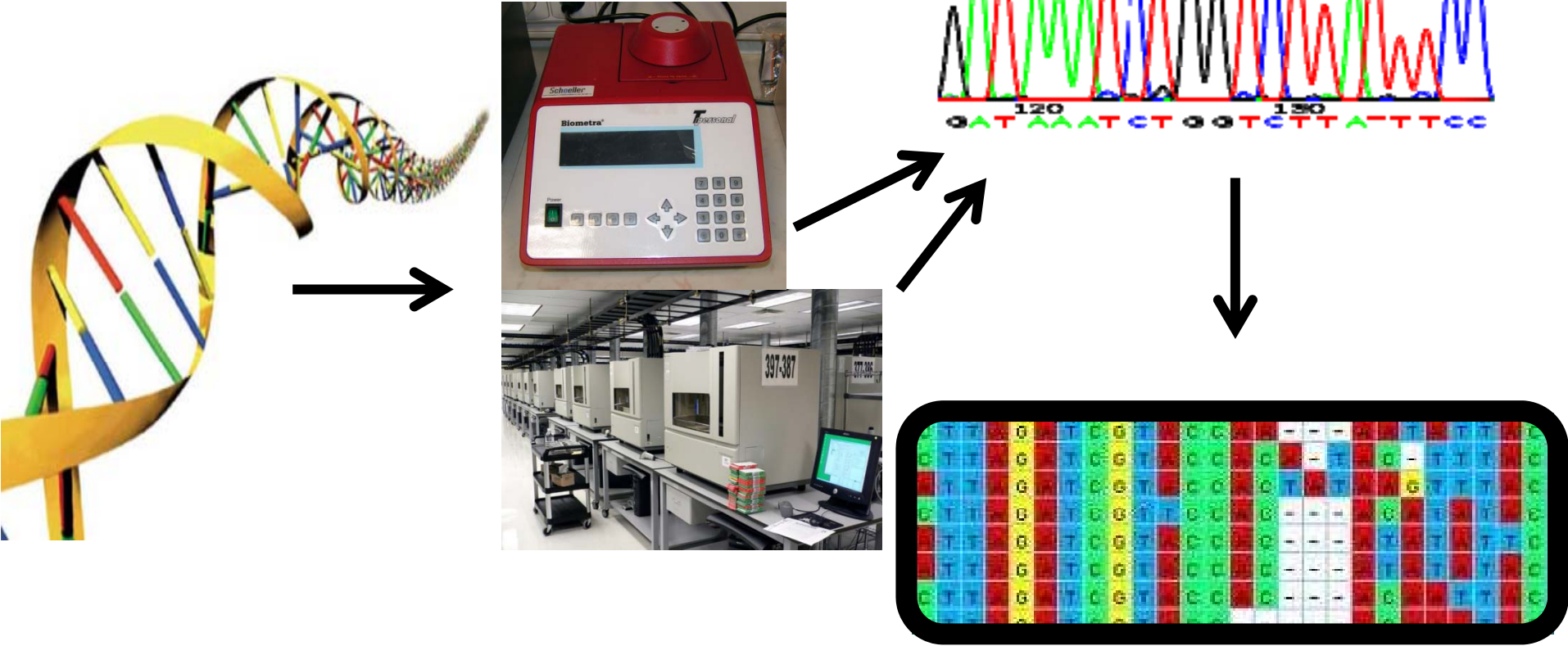
## DNA banding pattern



# Genotyping methods: three main categories (2/3)

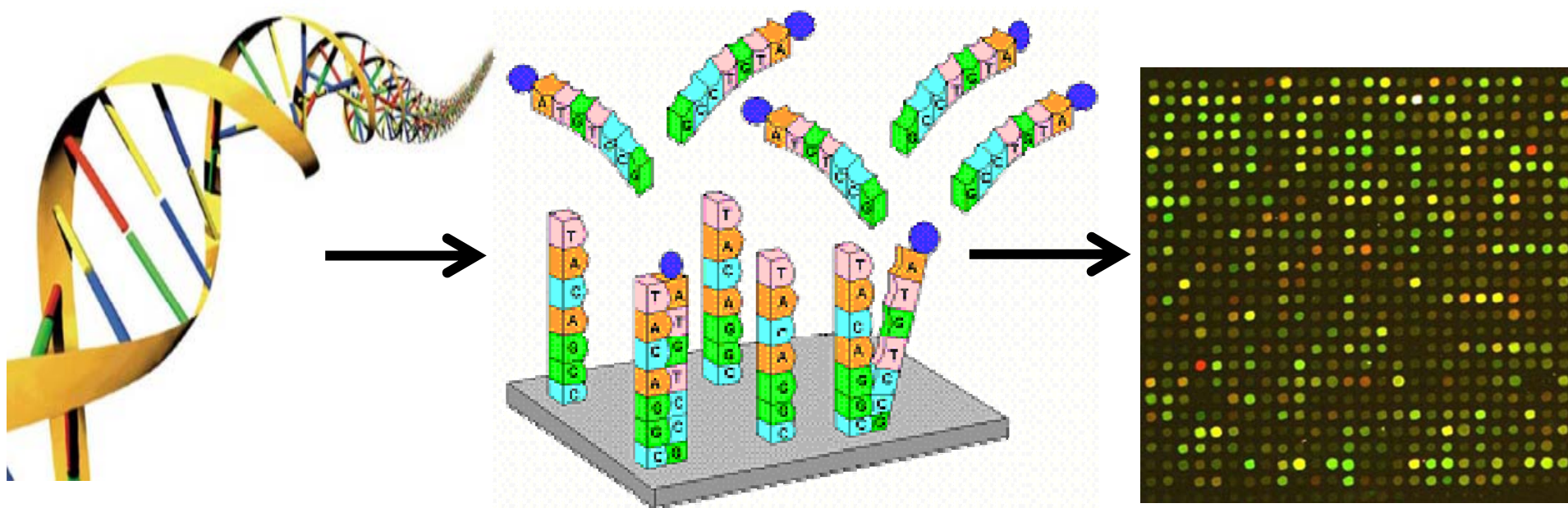


## DNA sequencing



# Genotyping methods: three main categories (3/3)

## DNA hybridization-based



# Genotyping methods



## DNA banding-pattern

- PFGE
- RFLP
- AFLP
- RAPD
- MLVA
- PCR-RFLP
- ...

## DNA sequencing

- MLST
- MST
- gene sequencing
- whole genome sequencing
- ...

## DNA hybridization-based

- Macroarray
- Microarray
- ...

# Genotyping methods



**Which one to choose?**

# The choice of a genotyping method



## We should consider the purpose...

- Tracing outbreaks
- Long-term surveillance

## ...and some additional criteria

- Typeability
- Discriminatory power
- Reproducibility
- Rapidity
- Cost
- Lab capacity
- ...

**... it is not possible to say that one method is always better than another...**

## This week's situation

- Imagine that the European Food Safety Authority (EFSA) launched a pilot study to determine the genetic background of bacteria showing antimicrobial resistance phenotypes of public health interest within European countries
- You will work in groups. Different groups will perform different tests on the same isolates: the results will be then pooled together to deliver the information requested in the pilot study
- There will be some shortcuts in the lab work flow due to time restrictions... stay tuned!

# This week's situation



- **Lab theme 1:**

Detection and characterization of AR determinants of public health relevance:

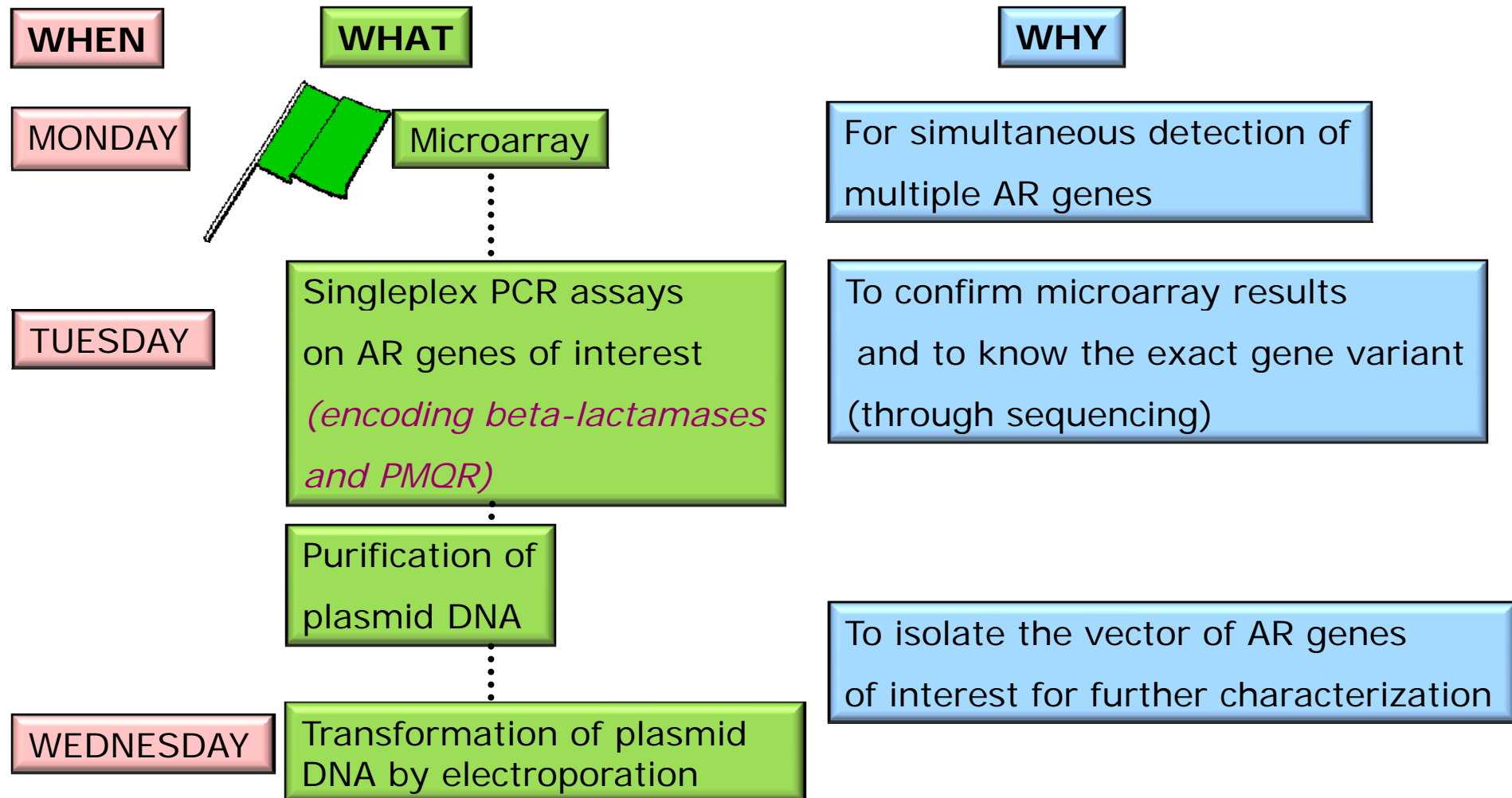
- beta-lactamase-encoding genes  
(conferring resistance to cephalosporins)
- plasmid-mediated quinolone resistance genes (PMQR)  
(conferring low-level resistance to fluoroquinolones)

- **Lab theme 2:**

Surveillance of methicillin-resistant *Staphylococcus aureus* (MRSA)

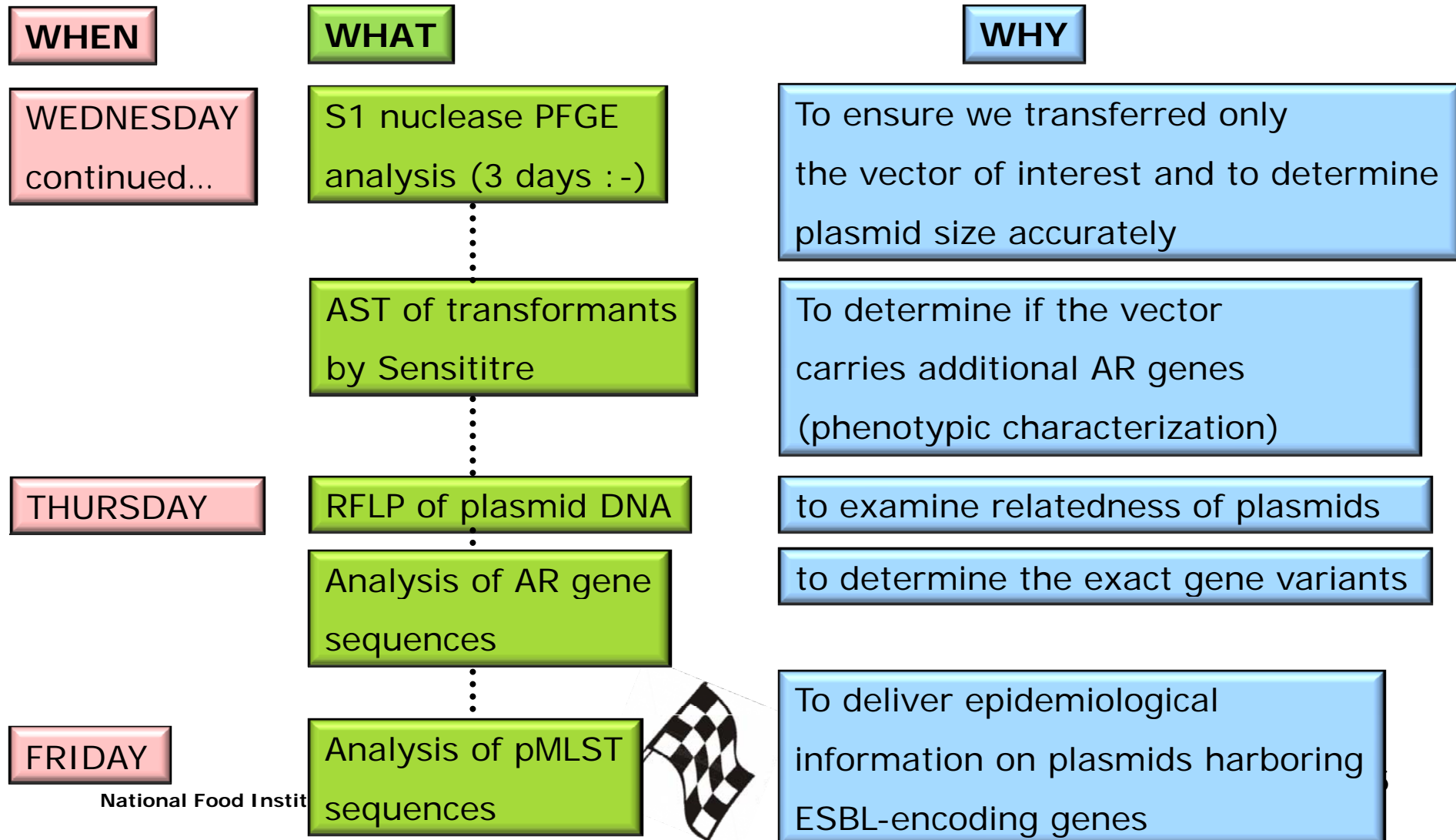
## Lab theme 1:

# Detection and characterization of AR determinants of public health relevance (beta-lactamase-encoding genes & PMQR)



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# Detection and characterization of AR determinants of public health relevance (beta-lactamase-encoding genes & PMQR)

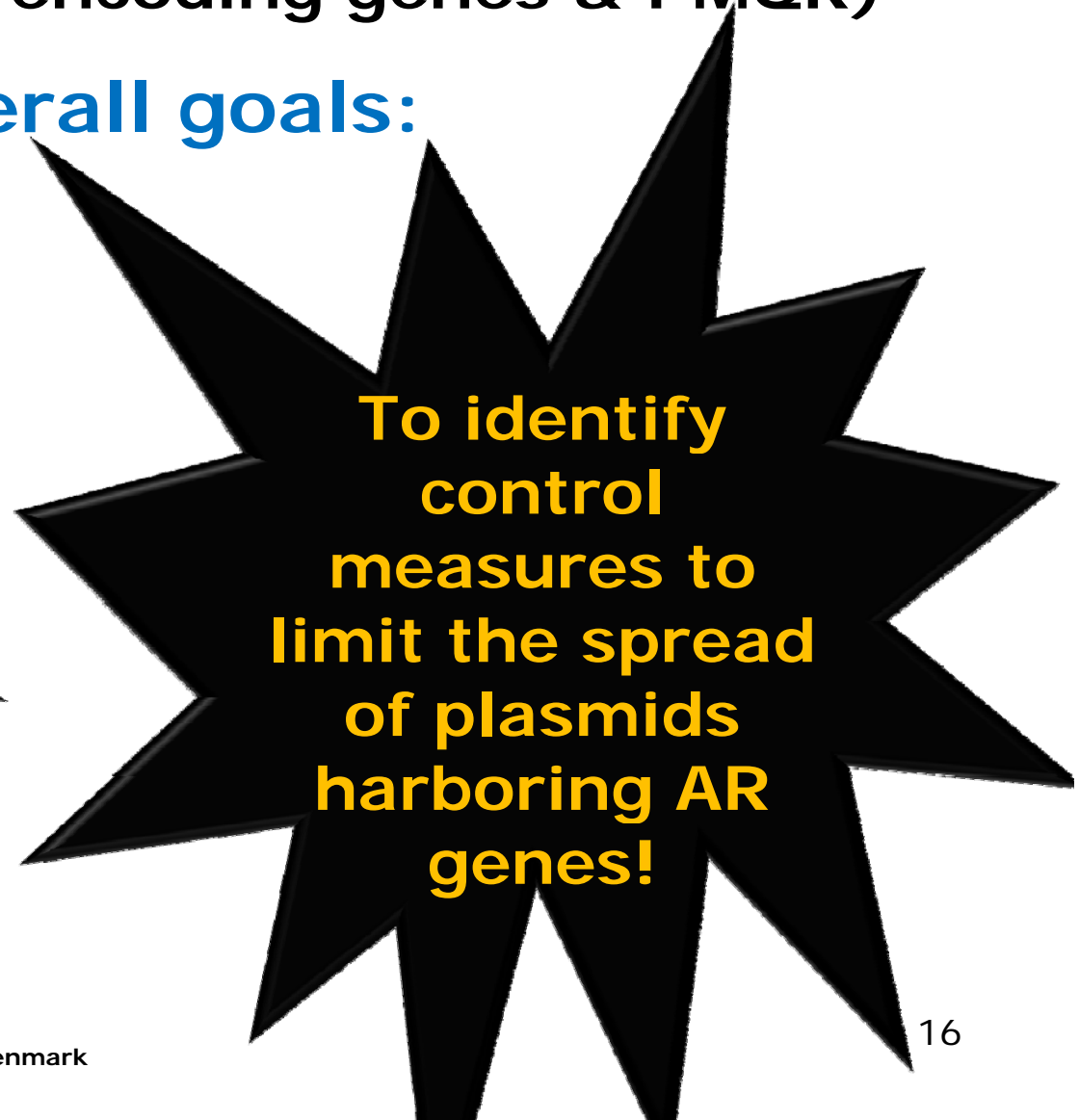


Lab theme 1:

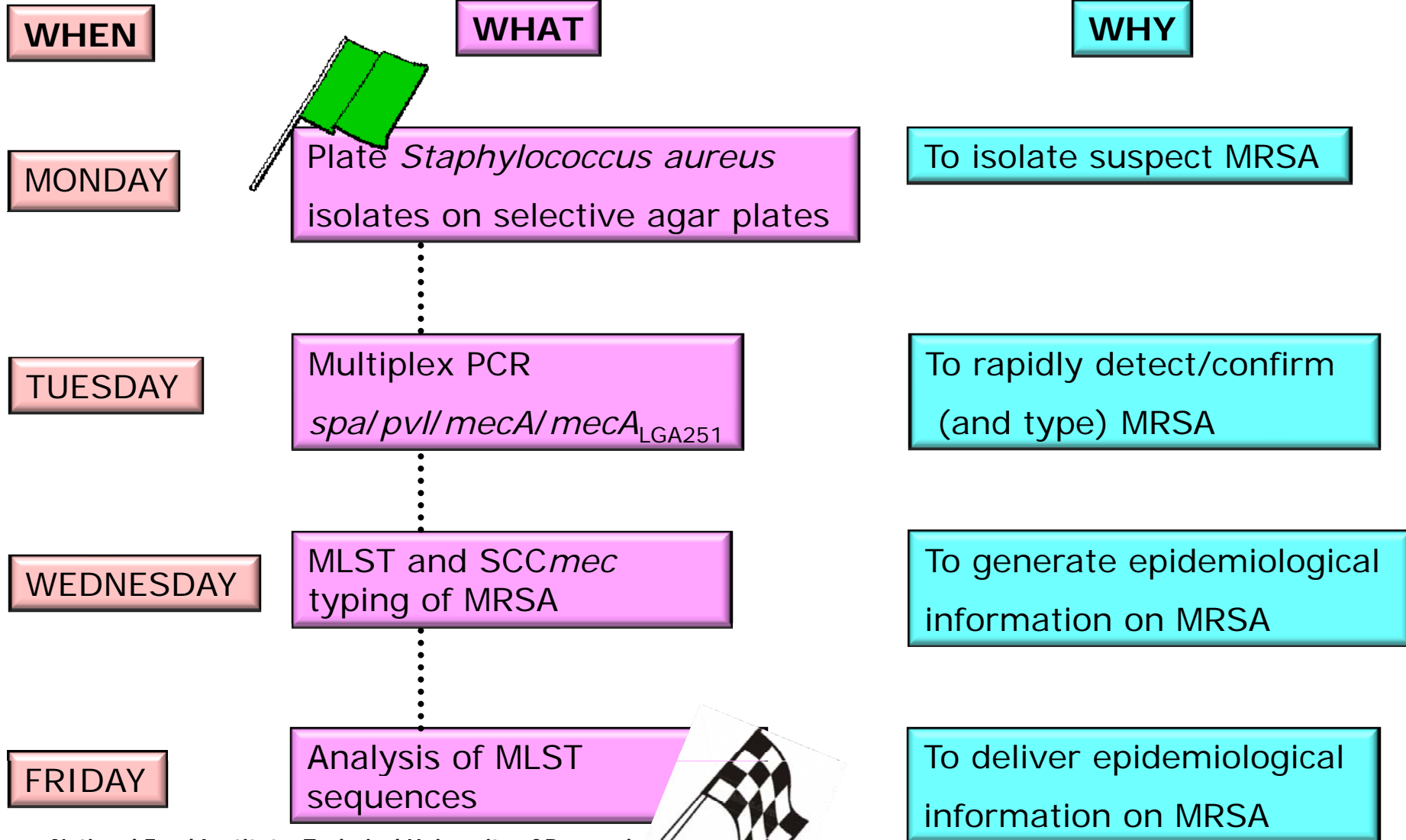
**Detection and characterization of AR  
determinants of public health relevance  
(beta-lactamase-encoding genes & PMQR)**



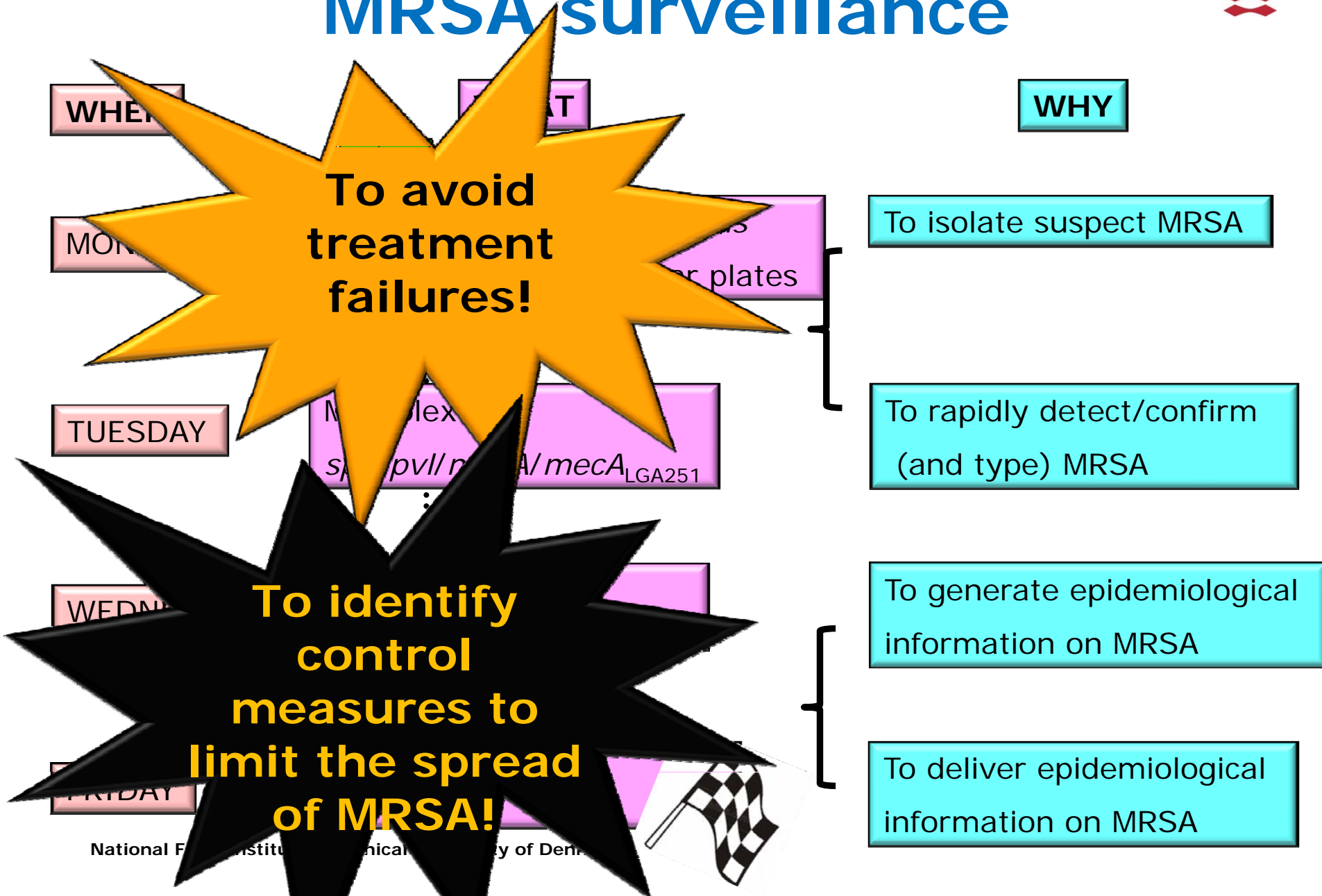
**Overall goals:**



# Lab theme 2: MRSA surveillance



# Lab theme 2: MRSA surveillance



# This week's golden rules

1. We will be ca. 40 people with different backgrounds and experience sharing a limited space for a week: help each other!
2. Do not waste time: ask, ask, ask and complain if you are not satisfied
3. Do not get disappointed if we cannot answer you immediately ;-)
4. Make sure to go home with improved knowledge on genotyping methods
5. You are very welcome to contact us in the future for additional information not included in the manual (e.g. protocols, composition of reagents, etc...)

# Some practicalities



1. Check that you are in the list of participants and, if you are reimbursed by us, remember to sign every day (and keep receipts!)
2. Please fill in the course evaluation form
3. The handouts of the presentations given during the course will be available on our webpage ([www.antimicrobialresistance.dk](http://www.antimicrobialresistance.dk))
4. The course will take place in different locations: see the program

# Enjoy this course!