



# EURL for Lm

European Union Reference Laboratory for *Listeria monocytogenes* 

# A molecular *Listeria monocytogenes* database: to centralize and share typing data from food, environmental and animal strains at the European level

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# Food borne pathogens molecular surveillance networks

#### Success of PulseNet USA At the International Level :





success of PulseNet International !

#### At the European level :

-PulseNet Europe : not active since 2006 (Lack of funding)

-European Center for Disease Prevention and Control (ECDC) : Recent launching of Tessy molecular surveillance database : strains isolated **from human cases** 

-No database centralizing and sharing typing data from food , feed and animal strains



# Anses, Maisons Alfort Laboratory for Food Safety

# European Union Reference Laboratory for *Listeria monocytogenes* (*Lm*) (EURL)

since May 2006 ; Regulation EC 776/2006



- Co-ordinate the network of the 35 NRLs (National Reference Laboratories)
- NRLs : responsible for typing *Lm* strains of food, feed and animal origin
- PFGE at Anses since 1998
- Other molecular methods // PFGE :
  - Semi-automated rep PCR (Roussel et al., 2010 Food Borne pathogens and Disease)
  - **MLVA** (Roussel et al., 2012, Gel Electrophoresis : Principles and Basics", Chapter 18)
  - **FAFLP** (Roussel et al., 2013, BMC Microbiology),

# For food, feed, environment and animal strains EURL set up a database, the "EURL Lm DB":

□ Shared within the NRL network

**Content:** data submitted by the NRLs on a voluntary basis



- 1) The EURL typing activities which have led to the setting up of the EURL *Lm* DB
- 2) The steps involved in developing the EURL *Lm* DB
- 3)The current use of the EURL Lm DB



# 1) The EURL typing activities which have led to the setting up of the EURL *Lm* DB



# The EURL typing activities

#### **Development of standardized typing protocols :**

- Conventional Molecular serotyping
- EURL PFGE protocol (participation to different EQAs)

- EURL PFGE profile interpretation, comparison with SSI protocol, (SSI : upon contract for ECDC)



Training sessions: conventional serotyping, molecular serotyping, PFGE laboratory, PFGE profile analysis and interpretation

> Annual EURL workshop including sessions dedicated on molecular typing

Technical and scientific assistance

Proficiency Testing trials



- 2009 : serotyping, PFGE
- 2010 : serotyping, PFGE Félix et al., 2012 Foodborne Pathogens and Disease, vol9, n°8
- 2012: PFGE and PFGE profile interpretation in collaboration with ECDC (Food and Waterborne Disease Programme) 18 NRLs and 10 NPHLs (National Public Health Laboratories) Félix et al., 2013, Foodborne Pathogens and Disease, Accepted the 28th May 2013.



### **PFGE PT trials results**

	2009		2010		2012	
	Nb of participating NRLs	Nb of competent NRLs	Nb of participating NRLs	Nb of competent NRLs	Nb of participating NRLs	Nb of competent NRLs
PFGE	15	8	17	14	18	10
PFGE profile interpretation	-	-	-	-	15	8 + 2*

\* Retroactively validated

To date, ten NRLs are able to submit profiles to the EURL *Lm* database.

- PFGE PT trial
- PFGE profile interpretation PT trial

Mandatory criteria to use EURL Lm DB



- Stimulate NRLs for typing
- Strengthen and consolidate NRL typing capacity
- Harmonize typing methods at European level



Need for exchanging typing data within the NRL network



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Need for exchanging typing data within the NRL network



#### **Summary**

# 2) The steps involved in developing the EURL Lm DB



# **Equipment:**

Anses network management platform : <u>www.moleculartyping-db.anses.fr/EUListNet</u> BioNumerics Server Web Edition 6.1 Oracle© database

Modified PulseNet USA communication scripts (with the agreement with CDC)

# **Organization:**

Steering committee: 9 NRLs, EFSA, ECDC and EURL Curator & administrator : EURL





European Union Reference Laboratory for *Listeria monocytogenes* 



# **EURL Lm DB functionalites**



# **EURL Lm DB functionalites**



**Data consultation and submission** 

# Submission of data by NRLs



Two ways to use the EURL *Lm* DB

# Consultation of data by NRLs (without mandatory submission)



#### **Participants:**

- (1) NRLs who successfully participated to the most recent EURL PFGE and PFGE profile interpretation PT trial
- (2) Comply with the Memorandum of understanding (MoU)

#### **Data submitted :**

- + Ascl/Apal combined PFGEprofiles
- + serotypes
- + epidemiological data
- + Do not submit duplicate strains\*



\* "Strains received within the same reception batch (1) sharing the same food product/environmental sample description" and (2) similar typing data



### Unlimited

#### consultation of profiles & metadata

- 1) matching their own profile against existing entries
- 2) Field query (according to pulsotype, epidemiological data, etc...)

Temporary download of selected profiles from the EURL Lm DB to the user's local database

e.g.: Statistical analysis Graphic representation Cluster search









# Benefits of the EURL Lm DB use

1) The NRLs can use the EURL *Lm* DB to make the interpretation of a PFGE profile in their own database

Utilize the profiles of the EURL *Lm* DB as "reference" for the interpretation and identification of newly analyzed profiles



# 2) EURL Lm DB enables NRLS to collect information useful



pulsotypes with serotypes

# Food product description in accordance with EFSA

#### Four large categories



#### Business rules

- 1) Adapted to Listeria
- 2) Few fields
- 3) Restricted pick lists

# Easy reporting without typo error

# Same level of description for:

- Food product
- Food processing environment

#### Food matrix

• Meat

Fish

• Milk



- Eggs
- Beverage
- Combining several food categories
- Other

Food products e.g.: cheese, sausage, pate, etc... Process applied e.g.: cooked, raw, fermented, etc...



# **Epidemiological description: EU standard**

#### Food description respect the EFSA Standard Sample Description (SSD2)





# **EURL Lm DB functionalites**



### **Data curation**

(Félix et al. 2012 Gel Electrophoresis book Chapter 14 p.241-254)



# **EURL Lm DB functionalites**



### **Curator feed back content**



curator fingerprint modifications

OFFICIAL CURATION REPORT HTML format





**Data submissions** 





**Curation process** 





# Feed back curator



# Synchronization of the network



Harmonization of the data circulating within the NRLs/EURL databases network



# Synchronization of the network



Improvement of the NRL network reproducibility and internal communication

# 3)The current use of the EURL Lm DB



#### European coordinated monitoring program = European Baseline Survey (BLS) :

➡ to assess the prevalence of Listeria in ready-to-eat food (EC Decision 2010/678/EU) in 2010-2011

Close cooperation with EURL, ECDC, EFSA and SSI

the food typing data : compared with those on human strains isolated during the same period of time = ELiTE (European Listeria Typing Exercise).

 Better estimation of the importance of certain food products as possible source of human Listeriosis





- by EURL to enter typing and epidemiological data on strains sent by NRLs of 16 other countries.
- by 9 NRLs to submit and share PFGE profiles and data

Total : 450 PFGE profiles Available to EURL *Lm* DB users



# In combination with epidemiological investigations and databases on human strains :

- (1) Strengthen the national surveillance in each European country
- (2) better allowing the detection of European contamination clusters,
- (3) optimizing the detection of emerging *Lm* strains
- (4) suggesting links with potential sources of contamination.
- (5) facilitating communication between NRLs, EURL, EFSA and ECDC
- The EURL *Lm* DB : improve the surveillance of *Lm* in the food chain



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#### EFSA : Unit of the Biological Monitoring

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# Food NRL network, members of the steering committee (AT, BE, DE, FI, IE, IT, NL, SE)

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# ECDC : Food and Waterborne Diseases and Zoonoses Program

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#### **Applied Math's team**

