SCIENCESPRINGDAY

FACULDADE DE CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

Life Sciences (DCV; Departamento de Ciências da Vida)

Infection Biology Laboratory

- **Irina Franco, post-doc**
- **Nuno Charro, post-doc**
- **Lia Domingues, PhD student**
- **Maria da Cunha, PhD student**
- **Filipe Almeida, PhD student**
- **Sara V. Pais, research student**
- **Catarina Milho, research student**

(The Infection Biology Laboratory is still at ITQB)

ITQB INSTITUTO DE TECNOLOGIA QUÍMICA E BIOLÓGICA /UNL

Luís Jaime Mota

PI

- Assistant Professor, FCT-UNL, from 2012.
- "Ciência 2007" Assistant Research, ITQB-UNL, 2008-2012.
- Post-Doc: Biozentrum, Univ. Basel and Imperial College London, 2001-2008.
- PhD: ITQB-UNL, 2001.

Objectives

Our laboratory aims to understand **molecular and cellular processes** underlying **bacterial virulence**. In particular, we study how bacterial pathogens alter the normal functioning of eukaryotic host cells. We focus on intravacuolar bacterial pathogens (***Chlamydia*, *Legionella* and *Salmonella***) that use **specialised mechanisms of protein secretion (termed "type III" and "type IV" secretion)** to deliver virulence **effector proteins** into eukaryotic cells (**Fig. 1**). The **general scientific questions** we address are:

- what is the function of bacterial effector proteins?
- how is secretion of bacterial effector proteins regulated?
- how are host cell proteins and pathways altered by bacterial pathogens?

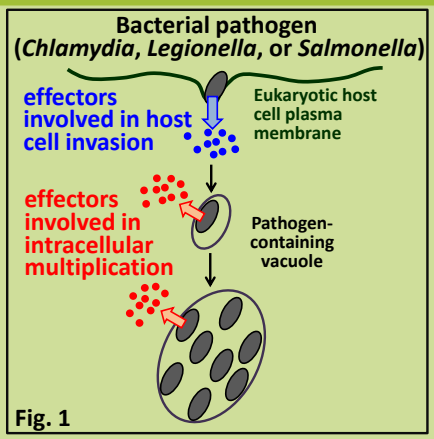

Fig. 1

Methodology

We use a variety of **molecular cell biology approaches** (i.e. molecular microbiology, cell biology, immunofluorescence microscopy, biochemistry) to tackle our scientific problems, which are currently divided into the following **specific projects**:

1. Identification and characterisation of novel *Chlamydia trachomatis* effectors (**Fig. 2**)
2. Functional analyses of a particular subclass of *C. trachomatis* effectors (the **Inc proteins**, which localize to the *Chlamydia* vacuolar membrane) (**Fig. 3**).
3. Identification and characterisation of novel *C. trachomatis* effector-chaperone pairs.
4. Analyses of the function of poorly characterised *Salmonella* effectors (**Fig. 4**)
5. Interaction between *Legionella pneumophila* and the host cell actin cytoskeleton.
6. Role of mammalian small GTPases during host cell infection by intravacuolar bacterial pathogens

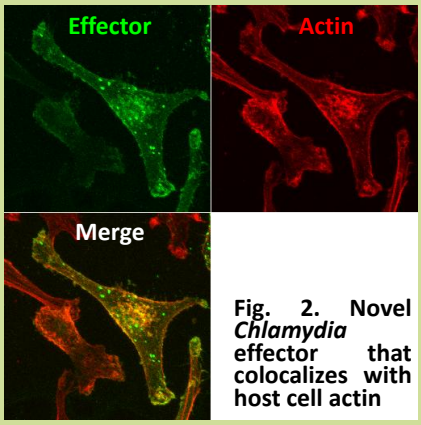

Fig. 2. Novel *Chlamydia* effector that colocalizes with host cell actin

Expected Results

We expect that our work will contribute to **further our fundamental knowledge** of **virulence mechanisms** used by intracellular bacterial pathogens, and could provide **novel insights into the cell biology of eukaryotic cells** or reveal **novel drug targets**.

We are well aware that effectors delivered by a single bacterium into a host cell act together and often have redundant functions, and thus analyses of the function of single effectors can be misleading and extremely difficult. However, we believe that continuous efforts to understand the molecular and cellular function of single effectors will eventually provide a comprehensive picture of virulence mechanisms of bacteria injecting host cells effector proteins.

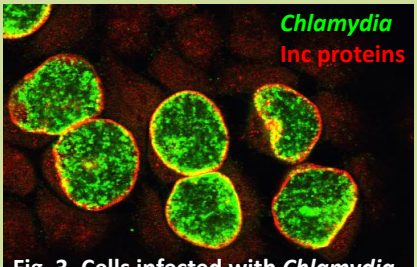

Fig. 3. Cells infected with *Chlamydia*

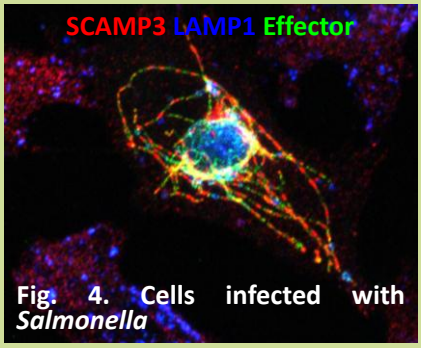

Fig. 4. Cells infected with *Salmonella*

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