A pilot integrative knowledgebase for the characterization and tracking of multi resistant *Acinetobacter baumannii* in Colombian hospitals

Our funding partners:
The partners

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**Acinetobacter baumannii**

*A.baumannii* is a Gram-negative bacterium that can become an opportunistic pathogen in patients with compromised immune systems.

In Colombia, it is increasingly found as a hospital-derived infection (nosocomial) carrying multiple drug-resistance genes since 2001.

**Carbapenems** resistance: Meropenem 65.7% in 2013 and 69.2% in 2014  
**Cyclins** resistance: Tigecycline 0% in 2013 and 4.2% in 2014  
Susceptibility to **colistin** remains high, however, development of resistance has already been detected in some colombian hospitals...
General objectives of the project

Design and develop a pilot integrative knowledgebase combining clinical, epidemiological and genomic data for tracking the multidrug resistant *Acinetobacter baumannii*

1. Sequence a collection of *A.baumannii* isolates, assemble and annotate the draft genomes.

2. Extract a genomic profile based on the known resistance and virulence genes (using HMMs).

3. Strengthen monitoring and surveillance of healthcare associated infections (HAIs).
120 isolates of *A. baumannii*

Collection of the Microbiology Laboratory

Surveillance program for antibiotic resistances from the Colombian Hospitals of all 22 departments

From 2012 to May 2015
120 Colombian isolations

Extraction of DNA

Whole genome sequencing (80 sequenced genomes)

Analysis of antibiotic resistance profile (VITEK; PHOENIX; KIRBY BAUER)

- Resistance genes
- Resistance genomic elements

A. baumannii (3’954’000bp)
Bioinformatics Pipeline

Sequence typing based on genomic data reveals ST-79 and ST-25 as the major strains with some minor known ST and some new STs.

40 additional strains to be sequenced by the end of the year.
2014

2015

ST-79
ST-25
ST-78
ST-Des

ST-79
ST-25
ST-78
ST-338
ST-886
Comparative genomics of the 66 *A. baumannii* strains

Non ST-79

ST-79

ST-25
Outreach of the project

Publication
Saavedra SY, Prada-Cardozo D, Rincón V, Pérez-Cardona H, Hidalgo AM, Gonzalez MN, Reguero MT, Valenzuela de Silva EM, Mantilla JR, Falquet L, Barreto-Hernández E, Duarte C.
Whole genome sequence of a *Acinetobacter baumanni* ST920 Colombian strain co-producer of OXA-72 and OXA-255-like.
*Genome Announcements (in press)*

Workshop with 18 participants and publication
Falquet L, Calderon-Copete S, Moreno J, Barreto-Hernández E.
Report on the Swiss-Colombian workshop, assembly, annotation and comparison of bacterial genomes.
*EMBnet.journal* 2016 (in press)
Funding already obtained following the project

From the seed money we applied for funding to the National University of Colombia with the project:


( Genomic characterization of Colombian Providencia rettgeri strains producers of metal-betalactamases, collected between 2012-2015)

The project was approved for 12’000 USD for a year.
Next steps?

Extension of the knowledgebase to other bacterial species (*Pseudomonas aeruginosa* and *Klebsiella pneumoniae*) of the ESKAPE group.

Application to the R4D open thematic call this winter (CHF500K for 3 years) For a joint project between Paraguay, Colombia and Switzerland.
Thank you for your attention