

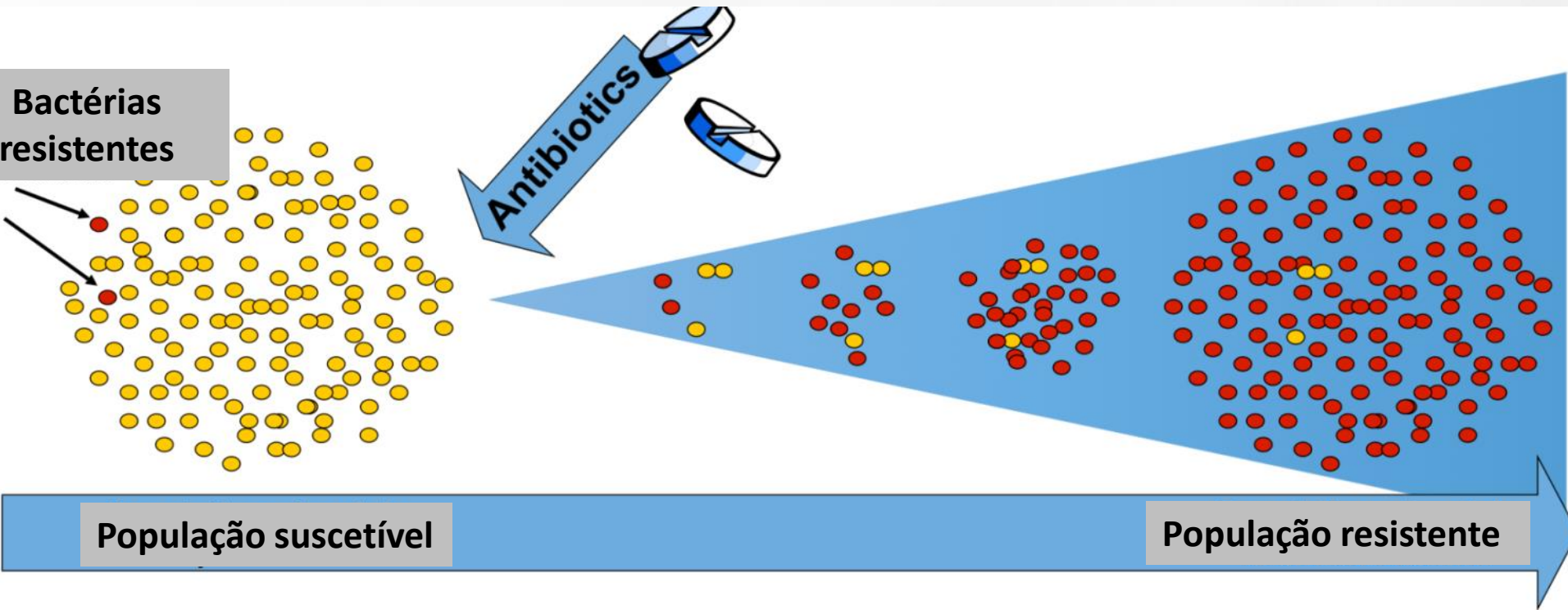
# A pesquisa agropecuária aplicada a resistência antimicrobianos: uma ameaça transversal

Jalusa Deon Kich  
Raquel Rebelatto

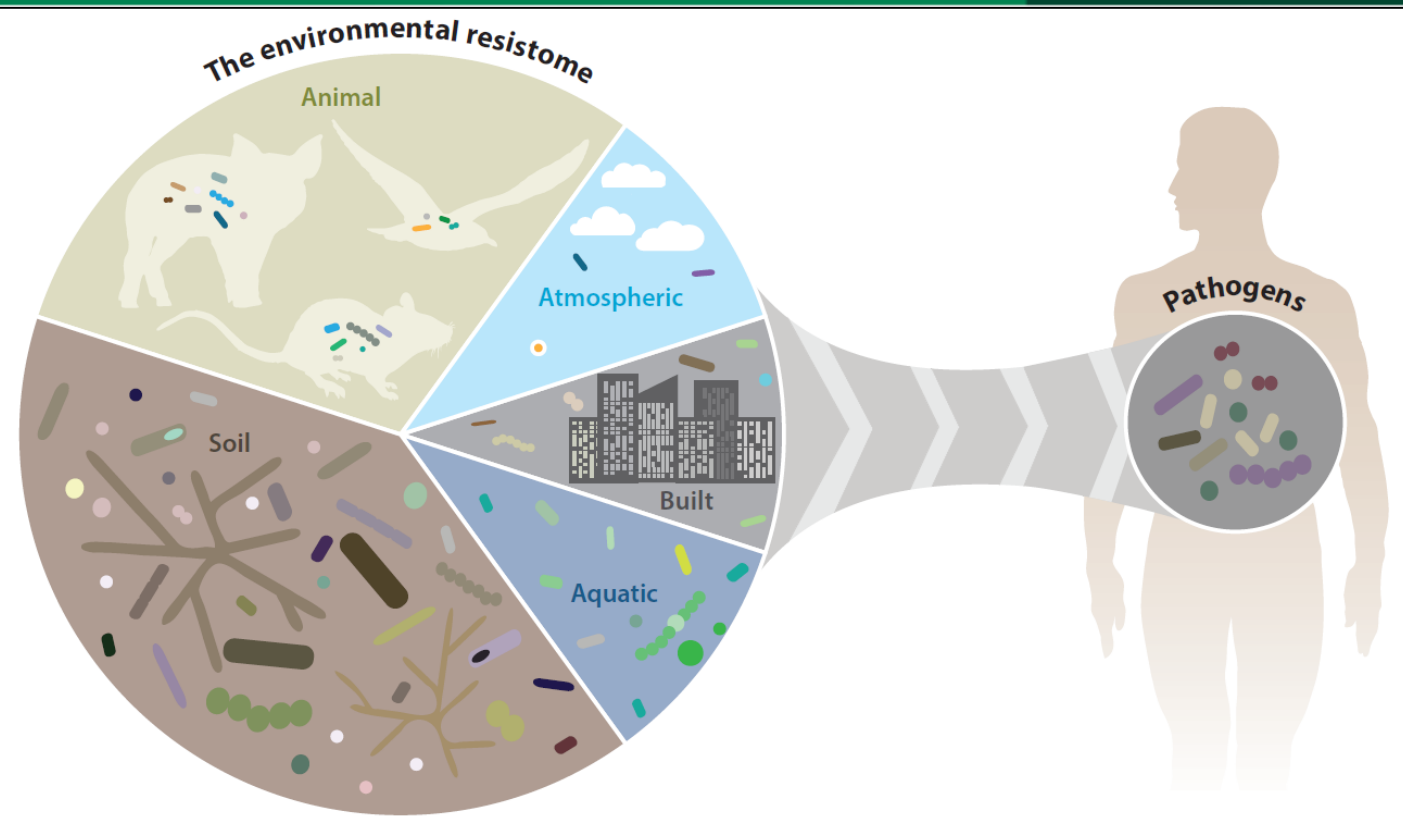


**Embrapa**

# A evolução genética é própria das bactérias há milhões de anos...



# Ameaça transversal? reservatório de genes de resistência



**Annual Review of  
Microbiology**

Volume 71, 2017

Surette e Wright (2017)

# Pesquisa agropecuária aplicada a resistência antimicrobiana: abordagem pelo problema

**Clínica  
rebanho**



**Resíduos**



**Clínica  
individual**



**Ambiente:  
contaminantes,  
genes de  
resistência  
microbioma**



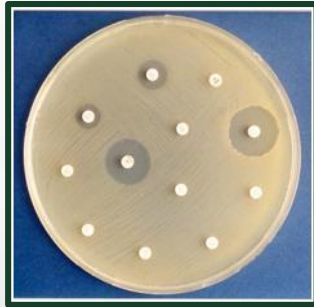
**Saúde Pública  
Ocupacional,  
DTAs  
comensais  
resistentes**



# Abordagem metodológica: fenotípica

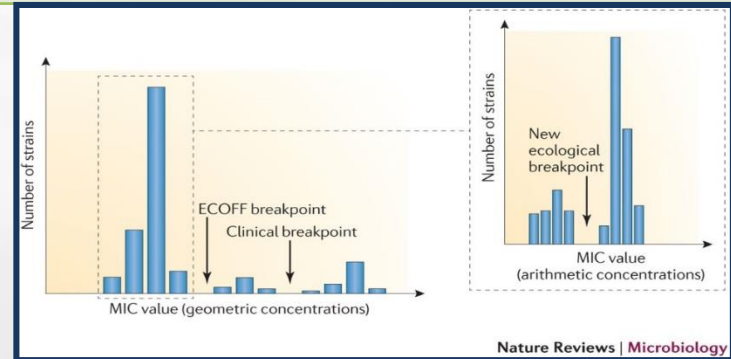
**Antibiograma**

**Perfil resistência/sensibilidade  
dicotômico**



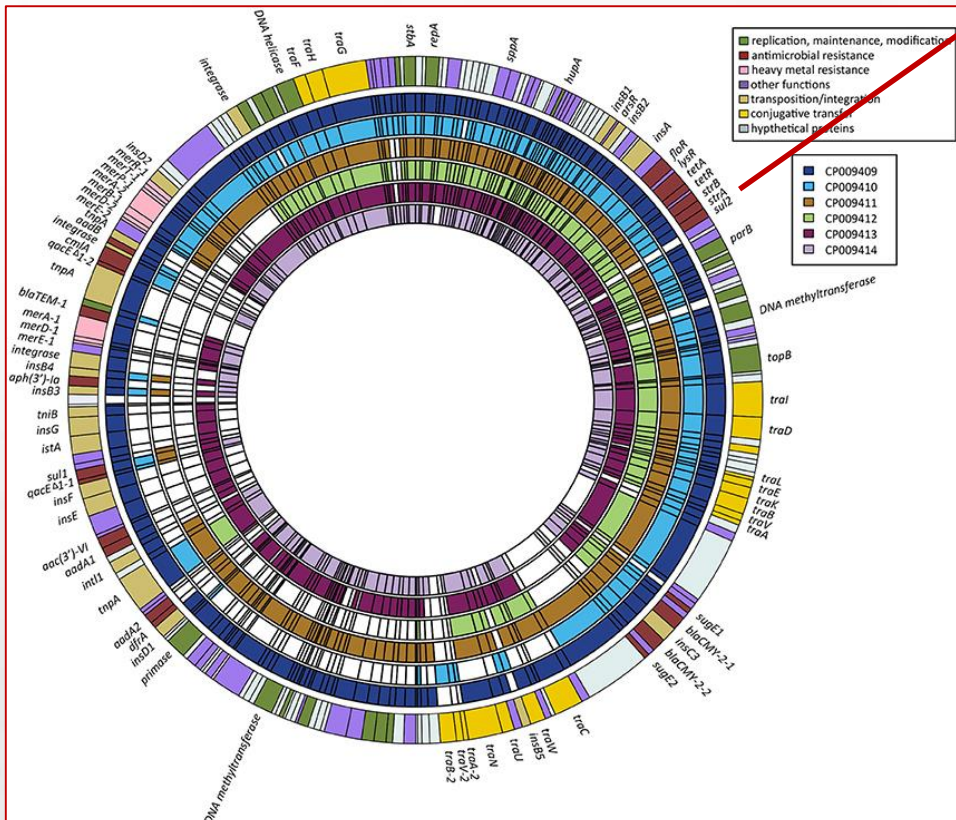
**Concentração Inibitória mínima**

**Possibilita visão epidemiológica**

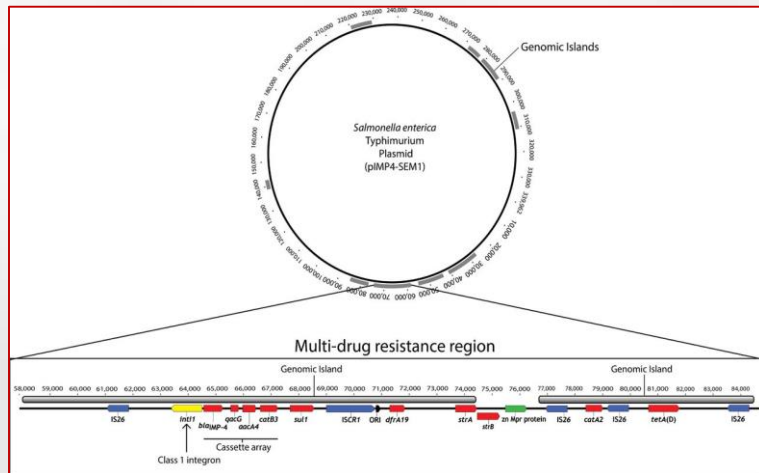




# Abordagem genotípica




## Genes de resistência antimicrobiana



Hoffmann et al, 2017 Frontiers in Microbiology

**Problema:** Cepas re/multiresistentes causando doença em animais

- 
- **Individual:** bovino de leite, animais de companhia, animais de esporte;
  - **Rebanhos:** suínos, aves, pescados
    - ❖ Perfil de resistência das cepas: relatos
    - ❖ Identificação de determinantes genéticos de resistência: PCR
    - ❖ Monitoramento epidemiológico: Concentração Mínima Inibitória (MIC)

## Bovinos de leite Mastite



J. Dairy Sci. 98:1–14

<http://dx.doi.org/10.3168/jds.2014-9137>

© American Dairy Science Association®, 2015.

### Phenotypic antimicrobial susceptibility and occurrence of selected resistance genes in gram-positive mastitis pathogens isolated from Wisconsin dairy cows

P. L. Rugg,<sup>\*1</sup> L. Oliveira,<sup>\*</sup> W. Jin,<sup>†</sup> and O. Okwumabua<sup>‡</sup>

<sup>\*</sup>Department of Dairy Science, University of Wisconsin, Madison 53706

<sup>†</sup>School of Veterinary Medicine, Ministry of Education Key Laboratory for Avian Prevention and Control, Jiangsu 225009, China

<sup>‡</sup>School of Veterinary Medicine, Wisconsin Veterinary Diagnostic Laboratory, University of Wisconsin, Madison 53706

DOI: 10.5433/1679-0359.2017v38n4Supl1p2581

### *In vitro* antimicrobial susceptibility and genetic resistance determinants of *Streptococcus agalactiae* isolated from mastitis in Brazilian dairy herds



### Suscetibilidade *in vitro* a antimicrobianos e determinantes genéticos de resistência em *Streptococcus agalactiae* isolados de mastite em rebanhos bovinos brasileiros

Juliana Rosa da Silva<sup>1</sup>; Glei dos Anjos de Carvalho Castro<sup>2</sup>; Maysa Serpa Gonçalves<sup>3</sup>; Dircéia Aparecida da Costa Custódio<sup>4</sup>; Gláucia Frasnelli Mian<sup>5</sup>; Geraldo Márcio da Costa<sup>6\*</sup>



## Animais de Companhia e esporte

Contents lists available at ScienceDirect

Journal of Antimicrobial Chemotherapy

—NOTE—

### Methicillin-resistant *Staphylococcus aureus* ulcerative keratitis in a Thoroughbred racehorse

Taisuke KURODA<sup>1</sup>, Yuta KINOSHITA<sup>2</sup>, Hidekazu NIWA<sup>2</sup>, Fumiaki MIZOBE<sup>3</sup>, Takanori UENO<sup>2</sup>, Atsutoshi KUWANO<sup>1</sup>, Takashi HATAZOE<sup>4</sup> and Seiji HOBO<sup>5\*</sup>

<sup>1</sup>Clinical Science and Pathobiology Division, Equine Research Institute, Japan Racing Association, Tochigi 320-0856, Japan

<sup>2</sup>Epizootic Research Center, Equine Research Institute, Japan Racing Association, Tochigi 329-0412, Japan

<sup>3</sup>Racehorse Hospital, Ritto Training Center, Japan Racing Association, Shiga 520-3085, Japan

<sup>4</sup>Kyushu Stallion Station, The Japan Bloodhorse Breeders' Association, Kagoshima 899-8313, Japan

<sup>5</sup>Joint Faculty of Veterinary Medicine, Kagoshima University, Kagoshima 890-0065, Japan

I. TUERENA<sup>a</sup>, N. J. WILLIAMS<sup>a</sup>, I. NUTTALL<sup>b</sup> AND G. PINCHBECK<sup>a,c</sup>

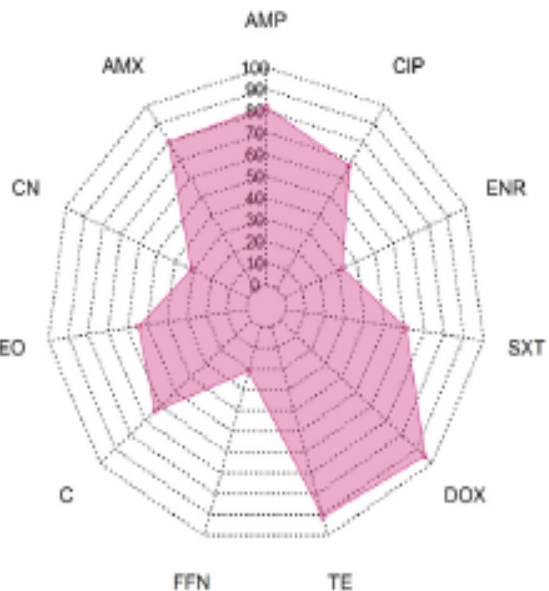
<sup>a</sup>Department of Epidemiology and Population Health, Institute of Infection and Global Health, University of Liverpool, Neston, CH64 7TE

<sup>b</sup>School of Veterinary Science, Faculty of Health and Life Sciences, University of Liverpool, Neston, CH64 7TE

<sup>c</sup>Corresponding author email: Ginap@liv.ac.uk

Antimicrobial Chemotherapy  
animals  
Sugiyono  
Amanda R  
<sup>a</sup> School of Animal  
<sup>b</sup> Research Centre  
<sup>c</sup> New South Wales  
<sup>d</sup> Antimicrobial  
<sup>e</sup> Australian Com  
Marques et  
DOI 10.1185  
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Cátia Mar  
Els M. Broens<sup>4</sup>, Marta Costa<sup>5</sup>, Delphine Crief<sup>6</sup>, Peter Dambörg<sup>7</sup>, Marloes A. M. van Dijk<sup>4</sup>, Astrid M. van Dongen<sup>8</sup>, Roswitha Dorsch<sup>9</sup>, Carmen Martin Espada<sup>10</sup>, Bernhard Gerber<sup>11</sup>, Maria Kritsepi-Konstantinou<sup>12</sup>, Igor Loncaric<sup>13</sup>, Domenico Mion<sup>14</sup>, Dusan Mistic<sup>15</sup>, Rebeca Movilla<sup>16</sup>, Gudrun Overesch<sup>17</sup>, Vincent Perreten<sup>17</sup>, Xavier Roura<sup>16</sup>, Joachim Steenbergen<sup>6</sup>, Dorina Timofte<sup>18,19,20</sup>, Georg Wolf<sup>21</sup>, Renato Giulio Zanoni<sup>14</sup>, Sarah Schmitt<sup>22</sup>, Luca Guardabassi<sup>23</sup> and Constança Pomba<sup>1\*</sup>

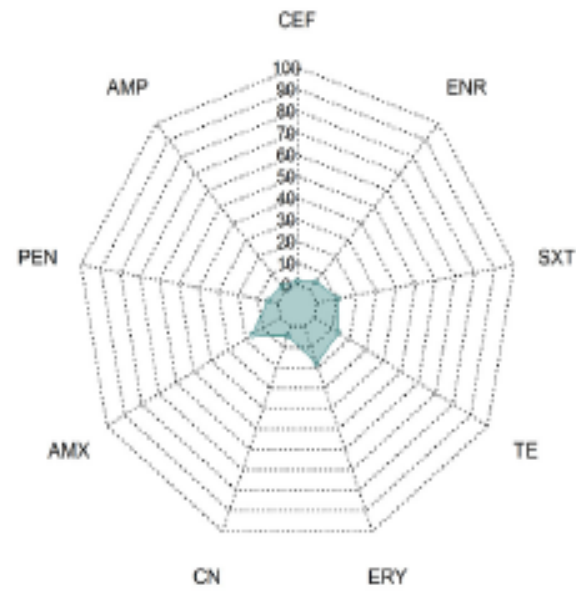
**E. coli**



**S. Pullorum/Gallinarum**



**P. multocida**

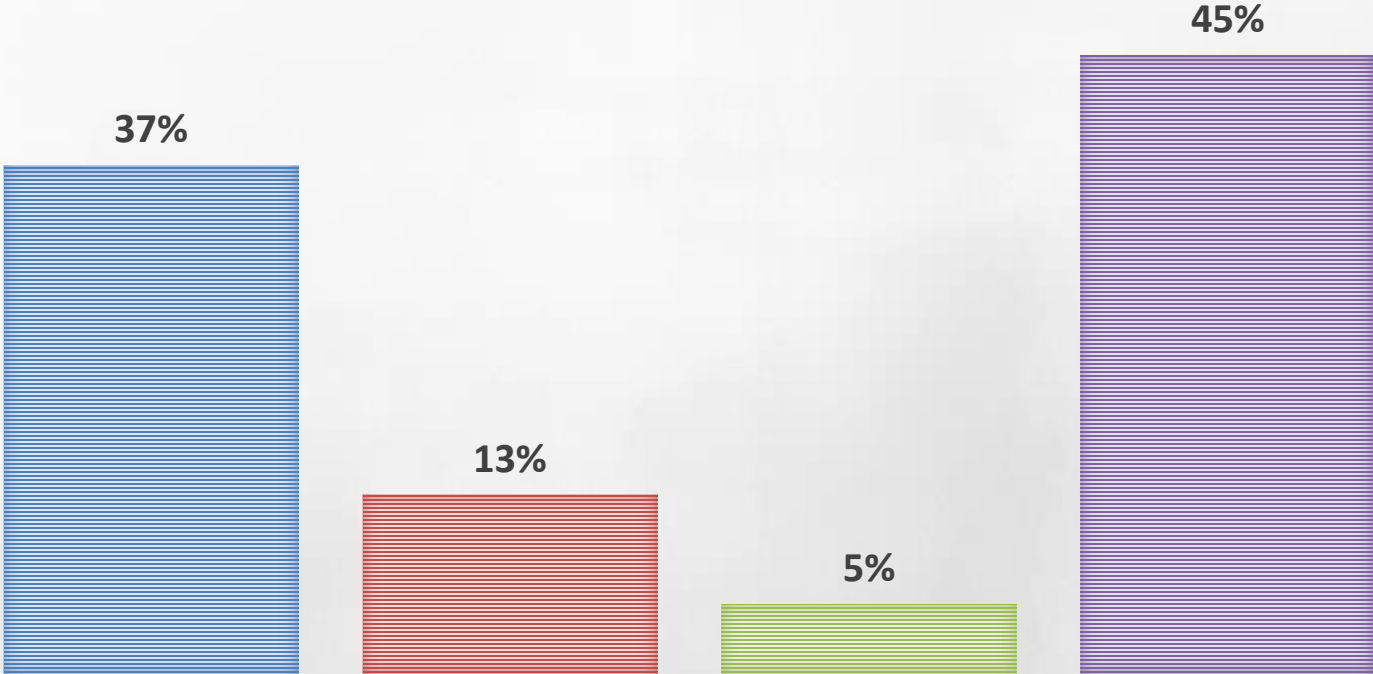


# Clínica de rebanhos: Suínos

S. Choleraesuis N 38

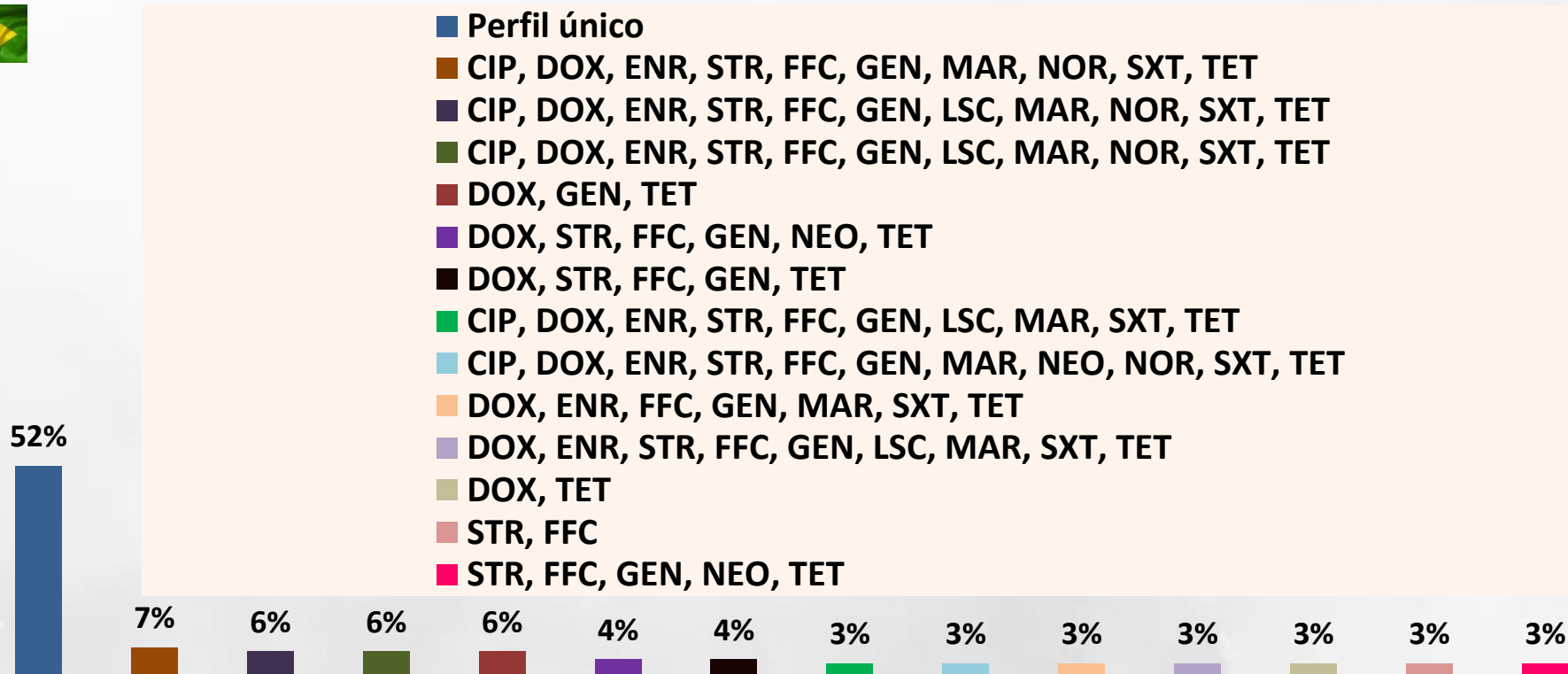


- DOX, STR, FFC, GEN, TET
- DOX, ENR, STR, FFC, GEN, TET



# Clínica de rebanhos: Suínos

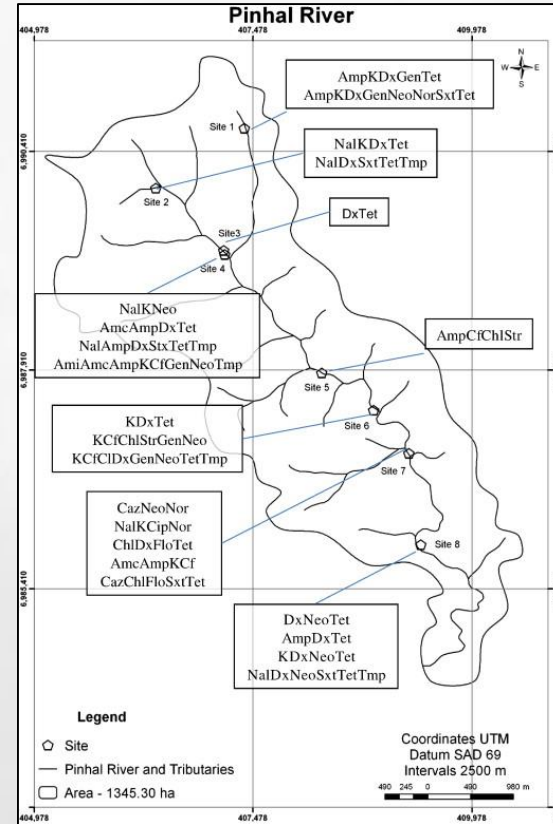
S. Typhimurium N 71



- **Contaminação direta com produtos e metabólitos: pesquisa química**
  - ✓ Excreção via urina e fezes
  - ✓ Fertilizantes
  - ✓ Ração, água, dejetos
  - ✓ Descarte de produtos
- **Presença de cepas resistentes / multirresistentes**
- **Presença de genes de resistência**



# Pesquisa de bactérias multirresistentes: rio em região produtora



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

**Science of the Total Environment**

journal homepage: [www.elsevier.com/locate/scitotenv](https://www.elsevier.com/locate/scitotenv)



*Salmonella* and antimicrobial resistance in an animal-based agriculture river system



Julio Cesar Pascale Palhares<sup>a,\*</sup>, Jalusa D. Kich<sup>b</sup>, Marjo C. Bessa<sup>c</sup>, Luiza L. Biesus<sup>b</sup>, Lais G. Berno<sup>d</sup>, Nelise J. Triques<sup>e</sup>

# Pesquisa de genes de resistência em Aquicultura

Science of the Total Environment 607–608 (2017) 357–366

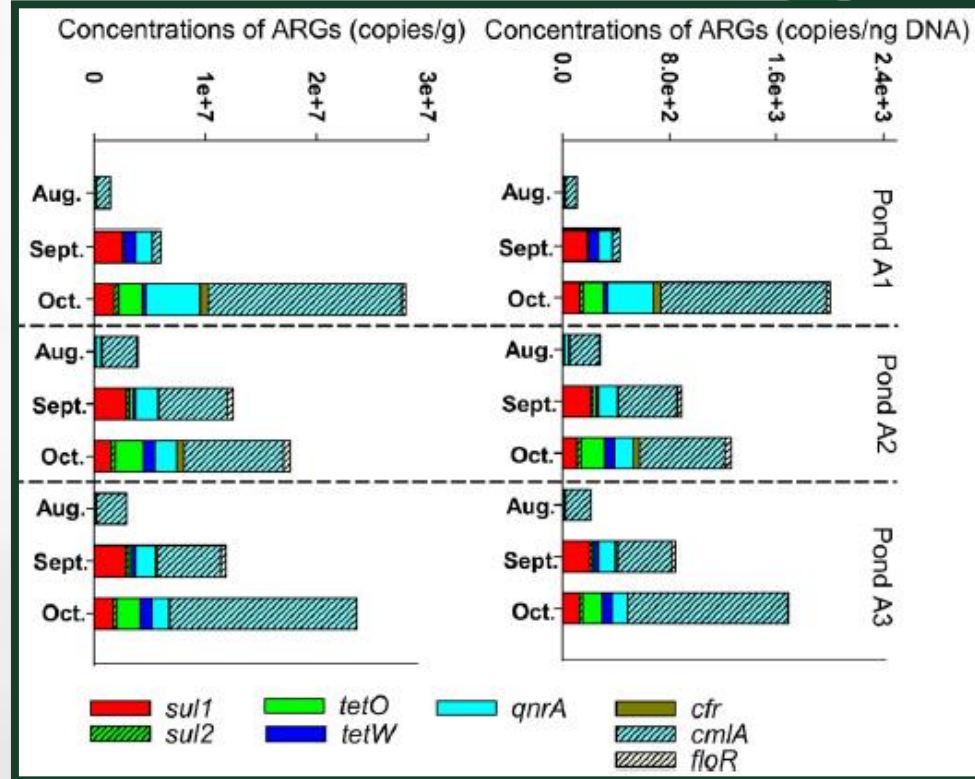
Contents lists available at ScienceDirect

**Science of the Total Environment**

journal homepage: [www.elsevier.com/locate/scitotenv](http://www.elsevier.com/locate/scitotenv)

Occurrence and temporal variation of antibiotic resistance genes (ARGs) in shrimp aquaculture: ARGs dissemination from farming source to reared organisms

Haochang Su <sup>a</sup>, Shan Liu <sup>c</sup>, Xiaojuan Hu <sup>a</sup>, Xiangrong Xu <sup>c</sup>, Wujie Xu <sup>a</sup>, Yu Xu <sup>a</sup>, Zhuojia Li <sup>a</sup>, Guoliang Wen <sup>a</sup>, Yousheng Liu <sup>b</sup>, Yucheng Cao <sup>a,\*</sup>



- **Ocupacional: Vets/produtores/operários rurais**
- **Resíduos em POA: leite; carne; ovos**
- **DTAs: Salmonelose (cepas resistentes *mcr1*); Tuberculose**
- **Comensais portadoras de genes de resistência:**
  - ✓ **Plasmídeos/integrans**

## Ocupacional

Contents lists available at SciVerse ScienceDirect

 **ELSEVIER**

**Veterinary Microbiology**

journal homepage: [www.elsevier.com/locate/vetmic](http://www.elsevier.com/locate/vetmic)



Clonal transmission of a rare methicillin-resistant *Staphylococcus aureus* genotype between horses and staff at a veterinary teaching hospital

Mitchell J. Schwaber<sup>a</sup>, Shiri Navon-Venezia<sup>a</sup>, Samira Masarwa<sup>a</sup>, Sharon Tirosh-Levy<sup>b</sup>, Amos Adler<sup>a</sup>, Inna Chmelnitsky<sup>a</sup>, Yehuda Carmeli<sup>a</sup>, Eyal Klement<sup>b</sup>, Amir Steinman<sup>b,\*</sup>

<sup>a</sup>National Center for Infection Control, Israel Ministry of Health, 6 Weizmann St., Tel Aviv 64239, Israel  
<sup>b</sup>Koret School of Veterinary Medicine, The Robert H. Smith Faculty of Agriculture, Food and Environment, The Hebrew University of Jerusalem, POB 12, Rehovot 76100, Israel

Sun et al. *BMC Infectious Diseases* (2017) 17:690  
DOI 10.1186/s12879-017-2802-1

BMC Infectious Diseases

RESEARCH ARTICLE

Open Access

### Longitudinal study of *Staphylococcus aureus* colonization and infection in a cohort of swine veterinarians in the United States



Jisun Sun<sup>1</sup>, My Yang<sup>1</sup>, Srinand Sreevatsan<sup>1</sup>, Jeffrey B. Bender<sup>1</sup>, Randall S. Singer<sup>2</sup>, Todd P. Knutson<sup>1</sup>, Douglas G. Marthaler<sup>1</sup> and Peter R. Davies<sup>1\*</sup>

# Saúde pública: resíduos em POA



# JMBFS

Journal of Microbiology, Biotechnology and Food Sciences

International peer-reviewed scientific online journal

Jabbar et al. 2013 : 2 (5) 2349-2354

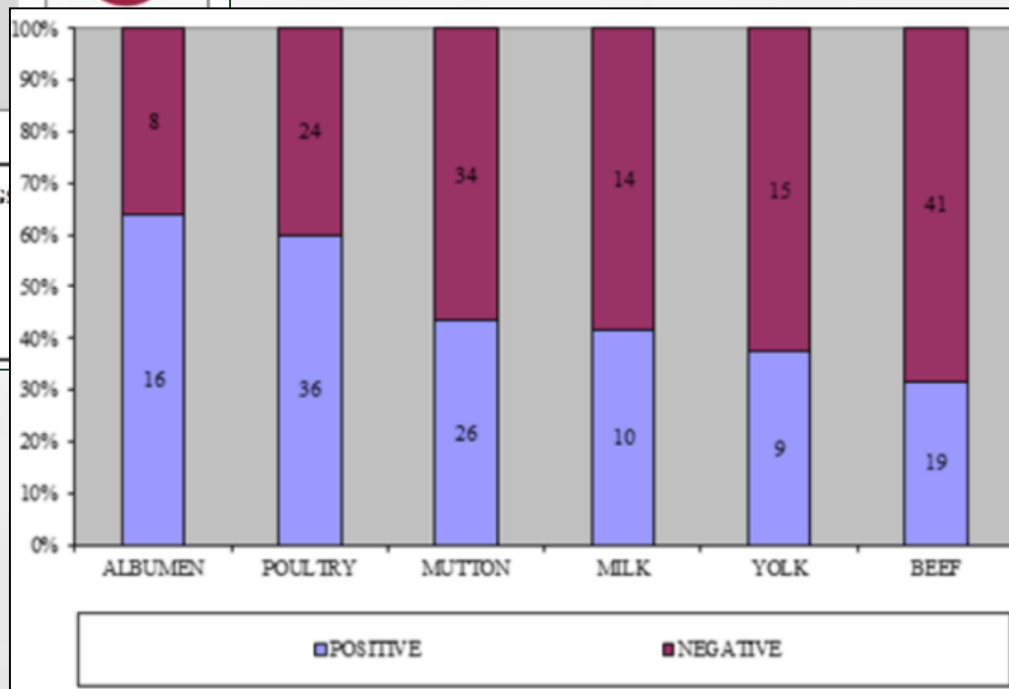


## MICROBIOLOGICAL EVALUATION OF ANTIBIOTIC RESIDUES IN MEAT, MILK AND EGG

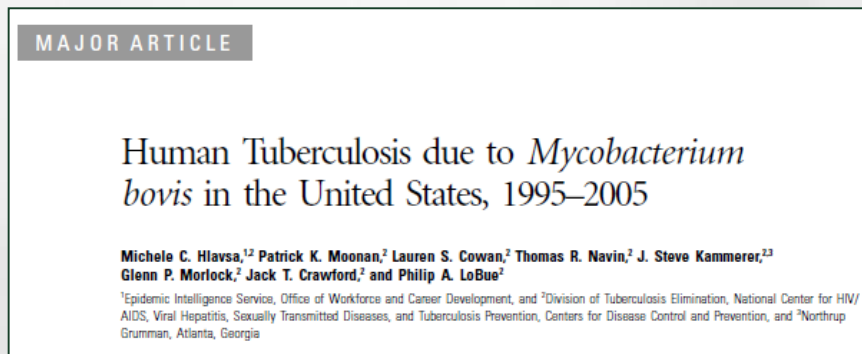
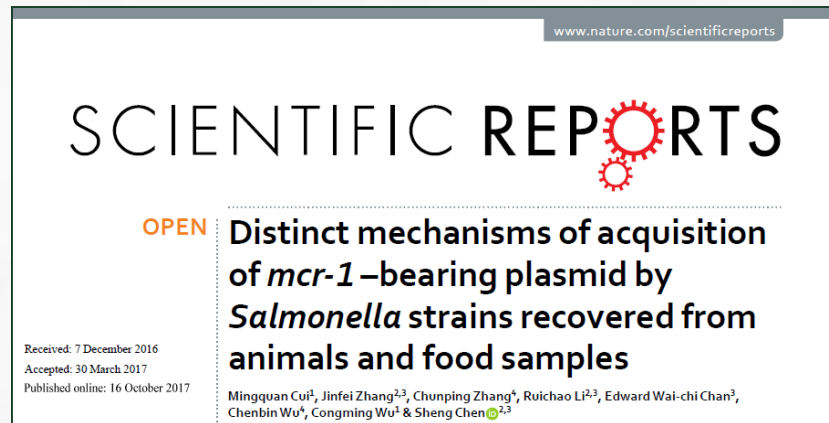
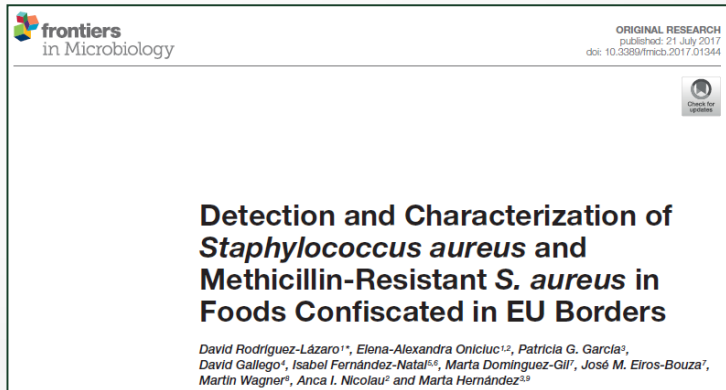
Abdul Jabbar \*, Sajjad-Ur-Rehman

Address(es): Abdul Jabbar  
Institute of Microbiology, University of Agriculture, Faisalabad- 38040, Punjab, Pakistan

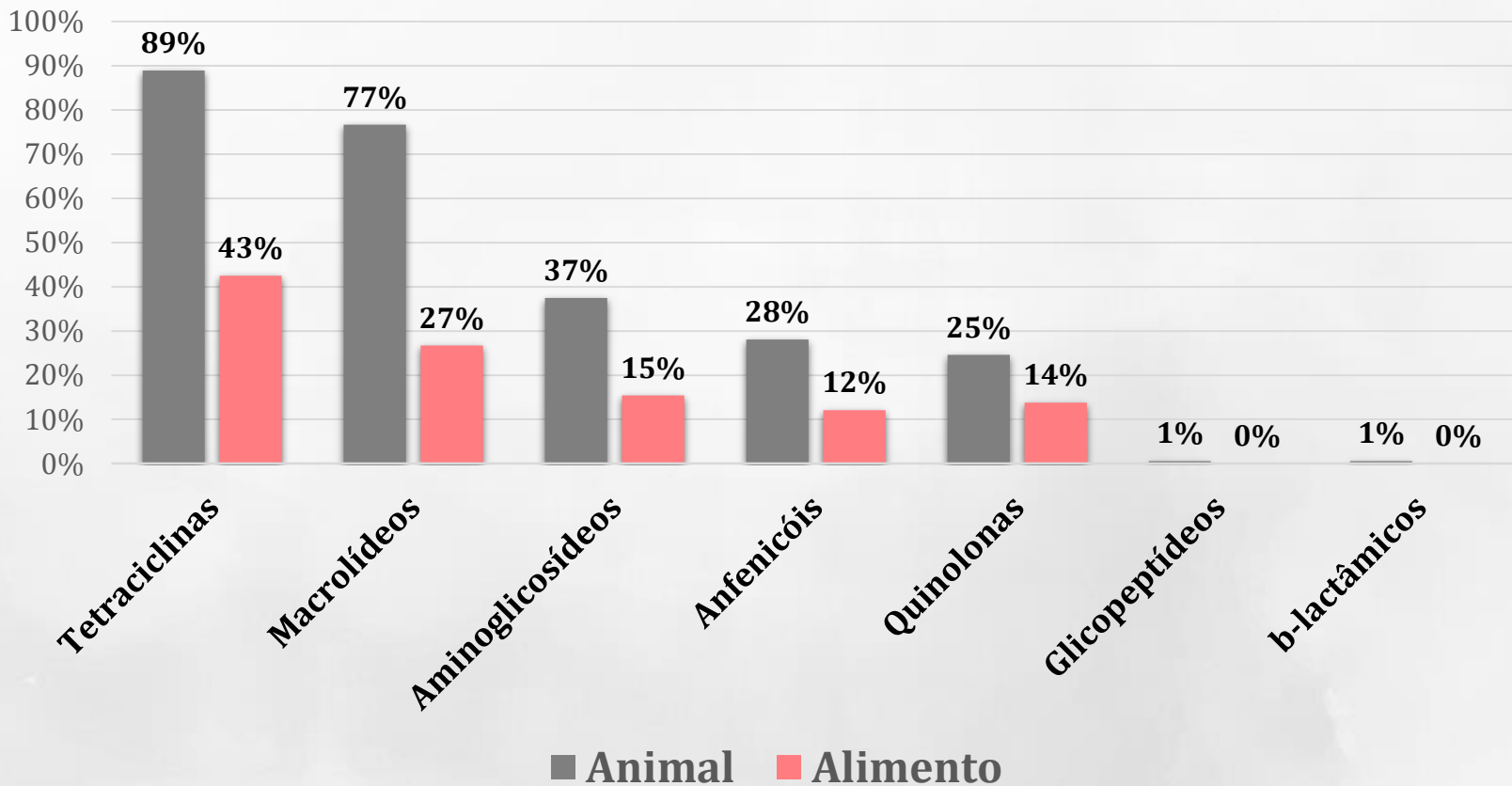
\*Corresponding author: [dr\\_jabbar@live.com](mailto:dr_jabbar@live.com)



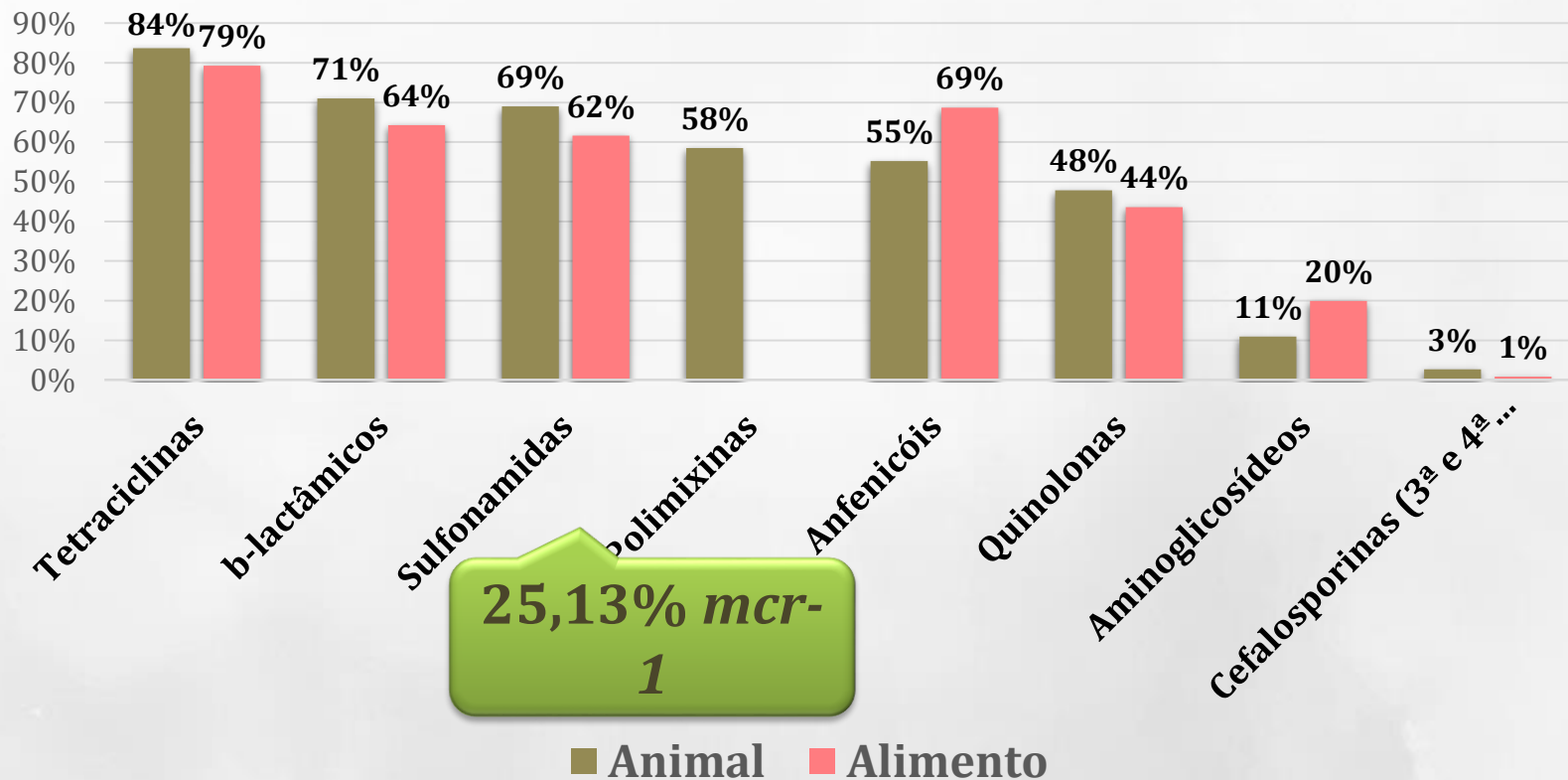




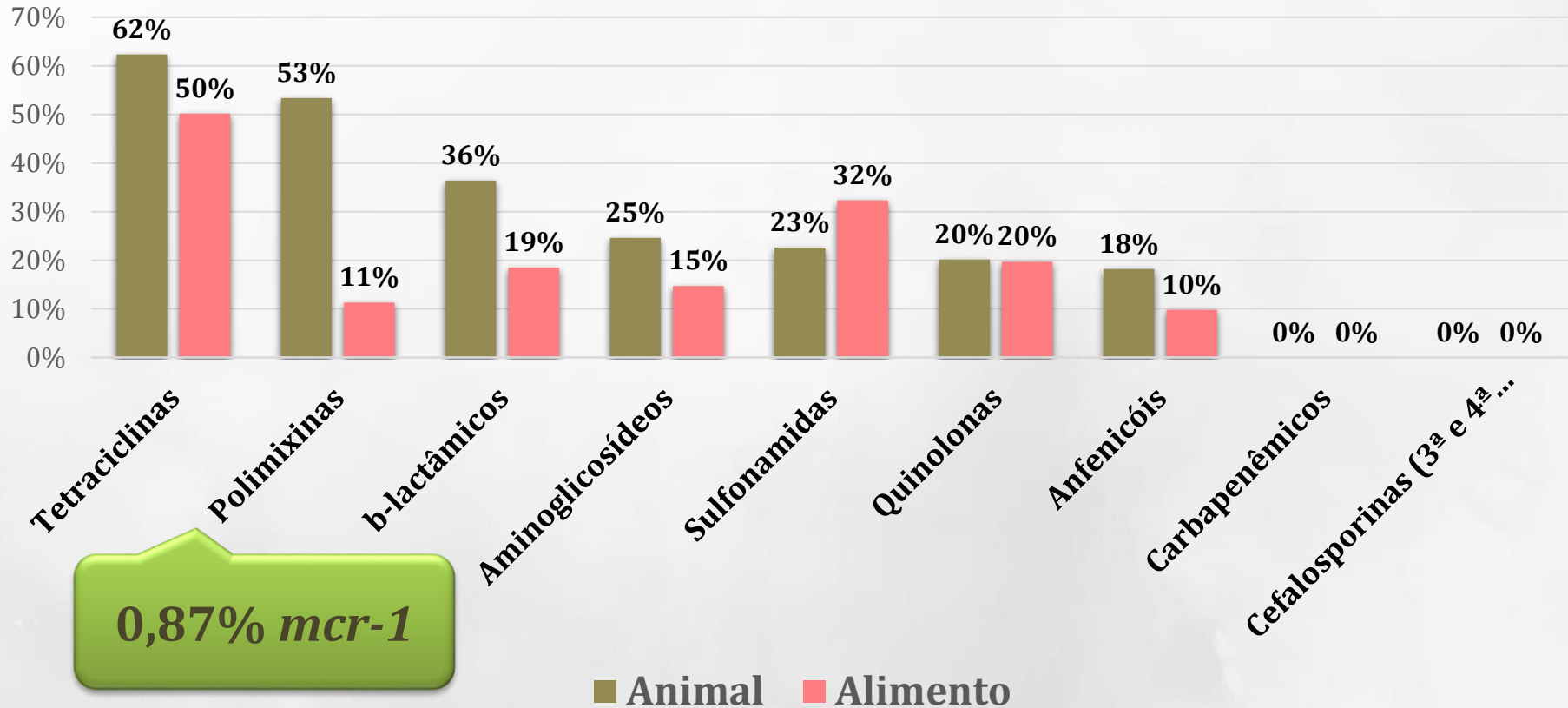
# Enterococcus sp. Fezes e carcaças de suínos



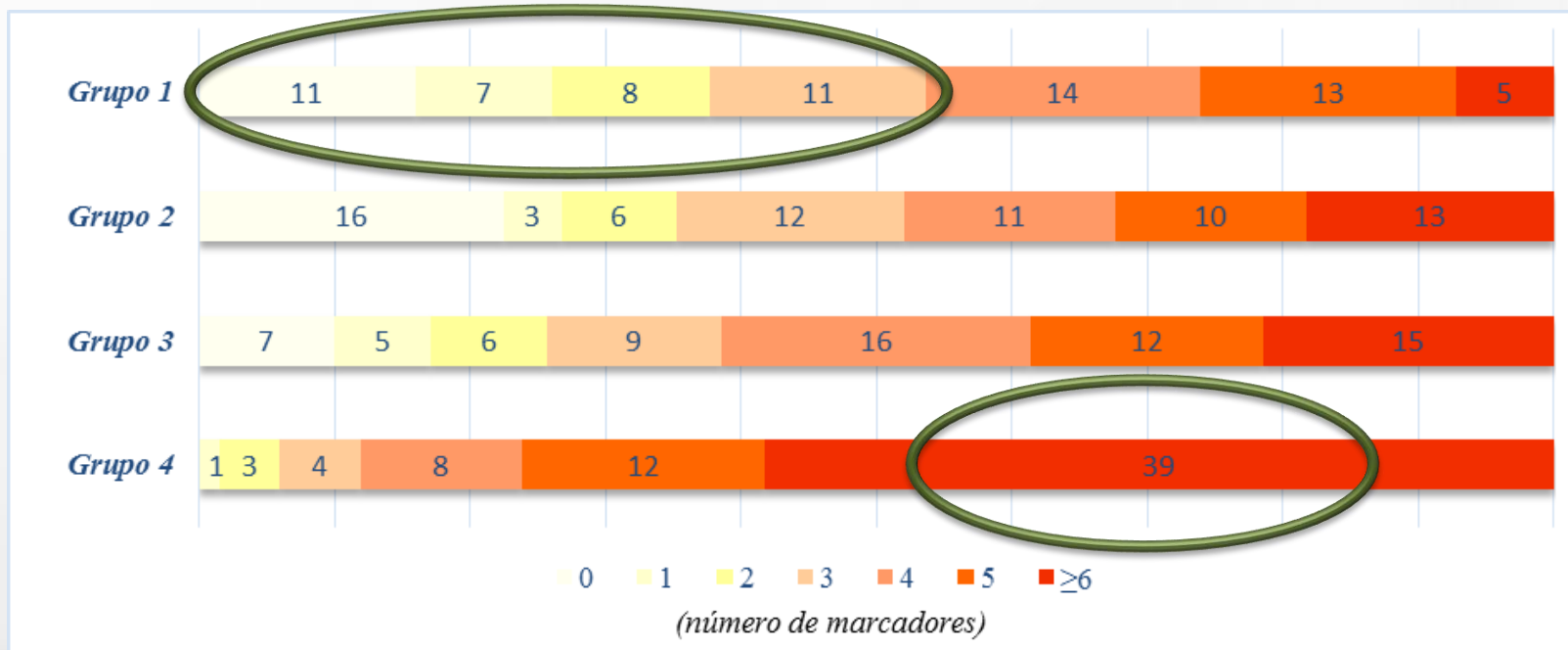
# Escherichia coli: Fezes e carcaças de suínos



# Salmonella enterica: Fezes, linfonodos, carcaças e embutidos



# Comparação entre diferentes sistemas de administração de atm Granjas de suínos X resistência antimicrobiana





# Metanálise *Salmonella* de Humanos e Aves

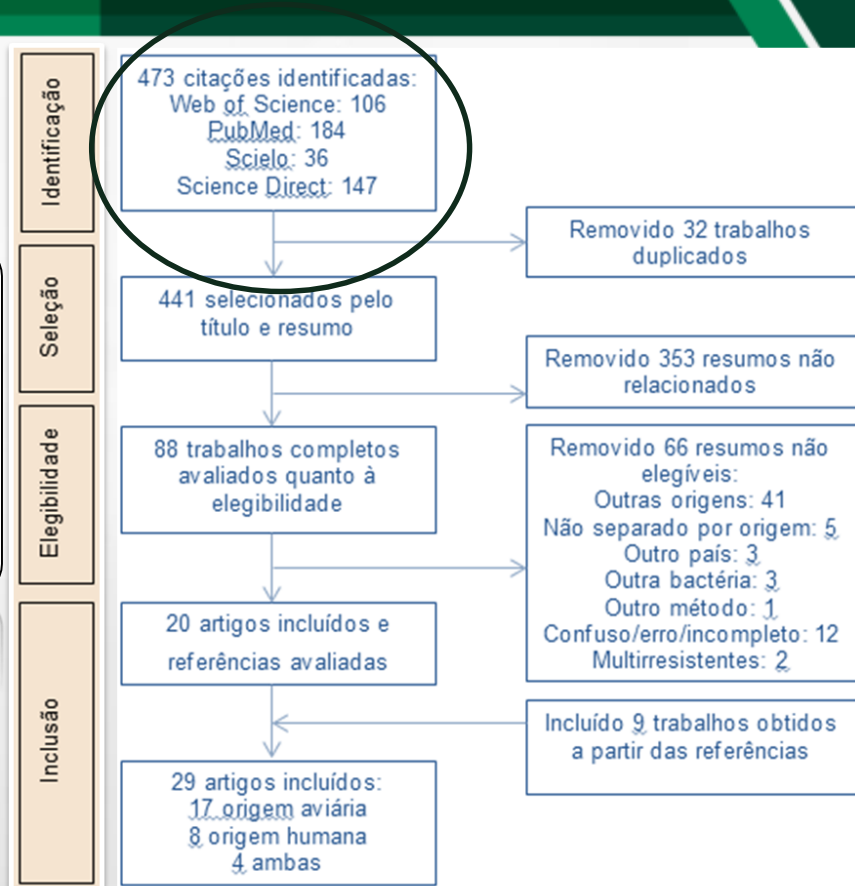
FOODBORNE PATHOGENS AND DISEASE  
Volume 14, Number 2, 2017  
© Mary Ann Liebert, Inc.  
DOI: 10.1089/fpd.2016.2228



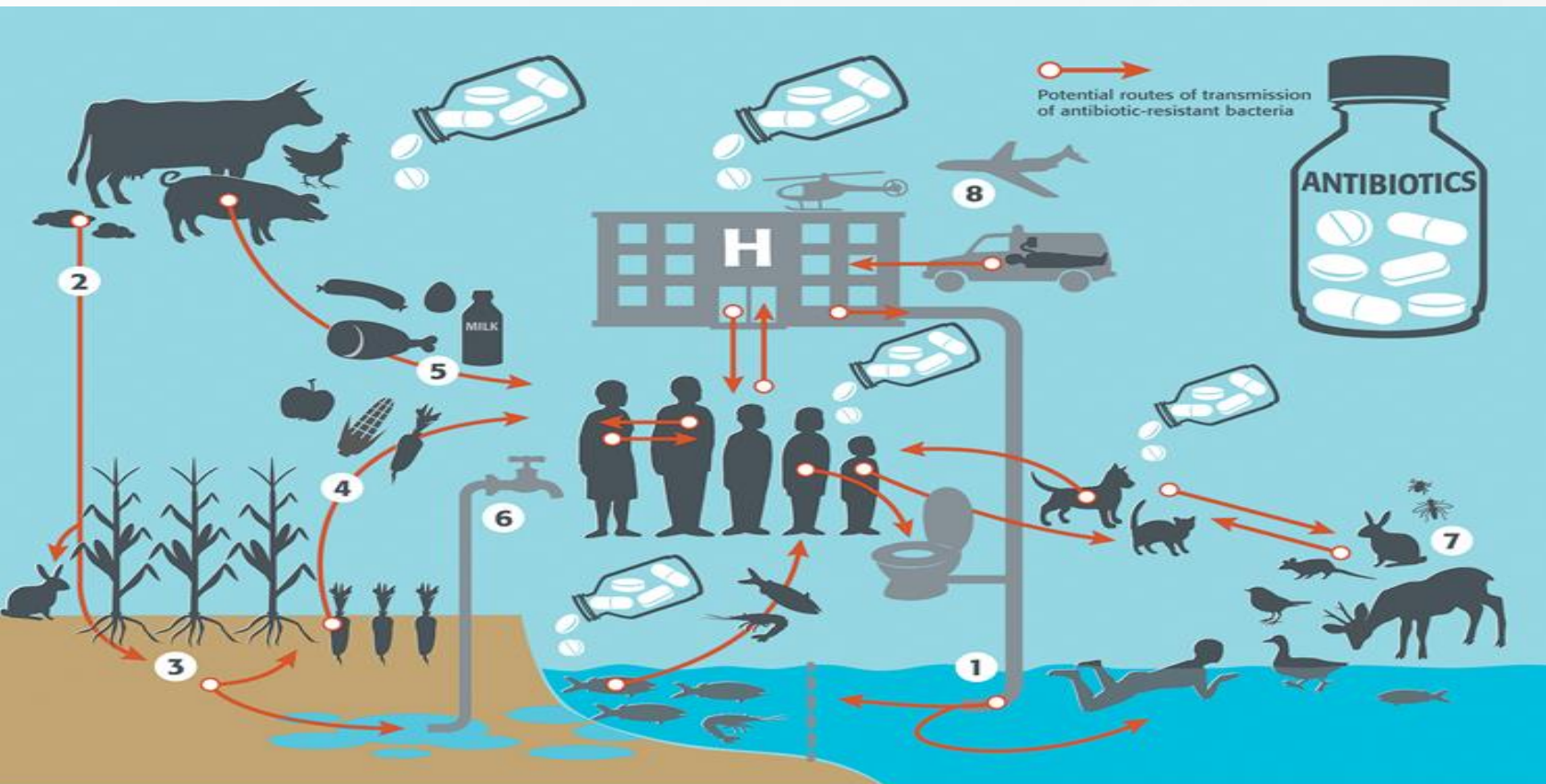
## Antimicrobial Resistance in Nontyphoidal *Salmonella* Isolated from Human and Poultry-Related Samples in Brazil: 20-Year Meta-Analysis

Daiane Voss-Rech<sup>1,2</sup>, Luciana Potter<sup>3</sup>, Clarissa Silveira Luiz Vaz<sup>2</sup>, Daniela Isabel Brayer Pereira<sup>4</sup>,  
Luís Antonio Sangioni<sup>1</sup>, Águeda Castagna Vargas<sup>1</sup>, and Sônia de Avila Botton<sup>1,\*</sup>

Luís Antonio Sangioni<sup>1</sup>, Águeda Castagna Vargas<sup>1</sup>, and Sônia de Avila Botton<sup>1</sup>,  
Daiane Voss-Rech<sup>1,2</sup>, Luciana Potter<sup>3</sup>, Clarissa Silveira Luiz Vaz<sup>2</sup>, Daniela Isabel Brayer Pereira<sup>4</sup>



# Potenciais rotas de transmissão de bactérias resistentes



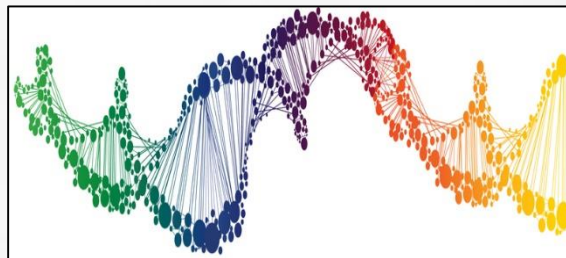
# A resistência em bactérias de humanos é resultado do uso de antimicrobianos em animais?

Review

CellPress

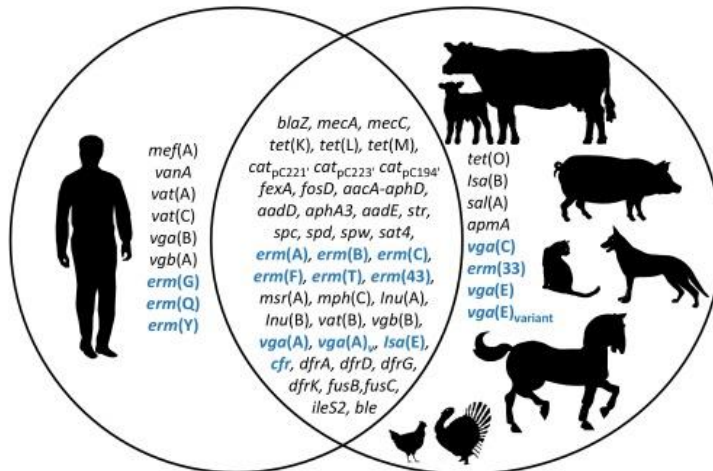
## Multidrug resistance genes in staphylococci from animals that confer resistance to critically and highly important antimicrobial agents in human medicine

Sarah Wendlandt<sup>1</sup>, Jianzhong Shen<sup>2</sup>, Kristina Kadlec<sup>1</sup>, Yang Wang<sup>2</sup>, Beibei Li<sup>3</sup>, Wan-Jiang Zhang<sup>4</sup>, Andrea T. Feßler<sup>1</sup>, Congming Wu<sup>5</sup>, and Stefan Schwarz<sup>1</sup>



Staphylococci from humans

Staphylococci from animals



TRENDS in Microbiology

# Como organizar a pesquisa para responder a complexidade do problema?

**Engajamento na FT global**

**Interdisciplinaridade**

**Diagnóstico**

**Identificação de GAPs específicos**

**Avançar da pesquisa descritiva**

**Análise de risco**

**Ação interministerial: Oficina MS;MAPA, MMA**

**Captação de recursos**

**Etc; etc, etc.....**



Obrigada pela  
atenção!



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