



Preventing community and nosocomial spread and infection with MRSA ST398

Methicillin-resistant *Staphylococcus aureus*

What is MRSA?

Methicillin Resistant *Staphylococcus aureus* (MRSA) are *S. aureus* bacteria that have developed resistance to methicillin and related antibiotics used for treatment. These bacteria are commonly associated with humans and can cause infection in hospitals (Hospital acquired-MRSA) and the community (Community acquired-MRSA). *S. aureus* also causes diseases in animals. Since 2003, a new MRSA strain associated with livestock (LA-MRSA, ST398) has been reported from several countries in farm animals, mainly swine, and persons in contact with these animals.

Why is LA-MRSA a concern?

LA-MRSA represents a concern in both animal and human health. The ability of this strain to spread to different animal species, colonize them and subsequently enter the food chain has been documented, although the role of food as source of human contamination is unknown. Transmission from colonized animals to humans has been reported. This strain may spread into the human community and enter into hospitals representing a potential health threat. Cooperation between veterinary and medical professions is vital to control, manage and minimise the spread of LA-MRSA.

The European Food Safety Authority (EFSA) has published the first EU-wide survey on MRSA prevalence in holdings with breeding pigs. The survey shows that MRSA ST398 is the predominant MRSA lineage in the holdings with breeding pigs in the European Union.

Prevalence of MRSA (Breeding Holding / Production Holding)		
	% ST 398	% other
European Union	13.1 / 25.5	0.8 / 1.4
Belgium	40 / 35.9	0 / 0
Germany	43.5 / 37.4	0 / 3.9
Italy	14 / 21.6	20.9 / 12.3
Luxembourg	0 / 36.6	0 / 0
Netherlands	12.8 / 17.9	0 / 0.5
Portugal	14.7 / 11.8	0 / 0
Spain	46 / 50.2	0 / 0

EFSA, Journal 2009; 7(11):1376

LA-MRSA is a concern for Animals

Healthy colonized animals may act as an MRSA reservoir and source of transmission to other animals. In livestock, LA-MRSA, may cause mastitis, skin and soft tissue infection, having consequences for animal health, the food supply and the economy. Thus, measures for preventing and limiting the spread of LA-MRSA in farm animals are necessary to promote the production of safe food and thereby protecting public health.

Humans

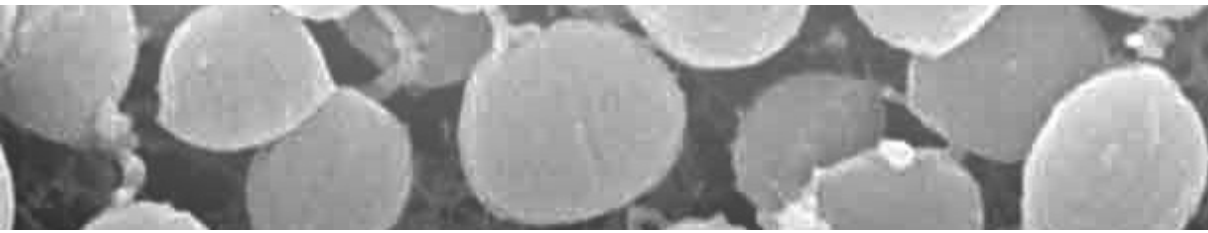
Persons in direct contact with MRSA-colonized livestock, such as farmers, veterinarians, workers at slaughterhouses and transporters of livestock are at high risk of becoming colonized with MRSA. In turn, they may become a source of transmission to animals and other humans. Subsequent contact with household members may transfer the bacteria. The incidence of transmission inside and outside farm settings requires further investigation.

Community

At present, the extent of LA-MRSA spread within the community, for example by close contact in sports clubs, schools and day care centres, remains to be investigated. Understanding the spread of LA-MRSA into the general population without exposure to farm animals will help in the fight against MRSA.

Health Care Setting

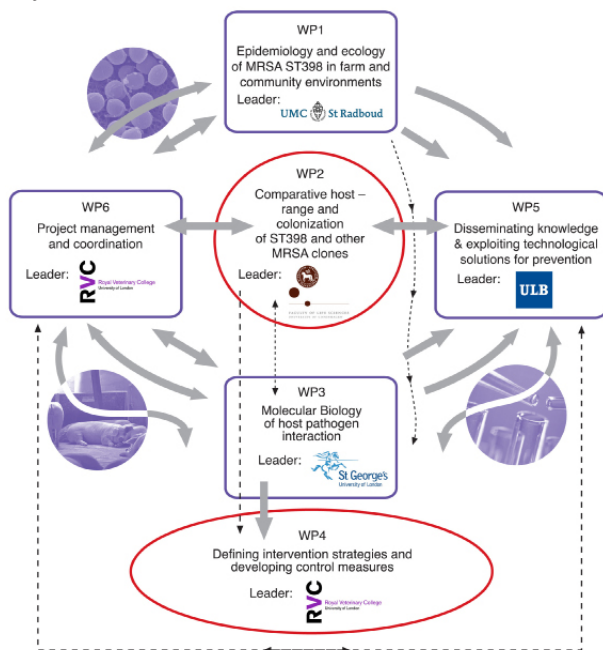
When patients colonized with LA-MRSA are admitted to hospitals, it may spread to other patients and health care workers with important health consequences. The role of persons in direct or indirect contact with farm animals as a possible source of nosocomial infection needs clarification. Screening strategy and infection control measures are risk management activities that limit the spread of LA-MRSA in health care facilities.



Background Information

PILGRIM - the project

The project is structured into four research work packages (WPs), one dissemination and exploitation WP and the project management WP. Each WP has a leader who coordinates the WP efforts and assures the links with other WPs. The research work is structured around epidemiological and physiological studies, *in vivo* and *in vitro* experiments and molecular/genetic analysis.



Project Objectives

The PILGRIM project will provide novel control measures for the accelerated identification and control of LA-MRSA ST398. A series of epidemiological, physiological and molecular studies of this organism will be conducted to:

- Investigate its biology and ecology.
- Identify and characterise risk factors and transmission pathways between animals and humans and amongst humans.
- Establish genetic differences, host-ranges and virulence of adhesive and non-adhesive strains, as well as differences between LA-MRSA ST398 and other MRSA.
- Identify genes for the development of new rapid tests for

the identification of specific MRSA strains.

- Provide a Technology Testing Platform for developing and assessing decolonisation and environmental sanitation approaches.
- Integrate results in policy and practice guidelines.

Expected Outcome

PILGRIM research will provide the following outcomes:

- Determination of interactions between surface proteins of host-adapted lineages of *S. aureus* and host cells.
- Identification of surface structures as targets for therapeutic interventions providing opportunities for the pharmaceutical industry.
- Development of new diagnostic tools for rapid identification of MRSA lineages using PCR technology.
- Support of risk assessment and risk management of LA-MRSA ST398, other MRSA and resistant bacteria

Project Coordinator

Prof. Katharina Stärk

The Royal Veterinary College, London, UK

Project Partners

- accelopment AG, CH
- AguaCure Ltd, UK
- Centrum voor Onderzoek in de Diergeneeskunde en Agrochemie, BE
- Erasmus University Medical Center, NL
- Institute of Chemical Technology, Prague, CZ
- Københavns Universitet, DK
- National Institute of Public Health and Environment, NL
- Statens Serum Institut, DK
- St George's Hospital Medical School, UK
- Radboud University Nijmegen Medical Center, NL
- Université libre de Bruxelles - Hôpital Erasme, BE

Contact

Internet: www.fp7-pilgrim.eu

Email: contact@fp7-pilgrim.eu