A consortium of leading international researchers in antimicrobial resistance

The SATURN project, coordinated by **Prof. Stephan Harbarth (University of Geneva)** unites the best expertise in the field of antimicrobial resistance.
The consortium brings together 13 partners from **11 countries** which are members or associated states of the EU.
In addition to these partners, the project will interact with hospitals (subcontractors) throughout Europe for the SATURN ICU-trial.

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SATURN

IMPACT OF SPECIFIC ANTIBIOTIC THERAPIES ON THE PREVALENCE OF HUMAN HOST RESISTANT BACTERIA

The SATURN project has received funding from the European Community's Seventh Framework Programme [FP7/2007-2013] under Grant Agreement n°241796

SATURN at a glance

SATURN will study the **impact of antibiotic exposure on antimicrobial resistance** (AMR) with a **multidisciplinary approach** that bridges **microbiological, clinical, epidemiological and pharmacological research.** SATURN will improve methodological standards and conduct research to better understand the impact of antibiotic use on acquisition, selection and transmission of antibiotic-resistant bacteria in different environments, by combining state-of-the-art analyses of molecular, ecologic and individual patient-level data. The proposed program and anticipated results will **help reduce the burden of AMR in Europe** and guide both clinical decision making and policy decisions in this area.

Starting date: January 1, 2010

Term: 5 years

Coordinator: University of Geneva (Stephan Harbarth)

Partners: Clinicians, microbiologists and epidemiologists, pharmacologists and infectious disease specialists, caregivers in inpatient care and outpatient clinics. The SATURN consortium is made of 13 partners from 11 countries which include Switzerland, Germany, Poland, Netherlands, Belgium, France, Spain, Italy, Serbia, Romania and Israel.

Budget: A total Budget of 7.8 M€ and a funding support of 6 M€ from the European Commission's 7th Framework Programme

Why the SATURN programme?

The emergence and spread of human pathogenic bacteria resistant to antibiotics has become a major problem in the past fifty years. **Antimicrobial Resistance** (AMR) is rampant among bacteria that cause healthcare- and community-acquired infections, driving up costs and increasing the difficulty of therapeutic management. Molecular and patient-level investigations are necessary **to better elucidate the** time-varying and heterogeneous **role of antibiotic selection pressure on emergence and selection of AMR.**

What are SATURN's objectives?

SATURN aims at **defining strategies** to improve the knowledge about **antibiotic selection pressure and judicious antibiotic use.** One intervention study and three observational clinical studies will be conducted that will produce demonstrable improvements over previously generated evidence regarding the effect of antibiotic exposure and selection pressure on acquisition, selection and transmission of antibiotic-resistant bacteria within hospital and community settings. Molecular and pharmacologic issues generated by the four clinical studies will be also addressed.

What are SATURN's expected results?

The SATURN program will provide a comprehensive **knowledge base on the effect of various antibiotic classes, duration of treatment, order of treatment and dosage on AMR in the community, general hospital wards and in intensive care units.** This comprehensive data will be generated at the individual level for both colonised and non-colonised patients and at the ecological (i.e. ward) level.
Moreover, SATURN will provide **data on the effects of antibiotics on resistance both at the human host and at the bacterial level.** Combining the results of epidemiological investigations with microbiological and molecular studies on epidemicity, virulence and fitness of strains will provide data for action.

What is SATURN's strategy?

SATURN comprises the following studies:

- A randomised multi-facility **intervention study** in the ICU setting will be performed to resolve an issue of high controversy: **antibiotic cycling vs. mixing.**
- **Three observational studies** will be conducted to study important issues surrounding the effect of antibiotic usage that are not easily assessable through randomised controlled trials, due to the **problem of rare outcomes and sample size requirements.**
- **Molecular studies** will generate new evidence about the **changes effected by antibiotic therapy** on commensal organisms or opportunistic pathogens in the oropharyngeal, nasal and gastro-intestinal flora and study AMR mechanisms and the dissemination of successful clones of fluoroquinolone-resistant, carbapenem-resistant or extended-spectrum beta-lactamase harboring Gram-negative bacteria, MRSA and fluoroquinolone-resistant viridans streptococci.
- A **pharmacodynamic study** will model the **relationships between antibiotic exposure and AMR emergence** over time for various classes of agents.