Utrecht University

One Health
Utrecht:
from molecule
to population

Utrecht University:
creating impact in One Health

Utrecht University is one of Europe's leading research universities and a member of the League of European Research Universities. It is recognised internationally for its high quality and innovative approach to research and education. Founded in 1636, the University has always placed a strong focus on excellent science and is now operating at the forefront of the international academic field. According to the 2014 Academic Ranking of World Universities (Shanghai Jiao Tong), Utrecht University is ranked 57th in the world, 16th in Europe, and 1st in the Netherlands.

With a population density of 406 people per km2 – 497 if water is excluded – the Netherlands is a small and very densely populated country. Only Bangladesh, South Korea and Taiwan have both a larger population and a higher population density. Nevertheless, the Netherlands is the world's second largest exporter of food and agriculture products after the United States.

Just imagine…

- Almost 17 million people
- 12 million pigs
- 97 million chickens
- 1.5 million dairy cows
- 1 million veal calves
- 1 million fur animals
- 6 million pets
- 130,000 horses
- A large wildlife population

…all living in close harmony in the Netherlands.

The health of both humans and animals, sharing the same limited space and with competing claims on sustainable animal production, must be considered as a grand challenge for the near future. Utrecht University has been playing a major role in preventing and overcoming One Health risks in the Netherlands and will be pleased to share its experiences, know-how and facilities with the world.

The University is also home to the only Faculty of Veterinary Medicine in the Netherlands. Given the intimate relationship between animal and human health and the environment, the joint research programmes of the Faculty of Veterinary Medicine, the Faculty of Science and UMC Utrecht constitute a unique centre of excellence for One Health/One Medicine. To generate impact, we have compiled a substantial and multidisciplinary One Health Programme as one of the main pillars of Utrecht University's strategic research theme Life Sciences and the Utrecht Life Sciences network. Moreover, One Health is one of the drivers of the regional socio-economic agenda of the Economic Board Utrecht, with the aim of creating shared value for all stakeholders while simultaneously providing economic and societal benefit. In collaboration with our public and private partners, we focus on the prevention of and fight against existing and emerging infectious diseases – both in humans and animals – including zoonoses and food safety pathogens, on the prevention and control of antimicrobial resistance and on overcoming environmental risks.

Human and veterinary medicine are closely intertwined at Utrecht Science Park, emphasising basic biomedical research, the development of solutions, clinical care and the development of policy and legislation. This extends to areas such as vaccination technology, cell biology, biochemistry, regenerative medicine and oncology. Insights from the field of veterinary medicine can serve as a source of innovation for human medicine and vice versa. By building bridges and working in public-private partnerships between academia and industry, Utrecht University is taking on its responsibility to find answers to the world's grand challenges.

Utrecht Centre of Excellence for Affordable Biotherapeutics

Utrecht University has established the Utrecht Centre of Excellence for Affordable Biotherapeutics Foundation (UCAB) which facilitates the development, production and distribution of high quality and affordable medicines in developing countries. One of the tasks is the transfer of technology to private parties who produce the medicines under the auspices of the World Health Organisation. The first medicine that UCAB is focusing on is palivizumab, a drug for a serious respiratory infection (RS virus) that primarily affects premature infants. UCAB will be located at the Utrecht Science Park.

RESEARCH FOCUS: One health THEMES:

From molecule to population

Controlling infectious diseases

Infectious diseases pose a major problem for both human and animal health. In the near future possibly 75% of all infectious diseases will be of zoonotic origin (transmitted from animals to humans) or vector-borne. In our One Health Programme we try to prevent and intervene in the introduction and transmission of existing and emerging zoonoses (e.g. avian influenza). There is still a lot that can be improved in relation to controlling the risks associated with current and future infectious diseases, both in humans and animals. In this respect Utrecht University advocates the development and application of dedicated vaccines, smart interventions and safe and effective therapeutics.

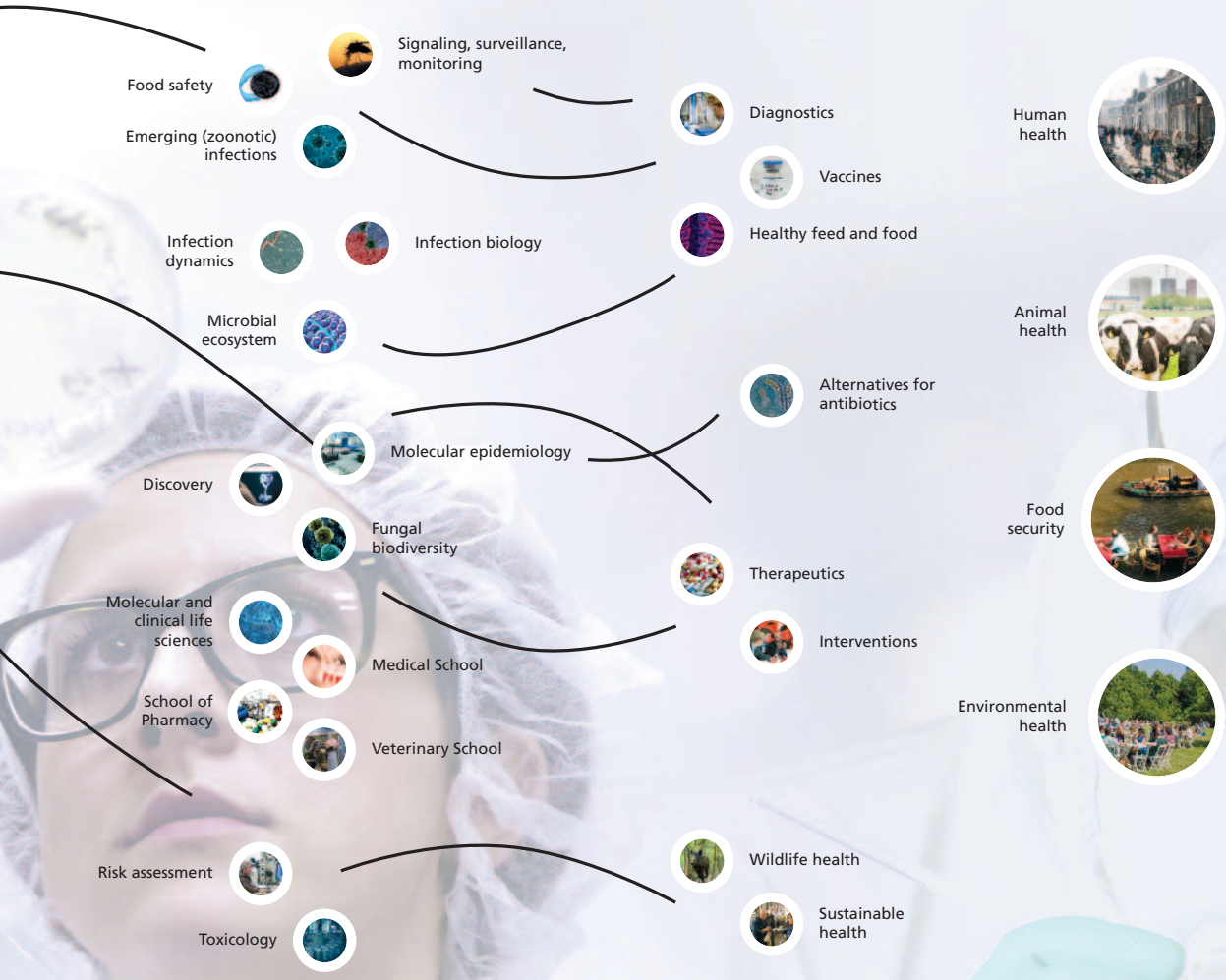
Challenging antimicrobial resistance

Micro-organisms are a constant challenge to human and animal health, generally treated with antimicrobial therapies. However, the increase in antimicrobial resistance poses one of the major risks to health care worldwide. In Utrecht we try to unravel the mechanisms behind the development of antimicrobial resistance and the spread of antimicrobial resistant genes, including the transmission of resistant pathogens between humans and animals. This knowledge is essential to interventions. Utrecht University is a leader in the molecular epidemiology of antimicrobial resistance and the development of alternatives to antimicrobials, such as vaccines and the use of microbes beneficial to the health and wellbeing of humans and animals.

Famous collection of fungi, yeasts, and bacteria

The Fungal Biodiversity Centre (CBS-KNAW) hosts a world-renowned collection of more than 80,000 living fungi, yeasts and bacteria. In its diversity of species it is unrivalled as a reference centre for mycological research. Fungi may cause diseases of plants, animals and people. The Fungal Biodiversity Centre conducts innovative mycological research, examines fungal properties and develops novel fungal applications and solutions to societal challenges based on the fungi's unique genetic resources. The centre's large collection and metadata are used intensively by public and private parties.

SCIENTIFIC DOMAINS: SOLUTIONS: TARGETS:



Health risks from livestock farming

Residents of urban areas living close to livestock farming may be exposed to potentially harmful infectious and drug resistant micro-organisms, as well as gases and dust particles containing toxins. What are the health risks for people working at or living near a pig or poultry farm? There is little scientific information about environmental health effects for neighbouring residents, but the available literature suggests several potential health risks, such as zoonoses, the spread of antimicrobial resistance and respiratory problems due to fine particles. In Utrecht we investigate the risks of environmental exposure to livestock farming emissions in the Netherlands and the possibilities for intervention.

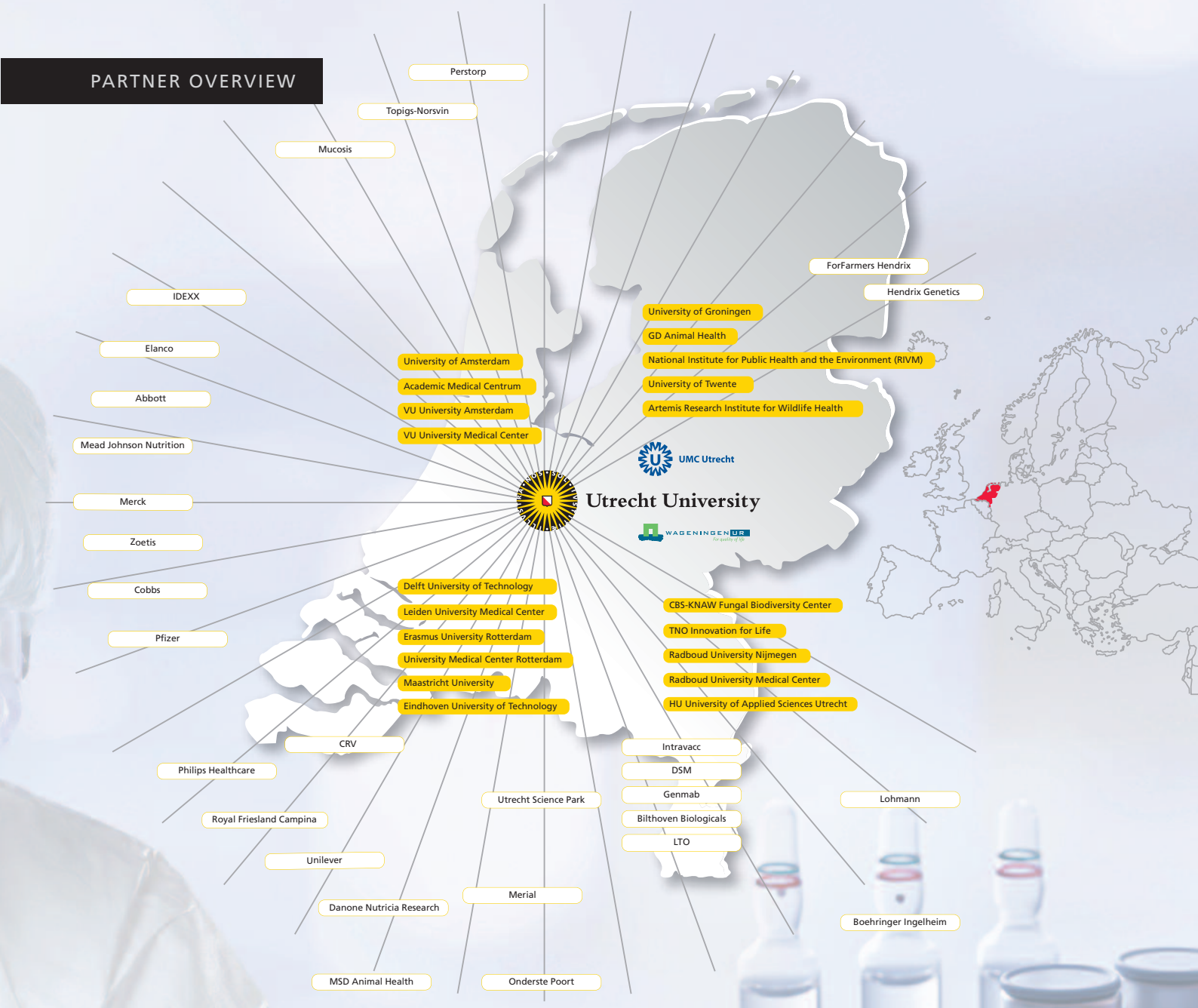
Vaccines against zoonoses

Collaboration between the worlds of veterinary and human health, both academically, governmentally and industrially, is extremely important for the control of zoonoses. According to Utrecht University researchers, in many cases humans can best be protected by vaccinating animals. Castellum is a large public-private partnership that develops marketable vaccines against emerging zoonoses. Castellum's partners are the National Institute for Public Health and the Environment, MSD Animal Health, Utrecht University and the Central Veterinary Institute. Castellum also features in the realisation of the necessary research infrastructure in the Netherlands (Biosafety Level 3, large animal facilities and laboratories).

Alternatives to antibiotics

The innate immune systems of humans and animals provide the first barrier of defence against pathogens. The immune system is ready to be mobilized upon the first signs of infection and plays a vital role in host defence. ALTANT (ALTernatives to ANTibiotics) is a collaborative research programme between academic and business partners that is helping to develop new alternatives to antibiotic use in veterinary health care. ALTANT brings together a multidisciplinary, high calibre research team to investigate the use of new classes of peptides that have shown to have profound antimicrobial and immunomodulatory effects. Partners of ALTANT are the Faculty of Veterinary Medicine, ImmunoValley, Zoetis and the Ministry of Economic Affairs.

PARTNER OVERVIEW



Combatting bacterial resistance in Europe

Antimicrobial resistance represents a growing threat to human and animal health worldwide and, consequently, there is an urgent need for new medicines to treat resistant infections. The COMBACTE project (Combatting Bacterial Resistance in Europe) boosts antibiotic drug development by pioneering new ways of designing and implementing efficient clinical trials for novel antibiotics. COMBACTE is part of the New Drugs for Bad Bugs (ND4BB) initiative, a large European programme to tackle antimicrobial resistance.

Antimicrobial resistance in bacteria

Utrecht University's EFFORT project (Ecology from Farm to Fork of microbial drug resistance and transmission) studies antimicrobial resistance in bacteria, which is currently one of the main threats to public health. Academic and business partners from ten countries are working together in the EFFORT project to provide the animal production sectors and policymakers with evidence-based information about antimicrobial resistance. This will ultimately support sustainable animal production with minimal risk to public health.

Wildlife health in the Netherlands

The Dutch Wildlife Health Centre (DWHC) helps to enhance knowledge and expertise in wildlife health in the Netherlands. Infections and diseases in wild animals may be transmitted to humans or other animals and vice versa. The DWHC, founded in 2002 with support of the Ministry of Economic Affairs and the Ministry of Health, Welfare and Sport, is located at Utrecht's Faculty of Veterinary Medicine. The DWHC conducts an extensive early warning and surveillance programme and provides essential information for the Dutch signalling infrastructure. The centre provides scientific information to assist political and practical decision-making concerning public health, wild and domestic animal health and nature conservation issues.

Facts and figures 2014

Utrecht University

ORGANISATION

7 Faculties:

Geosciences, Humanities, Law, Economics and Governance Medicine, Science, Social and Behavioural Sciences, Veterinary Medicine

7 Graduate Schools

4 Campuses

6,500 staff members

(excl. the Faculty of Medicine/UMC Utrecht and the staff of Roosevelt Academy or casual workers)

BUDGET

€766 million

Member of the League of European Research Universities (LERU) a partnership of Europe's top research universities that includes the universities of Oxford, Cambridge, Imperial College London, Heidelberg, Sorbonne-Paris and others (www.leru.org).

FOUNDED

1636

EDUCATION

30,000 students

1,700 international students

120 nationalities

2,600 PhD candidates

More than 2,000 courses taught in English

The widest range of graduate programmes taught in English in the Netherlands
Europe's largest academic summer school

INTERNATIONAL RANKINGS

According to the 2014 Academic Ranking of World Universities (Shanghai Jiao Tong):

57th in the world

16th in Europe

1st in the Netherlands

SOME OF OUR NOBEL PRIZE LAUREATES

1999 Gerard 't Hooft (Physics)
1999 Martinus J.G. Veltman (Physics)
1995 Paul Josef Crutzen (Chemistry)
1981 Nicolaas Bloembergen (Physics)
1975 Tjalling Charles Koopmans (Economics)

University Medical Center Utrecht

BUDGET

€1,060 million

STAFF

Total number of staff members: 11,210

PATIENT CARE

Number of beds: 1,042

Admissions: 31,924

Days of care: 233,985

Daycare: 31,924

Operations: 21,633

Outpatient first clinic visits: 131,649

Accident & Emergency visits: 21,343

UMC Utrecht

Utrecht University

For further information

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UTRECHT SCIENCE PARK

COLOFON

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