

**44. Jahrestagung
der Österreichischen Gesellschaft
für Tropenmedizin und Parasitologie
Geographic Medicine & Global Health**



Programm  *Abstracts*

Graz, Meerscheinschloss
18. – 20. November 2010

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Graz, 18. bis 20. November 2010
Meerscheinschloss



**44. Jahrestagung der
Österreichischen Gesellschaft für Tropenmedizin
und Parasitologie
Geographic Medicine & Global Health**

Programm
Kurzfassung der Vorträge
(Abstracts)¹
Kurzfassung der Posterbeiträge
(Abstracts)¹

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¹ Die eingelangten Kurzfassungen sind alphabetisch (Erstautor) geordnet

THURSDAY, NOVEMBER 18TH

08.30 – 09.30 Entrance into the Meerscheinschloss and registration

09.30 – 09.45 **WELCOME ADDRESS**

Univ.-Prof. Dr. Gilbert REIBNEGGER (Vice Rector of the Medical University Graz)

Univ.-Prof. DDr. Egon MARTH (Head of the Institute of Hygiene, Microbiology and Environmental Medicine of the Medical University Graz)

Univ.-Prof. Dr. Ursula WIEDERMANN-SCHMIDT (President of the

ÖGTP)

09.45 – 11.00 **ZOONOSES AND TRAVELLING**

Chair: Univ.-Prof. Dr. A. JOACHIM & Univ.-Prof. Dr. D. OTRANTO

PLENARY LECTURE

Prof. Dr. **Domenico OTRANTO (Bari University):**

Leishmaniosis and other vector-borne diseases

Katja SILBERMAYR, K. HACKLÄNDER, C. DOSCHER, J. KÖFER, K. FUCHS:
A spatial assessment of *Culicoides* spp. distribution and bluetongue disease risk areas in Austria

J. Michael MÜHLEGGGER, F. JIRSA, C. FRANK:

Parasites of the mallard *Anas platyrhynchos* from eastern Austria – preliminary results

11.00 – 11.30 *Coffee break*

11.30 – 12.30 **MODELLING IN PARASITISM**

Chair: Dr. A. WAGNER & Mag. Dr. G. DUSCHER

Simone GABNER, K. WITTER, C. GAISWINKLER, H.L. WORLICZEK, Z. TONAR, A. JOACHIM:

Immunohistochemistry as a tool for analysing the immune response in the intestine, taking porcine isosporosis as an example

K. ROBISCH, Georg DUSCHER, A. JOACHIM:

Tick removal – A matter of removal instruments and/or pulling or twisting?

Simone KOGER*, S. GABNER, K. WITTER, A. JOACHIM:

Whole-mount preparations of the intestinal mucosa as a tool for immunological studies

IRMA SCHABUSSOVA, A. JOACHIM, B. RUTTKOWSKI, U. WIEDERMANN-SCHMIDT:

Oesophagostomum dentatum suppresses allergen-specific immune responses in a mouse model of birch pollen allergy

12.30 – 13.00 **„HISTORIC DOCUMENTS“**

Wolfgang BOMMER (presenting a 16mm film, approx. 20 minutes)

Masanga – The Swedish Leprosy Hospital in Sierra Leone, West Africa

13.00 – 14.00 *Lunch break*

14.00 – 15.30 MOLECULAR PARASITOLOGY

Chair: Univ.-Doz. Mag. Dr. J. WALOCHNIK & Univ.-Prof. Dr. M. DUCHÊNE

David LEITSCH, D. KOLARICH, M. DUCHÊNE:

The biochemical foundations of metronidazole resistance in *Trichomonas vaginalis* clinical isolates

Mirjana DRINIC, F. ASTLBAUER, A. RANINGER, D. LEITSCH, W.H. WERNSDORFER, B. BREM, A. OBWALLER, J. WALOCHNIK, H. GREGER, M. DUCHÊNE:

Anti-amoebic and anti-giardial activity of substances derived from tropical plants

Florian ASTELBAUER*, W.H. WERNSDORFER, H. GREGER, K. CONGPUONG, J. WALOCHNIK, M. DUCHÊNE, A. OBWALLER, B. BREM, A. RANINGER, G. WERNSDORFER:

Antiplasmodial activity of structurally identified, plant-derived compounds

Michael SYROWATKA*, M. KRANZLER, W. CEES, D. LEITSCH, U. BLÄSI, J. WALOCHNIK:

Trichomonas vaginalis: Efficacy of Pentamycin and Possible Resistance

Hans-Peter FÜHRER, V.E. HABLER, P. STARZENGRUBER, P. SWOBODA, M. FALLY, J. WALOCHNIK, H. NOEDL:

Molecular epidemiology of *Plasmodium ovale* and *Plasmodium malariae* in Bangladesh

15.30 – 16.00 *Coffee break*

16.00 – 17.30 **PROBLEME BEI DER INTERPRETATION SCHWIERIGER LABORATORIUMSDIAGNOSTISCHER BEFUNDE IN MIKROBIOLOGIE UND PARASITOLOGIE (Symposium von INSTAND/WHO und ÖQUASTA – in German language)**

Chair: Prof. Dr. K. JANITSCHKE & Univ.-Prof. Dr. H. ASPÖCK

Heinz ZEICHHARDT (Berlin):

Probleme bei der Befundung von Hepatitiden und tropischen Virusinfektionen

Harald MAUCH (Berlin):

Fehler und resultierende Schwierigkeiten bei der mikrobiologisch-infektiologischen Diagnostik der Tuberkulose

Julia WALOCHNIK (Wien):

Knifflige Leishmaniose-Fälle

Herbert AUER (Wien):

Toxoplasmosediagnostik und Interpretation

Sven POPPERT (Hamburg):

Diagnostik der Dirofilariosen

18.00 „Come together“ at the Meerscheinschloss

FRIDAY, NOVEMBER 19TH

08.30 – 09.00 Entrance into the Meerscheinschloss and registration

09.00 – 11.15 **GEOGRAPHIC MEDICINE**

Chair: Univ.-Prof. Dr. U. WIEDERMANN-SCHMIDT & Univ.-Prof. Dr. S. WINKLER

PLENARY LECTURE

Dr. Ron BEHRENS (London School of Hygiene & Tropical Medicine):

The changing epidemiology of malaria in travellers and its impact on prophylaxis policy and recommendations

Jessika WEINGAST: Telemedicine

Robert LOEWE: Geographic Dermatology

Stefan WINKLER: Immunodiagnosis of tuberculosis

Michael RAMHARTER: Development Cooperation as Potential Focus for the Centre for Geographic Medicine

Harald NOEDL: Tropical Medicine in Bangladesh (MARIB)

Talin BARISANI-ASENBAUER: Geographic Ophthalmology

Georg ROSENMAYR, C. HUPIN, M. TANTI, N. FAURE, A. DIA, V. POMMIER

DE SANTI, A.M. DI LANDRO-GILLET: Health risks for global travellers: knowledge management for governmental and individual use

11.15 – 11.45 *Coffee break*

11.45 – 13.15 **CLINICAL TROPICAL MEDICINE (INCL. MALARIA)**

Chair: Univ.-Prof. Dr. E. SCHMUTZHARD & Univ.-Prof. Dr. W.H. WERNSDORFER

S. AGNANDJI, S. BELARD, F. KURTH, P.G. KREMSNER,

Michael RAMHARTER:

Current status of the clinical development and implementation of paediatric antimalarials

Martin HÖNIGL, H.J.F. SALZER, I. ZOLLNER-SCHWETZ, T. VALENTIN, H. FLICK, J. POLACHOVA, R. KRAUSE:

Asthma-like syndrome in a previously healthy Austrian traveller returning from Thailand

Bernd WALLNER*, K. FRIEDRICH, B. PFAUSLER, I. UNTERBERGER, W. MATUJA, A. KIDUNDA, C. NEWTON, L. JILEK-AALL, A. WINKLER, E. SCHMUTZHARD:

Head Nodding Syndrom - 4 years follow-up: Semiology, EEG and Video of an unusual seizure type in Tanzania

Robert AIGNER*, D. DHUNGANA, E. SCHMUTZHARD:

Evaluation of Epilepsy Data of the Nepal Epilepsy Association, Kathmandu – a retrospective neurological analysis

Gernot MÜLLER, F. THALLER, C. WENISCH:

Isospora belli infection in a 40 year old HIV positive Chechen refugee

13.15 – 14.15 *Lunch break*

14.15 – 15.15 **guided POSTERSESSION I** (at the Foyer) related to the topics Veterinary Medicine and Medicine in General

Veterinary Medicine (Chair: HR Dr. H. SATTMANN):

- VET 1 **Vitomir DJOKIC***, A. NIKOLIC, I. KLUN, B. BOBIC, V. IVOVIC,
M. VUJANIC, T. ZIVKOVIC, O. DJURKOVIC-DJAKOVIC:
Application of GIS in mapping geohelminth parasites in Serbia
- VET 2 **Éva FOK**, O. JACSO, I. KUCSERA:
Dirofilarioses in Hungary nowadays
- VET 3 **Andreas R. HASSL**:
Intestinal Parasites of Pet Leopard geckos
- VET 4 **Michaela LECHNER***:
Parasitic diseases of human and veterinary importance in Zoo Hellbrunn, Salzburg
- VET 5 **Martin VISSER**, S. REHBEIN, C. MESSNER:
Severe infestation with fur mites (*Lynxacarus mustelae*) of a stone marten from Tyrol

Medicine in General (Chair: Univ. Prof. Dr. E. SCHMUTZHARD):

- MED 1 **Johnnie AKGÜN***, I. SCHABUSSOVA, K. PASCHINGER, I. WILSON,
U. WIEDERMANN-SCHMIDT:
Immunomodulatory properties of nematode-derived glycans – phosphocholine and fucose dependent effects
- MED 2 **Dinesh DHUNGANA***, R. AIGNER, E. SCHMUTZHARD:
Hospital-based prevalence of neurological diseases in Kathmandu Model hospital and comparison with Western Regional hospital in Nepal
- MED 3 **Dzenita HASANACEVIC***, M. BLASCHITZ, S. REHAK, A. INDRA,
J. WALOCHNIK:
Establishment of a reference database for *Legionella*, atypical Mycobacteria and *Acanthamoeba* using MALDI TOF MS (Matrix Assisted Laser Desorption Ionisation Time of Flight Mass Spectrometry)
- MED 4 **Julia MATT**, M. DUCHÊNE:
Characterization of DNase activity in *Entamoeba histolytica*
- MED 5 **Gernot MÜLLER**, P. PONGRATZ, E. WALLIS, C. WENISCH:
Wound Myiasis-infestation of ulcera prolonged by chronic venous insufficiency
- MED 6 **Aleksandra NIKOLIĆ**, I. KLUN, B. BOBIĆ, V. IVOVIĆ, M. VUJANIĆ, T. ŽIVKOVIĆ, V. DJOKIĆ, O. DJURKOVIĆ-DJAKOVIĆ:
Human Giardiasis in Serbia: Asymptomatic vs. Symptomatic Infection
- MED 7 **J.F. Helmut SALZER**, M. HOENIGL, M. SCHATZ, T. VALENTIN, I. ZOLLNER-SCHWETZ, E. RATSCHKE, R. KRAUSE:
Neurocysticercosis in an Austrian traveller after a trip to India
- MED 8 **Andrea SCHNEIDER**, G. WURM, S. DOPPLER, K. NUßBAUMER, S. WEIS,
E. SZALAY, R. PICHLER:
Disease acquired in the tropics – is it tropical disease?
- MED 9 G. STEVANOVIĆ, M. PELEMIS, **Zorica DAKIĆ**, L. LAVADINOVIC,
B. MILOSEVIC, M. PAVLOVIC:
Treatment of patients with visceral leishmaniasis - problems and challenges

15.15 – 15.30 *Coffee break*

15.30 – 16.30 **guided POSTERSESSION II** (at the Foyer) related to the topics
Toxoplasmosis and Malaria

Toxoplasmosis (Chair: Univ. Prof. Dr. H. ASPÖCK):

- TOX 1 **Vladimir IVOVIĆ**, M. VUJANIĆ, M. KATARANOVSKI, A. NIKOLIĆ,
B. BOBIĆ, I. KLUN, I. VILLENA, D. KATARANOVSKI, O. DJURKOVIĆ-
DJAKOVIĆ:
Toxoplasmosis in naturally infected rodents in Belgrade, Serbia
- TOX 2 **Ivana KLUN**, A. NIKOLIĆ, B. BOBIĆ, V. IVOVIĆ, M. VUJANIĆ,
T. ŽIVKOVIĆ, V. DJOKIĆ, O. DJURKOVIĆ-DJAKOVIĆ:
Toxoplasma gondii infection in goats in Serbia (preliminary results)
- TOX 3 **Marija VUJANIĆ**, V. IVIVIĆ, A. NIKOLIĆ, B. BOBIĆ, I. KLUN,
T. ŽIVKOVIĆ, I. VILLENA, O. DJURKOVIĆ-DJAKOVIĆ:
First report of *Toxoplasma gondii* genotypes in Serbia
- TOX 4 **Angelika WAGNER**, I. SCHABUSSOVA, A. JOACHIM, U. WIEDERMANN-
SCHMIDT:
Tracking *Toxoplasma* induced cells with suppressive properties against allergy
- TOX 5 **Tijana ŽIVKOVIĆ**, V. IVOVIĆ, M. VUJANIĆ, I. KLUN, B. BOBIĆ,
A. NIKOLIĆ, O. DJURKOVIĆ-DJAKOVIĆ:
Absence of timely prenatal diagnosis of congenital toxoplasmosis can lead to fatal
fetal outcome – case report

Malaria (Chair: Univ.-Prof. Dr. P.G. KREMSNER):

- MAL 1 **Zorica DAKIĆ**, M. PELEMIŠ, O. DJURKOVIĆ-DJAKOVIĆ,
L. LAVADINOVIĆ, A. NIKOLIĆ, G. STEVANOVIĆ, J. POLUGA,
I. OFORI-BELIĆ, B. MILOŠEVIĆ, M. PAVLOVIĆ:
Imported malaria in Belgrade, Serbia, between 2001 and 2009
- MAL 2 **Deepa GANESH**, H. GSTACH, M. MASTALIR, H. NOEDL, S. WINKLER,
H.M. WINKLER, H.P. KAEHLIG, P. CHIBA:
Target identification of novel antimalarials by photolabelling and ligand capture:
development of tool compounds
- MAL 3 **Maria GRUBER***, W.H. WERNSDORFER, F. ASTELBAUER, H. GREGER,
K. CONGPUONG, M. DUCHÊNE, A. OBWALLER, B. BREM,
G. WERNSDORFER, J. WALOCHNIK:
Activity of plant-derived compounds against *Plasmodium vivax*
- MAL 4 **Verena HABLER**, H.P. FÜHRER, P. STARZENGRUBER, P. SWOBODA,
M. FALLY, J. WALOCHNIK, W.A. KHAN, E.B. YUNUS, H. NOEDL:
Molecular confirmation of high prevalence of asymptomatic malaria in Bangladesh
- MAL 5 **M. MÜLLER**, **Peter STARZENGRUBER**, H.P. FÜHRER, J. REISMANN,
P. SWOBODA, D. GANESH, W.A. KHAN, E.B. YUNUS, H. NOEDL:
Ex vivo drug interaction of tigecycline with dihydroartemisinin and chloroquine in
clinical field isolates of *Plasmodium falciparum*
- MAL 6 **Peter PONGRATZ***, F. KURTH, P.G. KREMSNER, M. RAMHARTER:
In vitro activity of antifungal agents against *Plasmodium falciparum* field isolates
- MAL 7 **J. REISMANN**, **Peter STARZENGRUBER**, H.P. FÜHRER, M. MÜLLER,
P. SWOBODA, D. GANESH, W.A. KHAN, E.B. YUNUS, H. NOEDL:
Minocycline drug interaction profile with dihydroartemisinin and chloroquine in
clinical field isolates of *Plasmodium falciparum* in Bangladesh

MAL 8 **Moritz TREIBER***, G. WERNSDORFER, U. WIEDERMANN-SCHMIDT,
K. CONGPUONG, J. SIRICHAISINTHOP, W.H. WERNSDORFER:
Sensitivity of *Plasmodium vivax* to chloroquine, mefloquine, artemisinin and
atovaquone in north-western Thailand

16.30 – 16.45 *Coffee break*

16.45 – 18.00 **EPIDEMIOLOGY/IMMUNOLOGY/VACCINOLOGY**

Chair: Univ.-Prof. Dr. T. BARISANI & Univ.-Doz. DDr. H. NOEDL

P. SWOBODA, **Peter STARZENGRUBER**, H.-P. FÜHRER, B. LEY, K.
THRIEMER, W.A. KHAN, E.B. YUNUS, H. NOEDL:

Dengue fever in rural Bangladesh

Branko BOBIC, I. KLUN, A. NIKOLIC, M. VUJANIC, T. ZIVKOVIC, V. IVOVIC,
V. DJOKIC, O. DJURKOVIC-DJAKOVIC:

Dynamics of *Toxoplasma* infection in the Balkans

Angelika WAGNER, B. WINKLER, I. SCHABUSSOVA, U. WIEDERMANN-
SCHMIDT:

The influence of the vaccines adjuvant system on allergic sensitisation

Maria PAULKE-KORINEK, P. RENDI-WAGNER, M. KUNDI, B. LAABER,
U. WIEDERMANN-SCHMIDT, H. KOLLARITSCH:

Booster vaccinations against tick-borne encephalitis: 6 years follow-up indicates long-
term protection

18.00 Casting of the ballots for the Junior Award/Poster Prize

19.00 WELCOME RECEPTION OF THE MAYOR

Rathaus Graz, Hauptplatz

19.30 HANDING OVER OF THE TRAVEL GRANTS

(courtesy of ÖGTP)

HANDING OVER OF THE JUNIOR-AWARD

(sponsored by Pfizer)

Lecturer with an asterisk * are registered for the „Junior-Award“

HANDING OVER OF THE POSTER-PREIS

(sponsored by Pfizer)

Poster with an asterisk * are registered for the „Poster-Preis“

21.00 JAZZKELLER Ulli Hahn Quintett, Gartengasse 11

SATURDAY, NOVEMBER 20TH

FORTBILDUNG ÄRZTE / APOTHEKER (in German language)

08.30 – 09.00 Entrance into the Meerscheinschloss and registration

09.00 – 10.30 „**HIGHLIGHTS**“ AUS DEM IMPFWESEN

Chair: Univ.-Prof. Dr. U. WIEDERMANN-SCHMIDT

Theresa POPOW-KRAUPP: Influenzaviren: Rückblickende Analyse und Vorausschau

Georg STEINDL: Menigokokkenepidemiologie 2009/2010 in Österreich

Egon MARTH: Immunität nach Infektion und Impfung: besteht ein Unterschied?

10.30 – 11.00 *Coffee break*

11.00 – 12.00 **MALARIA UPDATE** (sponsored by Sigma-Tau)

Chair: Univ.-Prof. Dr. H. KOLLARITSCH

Hans-Dieter NOTHDURFT: Update Prophylaxe und NSM

Harald NOEDL: State of the Art: Malariatherapie

12.15 – 13.30 **REISEMEDIZINISCHE SZENARIEN (QUIZ)** (sponsored by MSD)

Organisation/Moderation: Univ.-Prof. Dr. H. KOLLARITSCH & DDr. Martin HADITSCH

Starting with a Case Report of **Tamara SAVIC**, K. VANDER, E. RATSCHKE,
A. LASSACHER, G. HACKL, H. WURZER, A. BOGIATZIS

ca. 13.30 END

Current status of the clinical development and implementation of paediatric antimalarials

Selidji T Agnandji, Sabine B elard, Florian Kurth, Peter G. Kremsner, Michael Ramharter

¹ Medical Research Unit, Albert Schweitzer Hospital, Lambar en , Gabon

² Institute of Tropical Medicine, University of T bingen, Germany

³ Department of Medicine I, Division of Infectious Diseases and Tropical Medicine, Medical University of Vienna, Austria
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The clinical development of paediatric drug formulations of current first line antimalarials has been among the most important advances in the treatment of African children suffering from uncomplicated malaria in recent years. A variety of paediatric artemisinin combination therapies are currently investigated or already on the market in endemic regions including artemether-lumefantrine, artesunate-pyronaridine, artesunate-amodiaquine, dihydro-artemisinin-piperaquine, and artesunate-mefloquine.

Based on currently available evidence from controlled clinical trials we have shown that treatment with paediatric ACTs leads to significantly improved tolerability by reducing the occurrence of drug related vomiting, drug related gastrointestinal disorders and overall drug related adverse events. At the same time the efficacy of paediatric ACTs is comparable to tablet ACTs. Despite this appealing evidence from clinical trials paediatric ACTs have not yet found their place in international treatment recommendations and similarly national health authorities remain reluctant to change first line antimalarial treatment regimens. Nevertheless a broad range of paediatric ACTs are available at affordable prices in the private sector in large parts of Central Africa. Data of a cross sectional survey on the current status of implementation and use of paediatric ACTs in Central Africa show the likely future role of paediatric ACTs in the treatment of young children in endemic regions.

Evaluation of Epilepsy Data of the Nepal Epilepsy Association, Kathmandu - a retrospective neurological analysis

Robert Aigner, Dinesh Dhungana, Erich Schmutzhard

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Hitherto, only a few studies have been carried out on epilepsy or epileptic seizures in Nepal. The aim of this survey was to find out the predominant seizure types and their features as well as the most frequent etiological factors of epilepsy in Nepal. The study was performed at the Nepal Epilepsy Association (NEA) in the capital of Nepal - Kathmandu. It was founded in 1986 with the main purpose of treating epilepsy and generating public consciousness about epilepsy. Since then, patients from all over the country were referred to the NEA by doctors, hospitals or by people who had heard of the center. A total number of 573 patients were included in the study, examined during the period from 1992 to 2009. There was a considerable increase in patient numbers since 1996. 78,7% of patients, which makes up the vast majority, presented with generalized seizures. Partial seizures were observed in 96 cases (16,8%), while the seizure type of 26 patients (4,5%) could not be classified. In total 8 (1,4%) patients were diagnosed with simple partial seizures and 25 patients (4,4%) with complex partial seizures. 63 patients (11%) showed patterns of partial seizures with secondary generalization. Absence seizures amounted to 1,2% (7 cases). 3 cases (0,5%) were identified as myoclonic seizures. Only 1 patient (0,2%) manifested with clonic type of seizures and 13 patients (2,3%) with tonic type of seizures. Tonic-clonic seizures made up the largest part of seizures with 424 cases (74%). 31 tonic-clonic seizures (5,4%) occurred only during the nighttime and were classified as nocturnal tonic-clonic seizures. Finally 3 patients (0,5%) had atonic or astatic seizures. However, the patient's age when the first attack occurred was ranging from birth to 78 years with a mean age of 18 years in male and 14,5 years in female patients. 72% of all patients had the onset of seizures before the age of 20. A male preponderance was observed with 60,7% male patients 38,9% female patients. The male:female ratio amounted to 2:1,3. Furthermore this survey determined the frequency of seizure attacks, self injury during attack, duration of attack, aura before onset, suspected cause of seizures, investigations that were performed and EEG or CT findings. In only 23% of all cases (132 patients) a possible cause could be identified. Most frequent causes were family heredity (26,5%), head injury (22,7%) and febrile illness (11,4%). Neurocysticercosis was causative in 6,1%, which was very rare.

Antiplasmodial Activity of Structurally Identified, Plant-Derived Compounds

Florian Astelbauer¹, Walther H. Wernsdorfer¹, Harald Greger², Kanungnit Congpuong³, Julia Walochnik¹, Michael Duchêne¹, Andreas Obwaller⁴, Brigitte Brem², Adriane Raninger², Gunther Wernsdorfer⁵

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² Comparative and Ecological Phytochemistry, Faculty Center of Botany, University of Vienna, Austria

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Malaria remains a major public health problem in many tropical and subtropical countries, about 40% of the world's population living under malaria risk. To be successful, any attempt towards malaria elimination or eradication requires multipronged operational approaches, of which effective treatment of malaria is an essential part. However, resistance has invalidated many of the available drugs and, for various reasons, affordable new compounds are hardly in sight.

Realizing that two important antimalarial compounds, quinine and artemisinin, originate from plants, our group explored other structurally identified substances derived from higher tropical plants for their activity against *Plasmodium falciparum*, the cause of „tropical“ malaria.

The compounds were methylambullin, a sulfur-containing amide from *Glycosmis angustifolia*, methylgerambullin, a sulfone from *Glycosmis trichanthera*, sakambullin, a prenylated sulfonamide from *Glycosmis chlorosperma*, 5-hydroxynoracronycine, an acridone from *Atalantia rotundifolia*, yukocitrine, an acridone from *Glycosmis trichanthera*, and zanthobungeanine, a pyranoquinoline from *Glycosmis puberula*.

The specific sensitivity to these substances was assessed in 43 fresh isolates of *Plasmodium falciparum* from the area of Mae Sot, Thailand, measuring the inhibition of schizont maturation in vitro and using artemisinin as standard. Methylambullin was the least active compound (IC₅₀ = 4361 nM, IC₉₉ = 2.5 x 10⁹ nM), whereas all other compounds inhibited schizont maturation totally at concentrations ranging from 2426 nM to 2851 nM, i.e. similar to artemisinin with an MCOC of 2766 nM. The heterogeneity of the log-probit regressions was highest, albeit within the limits of acceptability, with artemisinin, while it was generally low with the test compounds. The slopes of the log-probit regressions were highest with methylambullin (298.6), followed by artemisinin (9.0), zanthobungeanine and sakambullin (5.4), methylgerambullin (5.1), yukocitrine (4.7) and 5-hydroxynoracronycine (4.3). The most active test compound was 5-hydroxynoracronycine, followed by methylgerambullin, yukocitrin, sakambullin and zanthobungeanine.

Serodiagnosis of *Toxoplasma* infections and interpretation of test results

Herbert Auer

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Diagnosis of human infections with *Toxoplasma gondii* are mainly based on the detection of specific IgM and IgG antibodies using different serological tests. In our department the indirect immunofluorescent test (IIFT) represents the basic test which detects IgM as well as IgG and IgA antibodies in gravid women. If the IIFT yields positive results specific IgM tests (Isaga M, ELFA M) and an IgG avidity will be carried out additionally. Using this test combination recent or latent infections with *Toxoplasma gondii* can be differentiated in nearly all cases. However, in a very few cases the interpretation of serological results is hampered by the fact that the status of the gravidity is often unknown on one hand and that tests produce results which do not allow a clear differentiation between recent and latent infection on the other hand. Our department started a comparative study with the department of pediatrics and adolescent medicine where the classic dye test (Sabin-Feldman-Test) as basic test is carried out. The results of this comparative study are presented.

Geographic Ophthalmology

Talin Barisani-Asenbauer

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The changing epidemiology of malaria in travellers and its impact on prophylaxis policy and recommendations

Ron Behrens

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Dr. Ron Behrens MD FRCP, Consultant physician, The Hospital for Tropical Diseases London

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The prevention of malaria in travellers is given a high priority when advising on travel to malaria endemic countries. The risk of malaria and the selection of and advice on appropriate preventative measures can take up to 13% of the consultation. There are many sources of information on malaria risk and national and international malaria guidelines are available for the health professional.

Recommendations are based on the risk of malaria against the benefits and risks of using malaria medication. Knowledge on malaria transmission and risk to the traveller is fundamental to policy makers and policy makers.

The epidemiology of malaria in endemic countries is based on WHO surveillance reports which are converted in to regional and international data and then interpreted by policy groups. The quality and accuracy of the locally collected malaria transmission is unclear and the WHO reports are often 5-8 years old.

Malaria transmission is not a static phenomenon and in many regions, there has been decline in local transmission consequent to effective malaria control.

I will explore the changing malaria epidemiology in Central and South America and in S-E Asia and identify the local epidemiological trends and risk to natives living in these endemic regions. I will then examine the changing pattern of malaria imported by travellers into Western countries and see if they correlate with the local trends and local transmission. I will examine if the changing epidemiology and malaria trends are reflected in national and international policy and explore the consequences of not adjusting recommendations to the trends in regional malaria. I will include some costing analysis to identify the economic impact of using preventative and treatment in travellers to low risk regions

Telemedicine

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Dynamics of *Toxoplasma* infection in the Balkans

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The clinical significance of toxoplasmosis, a globally distributed parasitic zoonosis, is defined by its role in perinatal pathology; maternal primary infection during pregnancy may cause congenital toxoplasmosis, a potentially serious clinical entity. The aim of this study was to assess the dynamics of *Toxoplasma* infection in women of childbearing age in the Balkans by comparing the results of local epidemiological studies published over the last decades.

Analysis showed a current regional seroprevalence of *Toxoplasma* infection of below 50% over the last ten years, ranging from 20% in Greece to 49% in Albania. However, a general trend of decrease in prevalence over time has been noted. *Toxoplasma* prevalence monitoring in generative age women has shown a decrease of prevalence in the last twenty years in Slovenia (from 49% to 25%), Serbia (86% to 31%), and Greece (36% to 21%), as well as in Montenegro from 2001-2007 (41% to 27%) and in FYR Macedonia from 2002-2005 (25% to 20%).

A decrease in the infection prevalence from the North to the South was confirmed in the eastern part of the Peninsula. In 1994, in southern Hungary (as a region neighbouring the Balkans at the North) it was 69%, in Serbia 53%, northern Greece 26%; in 2002, in Serbia 36%, FYR Macedonia 25%; and in 2004 in Serbia 32% and northern Greece 20%. More data is needed for a general conclusion on the whole of Balkan Peninsula.

Seasonality of infection, with significantly more cases of acute infection in the winter than in the summer months was described in Slovenia in the West and in Serbia in the East.

Consumption of undercooked meat was established as the leading transmission risk factor in Albania and Serbia, and contact with soil in FYR Macedonia. Contact with soil was associated with an increased risk of infection in northern Greece, and contact with cats in Slovenia.

While the general trend of a decreasing seroprevalence of *Toxoplasma* infection in the Balkans is in line with the overall trend in Europe, national strategies for the prevention of congenital toxoplasmosis should take this infection dynamics into account.

Masanga – The Swedish Leprosy Hospital in Sierra Leone, West Africa (16mm Film Presentation)

Wolfgang Bommer presents a 16mm film in English, approx. 15-20 minutes
Authors: Couple Dr. Kazen

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During our repeated stays in West Africa within the scope of partnerships of the universities of Marburg and later also Göttingen with the "Eastern Clinic" Mobai in Sierra Leone, my wife and I got to know the Swedish leprosy hospital Masanga and soon we were connected with the leading doctor Dr. Kazen and his wife friendly.

Both had developed together with their doctors and local employees an exemplary program against leprosy which connected the treatment of the illness with additional care, surgical rehabilitation and craft occupational support.

At the last meeting, not long before the civil war around the "blood diamonds" arose, our friends left the English version of the Masanga Film, which I own for some years now, so to speak, "on loan".

The contact with the Swedish hospital is interrupted since the warlike riots and the whereabouts of the married couple Dr. Kazen is unknown to us.

Anyhow the film is a remaining document. It was made with own staff and the leprosy patients.

Anti-amoebic and anti-giardial activity of substances derived from tropical plants

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Entamoeba histolytica and *Giardia intestinalis* present important health problems worldwide. *E. histolytica* causes amoebic colitis and liver abscess with incidence around 40 million infections per year and up to 100,000 deaths. *G. intestinalis* causes around 280 million symptomatic infections every year and has a high morbidity rate among children, due to persistent diarrhoea. The drug of choice for treatment of both parasites is metronidazol and although it has been used successfully for more than 40 years, it also possesses adverse properties such as potential teratogenicity. We therefore examined the anti-amoebic and anti-giardial activity of 14 newly isolated substances from tropical plants, from Rutaceae, Meliaceae and Stemonaceae. *E. histolytica* strain HM-1:IMSS and *G. intestinalis* strain WB C6 were grown anaerobically in 96-well microtiter plates. Tests were performed in triplicate and repeated three times, at compound concentrations between 1 µg/ml and 20 µg/ml. After 24 h and 48 h, life and dead cells were counted.

Methylgerambullin from *Glycosmis mauritiana* showed activity against both parasites. The mean EC50 values (24 h treatment) were 6.09 µg/ml for anti-amoebic and 6.14 µg/ml for anti-giardial activity. These values varied between the repeats, the activity being lower in freshly prepared media. This effect depended on the level of reduced cysteine in the medium, which is supported by testing methylgerambullin in four freshly prepared media with defined cysteine concentrations. This led to the hypothesis that chemical reaction of the compound with thiol groups in the parasite may be important for its mode of action. The effect of methylgerambullin on the *E. histolytica* proteome was analysed by two-dimensional gel electrophoresis. Four extra protein signals were reproducibly found in treated cells, which will be further explored.

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Molecular epidemiology of *Plasmodium ovale* and *P. malariae* in Bangladesh

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Malaria remains a major health issue throughout South and Southeast Asia. High standards in the diagnosis of the malaria-causing *Plasmodium* species are essential to control and adequately treat malaria. In spite of its known limitations microscopy remains the gold standard of malaria diagnosis in the field and frequently not even microscopy is available in resource-limited environments. This may lead to a significant underestimation of the true malaria burden, particularly of less prevalent and less documented species such as *P. ovale* and *P. malariae* in Asia. Both, *P. ovale* and *P. malariae*, are typically found at very low prevalences in Southeast Asia. *P. ovale* is known to be endemic in sub-Saharan Africa, the Middle East, Irian Jaya, and Papua New Guinea, but following the availability of PCR-based techniques for the diagnosis of malaria this parasite has recently also been reported from a number of countries in South and Southeast Asia. In South Asia infections with *P. ovale* had only been reported by a handful of groups (including our group in Bangladesh and another group in Gujarat in 2006). However, there remains a shortage of information regarding the distribution and variations of two out of four human pathogenic *Plasmodium* species endemic in South Asia.

Immunohistochemistry as a tool for analysing the immune response in the intestine, taking porcine isosporosis as an example

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Immunohistochemistry (IHC) can be used to detect and to quantify parasites as well as reactive immune cells in situ within single compartments of the affected organ. Certain technical questions have to be addressed first before host-parasite interactions can be analysed, as will be shown for porcine isosporosis in this study. First, an appropriate conservation technique for the tissue has to be found. As antibodies often do not work on formalin-fixed tissue, alternative conservation methods are necessary, especially for studying immune responses. In this study, three different conservation procedures were compared: formalin, the novel HOPE[®]-technique, and snap freezing. Of all antibodies used for identification of lymphocyte subpopulations, only anti-CD3, anti-CD45RC, and anti-Foxp3 could be used successfully after either conservation method. In order to analyse the influence of conservation on the quantity of detectable T cells, intestinal samples of 12 *I. suis*-infected piglets were stained immunohistochemically with the anti-CD3 antibody (T-cell marker). The quantity of T cells differed significantly between all three conservation techniques ($p = 0.022$, $p = 0.022$, and $p < 0.001$), with the highest amount of T cells in frozen tissue and the lowest in formalin-fixed samples. Only a weak correlation was detected between results obtained from formalin-fixed and frozen tissue. Since evaluation of the complete affected intestine (jejunum and ileum for isosporosis) is not feasible, the second question addressed in our study was the choice of one appropriate part of the intestine for further studies. Three parts of the jejunum (a proximal part - A, a middle part - B, and a distal part - C) of *I. suis*-infected piglets were compared. Significantly more T cells could be found in part B compared to part A. In conclusion, quantitative results obtained from different conservation techniques are generally not comparable and conservation of tissue should be standardised with regard to the antibodies that are to be used in the respective study. Similarly, the part of intestine chosen for quantitative studies should be determined in a pilot study, since different agents might affect intestinal regions differently. For quantification of immune cells in the intestine of *I. suis*-infected piglets, frozen mid-jejunum seems most suitable to obtain reproducible results.

This study was supported by the Vetmeduni Vienna Initiativkolleg „Host-pathogen interactions in the pig“, and Project KONTAKT ME09090 and Research Projects No. MSM4977751303 and MSM MSM0021620819 of the Ministry of Education, Youth and Sports of the Czech Republic.

Asthma-like syndrome in a previously healthy Austrian traveler returning from Thailand

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Background

Recently several studies have focused on the interaction between parasite infections and allergy. In a meta-analysis *Ascaris lumbricoides* eggs in stool samples were associated with an increased prevalence of asthma, whereas hookworm eggs were associated with a reduced prevalence. Tropical pulmonary eosinophilia is an occult form of human filariasis which has been increasingly reported from non-endemic countries due to increases in global travel and migration. Clinical manifestations of tropical pulmonary eosinophilia include airway hyperresponsiveness, manifesting as asthma-like syndrome. We report a case of asthma-like syndrome in a patient after travelling to Thailand.

Case Report

A 57-year old, previously healthy male patient presented with dyspnoea and cough to the pulmonology clinic. Four months before he had travelled to rural areas of Thailand for a total of 8 weeks, where he was working on fishponds without using insect repellents. Paroxysmal dyspnoea and cough as well as exanthema, which was advancing along the lymph stream developed about one week after returning to Austria. The latter resolved about two weeks later. Serology for filaria as well as ascaris was positive. The patient had quit smoking 20 years ago and serologic screenings for atopic disease as well as prick test were unremarkable. Peak flow protocol and histamin provocation revealed airway hyperresponsiveness, and budesonid / formoterol was initiated. The filarial antibody titer was increasing and therapy with diethylcarbamazine was initiated, and as the mazotti reaction (rising of eosinophils after therapy) was positive lymphatic filariasis was diagnosed. Consecutively over the next couple of months dyspnoea resolved, lung function test improved markedly, antiobstructive therapy was discontinued and the patient had no further complaints.

Conclusion

We report a case of asthma-like syndrome after lymphatic filariasis in a patient with a positive serology for ascaris as well.

Whole-mount preparations of the intestinal mucosa as a tool for immunological studies

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Whole-mounts use small organisms or part of organs for detection of structures or molecules. An advantage of this method is the possibility of quantification of rare cell populations that play an important role in research and diagnostics of illnesses. Detection of lymphocytes and their respective subpopulation is important as they perform essential tasks of the immune system. Due to partial formation of the immune system of young organisms or their small amount of cells the quantification of cells using histological sections is not possible. Therefore whole-mounts are necessary for some types of research studies.

The following hypotheses could partially be verified for the study of immunohistochemical detection of T-lymphocytes in the Tunica mucosa of pig's intestine:

- 1) Whole-mounts succeeded with formalin, methacarn and acetone as fixing agents. The preparation of the mucosa treated with formalin and methacarn turned out to be very successful; however preparation of acetone-fixed tissue was rather difficult.
- 2) Homogenous immunohistochemical staining could only be achieved with formalin- and acetone-fixed tissue; however, formalin-fixed material needed an additional preceding permeabilisation step. No antigen demasking was needed when the fixation time was short.
- 3) It is possible to keep fixed mucosa samples in PBS up to 14 days before immunohistochemical staining. The results of staining were not satisfactory or rather negative after storage in ethanol or dry storage.

The biochemical foundations of metronidazole resistance in *Trichomonas vaginalis* clinical isolates

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Trichomonas vaginalis is one of the most successful human parasites as it occurs ubiquitously and infects substantial proportions of female populations in many countries. Although trichomonosis not a fatal disease, it can be nevertheless debilitating and cause unfavourable pregnancy outcomes. Underlying *T. vaginalis* infections have also been suggested to greatly facilitate contraction of the HI virus. Treatment of *T. vaginalis* infections is exclusively based on 5-nitroimidazole drugs, especially metronidazole. Despite the overall high efficiency of this drug, resistance to metronidazole is not uncommon in *T. vaginalis*. However, metronidazole resistance in *T. vaginalis* clinical isolates becomes only manifest in the presence of oxygen which complicates their identification when applying standard laboratory protocols.

We have studied several metronidazole-resistant clinical isolates and compared them to normally metronidazole-susceptible isolates by application of proteomic and biochemical methods. Two enzyme activities are markedly down-regulated in metronidazole-resistant isolates: a flavin-reducing NADPH oxidase activity and another NADPH oxidase that reduces oxygen to water. Especially the deficiency of the latter enzyme leads to higher oxygen concentrations in the cell which prevent the reduction, and thereby the activation, of metronidazole.

Geographic Dermatology

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Infektion und Impfung: der kleine Unterschied

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Fehler und resultierende Schwierigkeiten bei der mikrobiologisch-infektiologischen Diagnostik der Tuberkulose

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Vielen Ärzten, auch mikrobiologisch tätigen Ärzten, sind Fehler häufig nicht bekannt, die bei der mikrobiologisch-infektiologischen Diagnostik der Tuberkulose (Tb) immer wieder auftreten und zu gravierenden Fehlentscheidungen führen können. Weltweit, wenn auch in Westeuropa prozentual weniger häufig, werden tausende Patienten in die Kliniken eingewiesen, isoliert und antituberkulös behandelt, Umgebungsuntersuchungen durchgeführt, ohne dass eine Tuberkulose vorliegt. Die Fehler sind häufig schwer zu erkennen.

Mikroskopie: Der Patient muss (in Deutschland) bei „Nachweis säurefester Stäbchen“ nach dem Infektionsschutzgesetz an das Gesundheitsamt mit Verdacht auf Tb gemeldet werden und wird dann häufig in die Klinik eingewiesen. Fehler: (1) Säurefeste Gebilde oder unspezifische Anfärbungen beim Fluoreszenztest werden als positive säurefeste Stäbchen mangels Erfahrung gedeutet und mitgeteilt, (2) charakteristische säurefeste Stäbchen sind keine Mykobakterien, (3) säurefeste Stäbchen sind Nicht-Tuberkulöse Mykobakterien (NTM) oder Nokardien, also keine Tb. Es ist auch als Fehler zu sehen, wenn bei (1) bis (3) nicht sofort eine Tb-PCR durchgeführt wird. (4) Objektträger werden bei der Anfertigung der Ausstriche vertauscht oder falsch beschriftet.

Mikroskopie, PCR, Kultur und Resistenztestung: (5) Die Probenbehälter oder Röhren werden auf Station oder im Labor vertauscht (6), falsche Etiketten werden auf die Röhren geklebt, z.B. auf Station (schwer erkennbarer Fehler), (7) Kreuzkontamination von Röhren zu Röhren bei der Färbung und insbesondere während des komplexen Vorgangs der Vorbehandlung zur Dekontamination (mehrfach zentrifugieren und umfüllen), (8) Differenzierungen nach Kultur und insbesondere bei Einsatz semiautomatisierter PCR-Geräte („black box“): Tb-Bakterien werden als NTM fehlidentifiziert und umgekehrt. **Interferongammatest.** Über falsch positive und falsch negative Befunde wird berichtet. Nach dem Fehler z.B. Vertauschen der Röhren oder Kreuzkontamination (Probe wird geteilt und verteilt), läuft dann u.U. die gesamte Kette der Fehlbestimmungen „automatisch“ weiter, insbesondere wenn wegen einer Veränderung im Röntgenbild eine einzige Probe „zum Ausschluss einer Tb“ eingesandt wurde: Die „positive Mikroskopie“ wird durch die Mitteilung einer „Tb-positiven“ PCR, und evtl. – bei hoher Keimzahl bereits nach wenigen Tagen – durch eine „positive Tb-Kultur“, schließlich durch das Ergebnis der Resistenztestung aus dem Labor „bestätigt“.

Diese Fehldiagnosen werden begünstigt durch „Massenabfertigungen“ (1) von täglich zahlreichen neuen Einsendungen im Labor, (2) der täglich vielen „neuen“ Patienten in der Ambulanz oder in der Klinik mit kurzfristigen Entlassungen zur ambulanten Weiterbehandlung, sowie (3) der sich über Tage hinziehenden bestätigenden positiven Befundmitteilungen und (4) bei nicht ausreichender personeller Besetzung (keine ausreichende Betreuung des Tb-Labors durch Mikrobiologen, „keine Zeit“). Die Fehldiagnosen werden dann häufig nicht oder zu spät bemerkt. Strategien und Hinweise zur Verringerung der Fehldiagnosen werden beschrieben, z.B. Einsenden von mehr als einer Probe, auch bei Bronchialsekret (optimal 3 Proben), Überprüfung des Arbeitsablaufs bei nur einer mikroskopisch- oder Kultur-positiven Probe, Rücksprache mit dem Kliniker – entscheidend: Passt der Befund? Bei Zweifel: Anforderung einer Fingerprinting-Untersuchung, auch wenn diese ein aufwendigeres Verfahren ist.

Parasites of the mallard *Anas platyrhynchos* from Eastern Austria - first results

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The mallard *Anas platyrhynchos* L. 1758, is one of the widest spread anseriform birds in Europe. Despite its high frequency and the high ecological and economical importance there is a lack of knowledge of the helminth community of these waterbirds.

Some of the parasites known to be occurring in the mallard are associated with morbidity as well as mortality in captive and wild waterfowl. For example digenean larvae of the genus *Trichobilharzia* can cause severe neuromotoric disorders and high mortality in chicks. In addition they are also known as human pathogens causing the so called “swimmers itch” or “cercarial dermatitis”, a worldwide occurring inflammatory skin reaction, which is considered as an emerging disease.

As there have been no intensive studies on the parasite community of *A. platyrhynchos* in Austria, a broad investigation is planned. The first 64 mallards from 6 districts of Lower Austria were investigated during the hunting season 2009/10 for helminth parasites. Cestodes, trematodes and acanthocephalans could be detected in the intestine of the mallards as well as nematodes in the body cavity.

***Isospora belli* infection in a 40 year old HIV positive Chechen refugee**

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Case Report

In October 2009 an otherwise healthy 40-year old refugee from Chechenia was transferred from an outer hospital to our department for further diagnosis and treatment.

The patient had presented with watery diarrhea since 10 days, weight loss and exsiccosis leading to acute prerenal failure. He had come over Poland to an Austrian refugee camp. Diagnostic procedures in the outer hospital included an HIV screening test, which was positive and blood samples via western blot without final diagnosis.

The Chechen patient was admitted in the author's hospital with cholera like fluid diarrhea of 12 litres per day, prerenal failure with elevated renal laboratory parameters with Creatinine of 2.6 mg/dl, metabolic acidosis with pH of 7,26 and exsiccosis.

First therapeutic procedures included rehydration and symptomatic therapy of metabolic acidosis.

In second day of hospitalization AIDS score C3 could be proved by serology, FACS analysis with CD4+ count of 197/ul, CD4/CD8-Ratio of 0,26 and positive RNA with 6.6 10(5) cells/L in PCR AIDS C3 measuring an enteric opportunistic infection.

Several stool samples were sent to laboratory, on 5th day of hospitalization oocysts of *Isospora belli* could be detected in stool.

According to the guidelines an antibiotic therapy with sulfamethol-trimeoprim 960 mg for 3 weeks was installed. Further on we began a highly active antiretroviral therapy (HAART) with NRTI-combination (emtricitabin and tenofovir) and nNRTI (efavirenz).

This therapy was well tolerated by the patient, diarrhea persisted and the clinical condition increased consistently. On 12 th day of hospitalization we could dismiss the patient in good clinical condition.

Further clinical controls of laboratory markers were not possible.

Background

Human Immunodeficiency Virus (HIV) infection leads to acquired immunodeficiency syndrome (AIDS) and major causes of morbidity and mortality of such patients are opportunistic infections caused by viral, bacterial, fungal and parasitic pathogens.

HIV infection has been modifying both the epidemiology and outcome of parasitic infections. The prevalence of any intestinal parasitic infection is significantly higher among HIV positive participants. Specifically, rate of infection with *Cryptosporidium*, *I. belli*, and *S. stercoralis* are higher, particularly in those with CD4 count less than 200 cells/microL. Diarrhea is more frequent also at the same lower CD4 T-cell counts.

Conclusion

Immunodeficiency increases the risk of having opportunistic parasites and diarrhea. Therefore; raising patient immune status and screening at least for those treatable parasites is important.

The challenge of treating malaria in 2010

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Malaria parasites have developed resistance to virtually all available therapeutic agents. As a result the World Health Organization is now recommending combination therapies for the treatment of falciparum malaria. Within the past decade virtually all malaria-endemic countries have adopted one of the WHO-recommended artemisinin-based combination therapies. Particularly in light of emerging resistance to even the most advanced compounds, the development and deployment of novel treatments for falciparum malaria is of utmost importance. The presentation will provide an overview of the current state of art in malaria therapy with a focus on novel treatment options for uncomplicated falciparum malaria.

Update Prophylaxe und NSM

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Leishmaniosis and other vector-borne diseases

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Vector-borne diseases (VBDs) comprise a group of globally distributed and rapidly spreading illnesses that are caused by a range of pathogens (bacteria, viruses, protozoa and helminths) transmitted by arthropods, including ticks, fleas, mosquitoes, and phlebotomine sand flies.

VBDs affect livestock, pets and humans worldwide and they substantially impact human health, animal health and the global economy, representing about 17% of the burden of all infectious diseases and causing millions of dollars in losses to the livestock industry annually. In the past few years, there has been increasing concern about the global spread of parasitic arthropods and the pathogens they transmit across the planet, which has been influenced by ecological and climatic changes, enhancement of international commerce, increased and more rapid global transport, human and animal population dynamics and emerging drug resistance among both vectors and pathogens. Canine vector-borne diseases (CVBDs) of zoonotic concern are of great relevance for the public human health due to the increasing importance of dogs leaving as pets. The explosion of the canine population, the social role that dogs have played in developed countries (e.g., as therapy dogs for people with mental disorders or as assistants for people with disabilities) and their increasingly close relationship with humans in both urban and rural areas pose new concerns for human public health. Leishmanioses, affecting dogs and humans, are vector-borne diseases being transmitted by more than 40 species of sand fly Phlebotominae in the Old World and 30 species of *Lutzomyia* in the Americas. Canine leishmaniasis due to *Leishmania infantum* is among the most important protozoal diseases of dogs worldwide. The relevance of canine leishmaniosis has increased over the last decade also for its zoonotic potential, which is enhanced by emerging immune suppressive conditions. In addition, a number of micro- and macroclimatic and other environmental conditions may cause an increased density of vectors into new geographical areas, impacting on the prevalence of infectious agents in the vectors and in competent host populations. Thus, climate change and global warming, through their effect on local climate conditions, have been broadly examined as causes for temporal and spatial distribution of many VBDs. Though great advanced into the knowledge of VBDs, our understanding of the complex interactions involved in the epidemiology of CVBDs is, in many cases, fragmentary due to the critical issues related with these diseases in endemic areas and the lack of funding for animal reservoir and vector interactions.

Booster vaccinations against tick-borne encephalitis: 6 years follow-up indicates long-term protection.

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Five and 6 years post-booster, immunity to tick-borne encephalitis (TBE) virus was assessed in 225 and 195 vaccinees, respectively, out of 430 healthy volunteers with at least three TBE-immunizations prior to study inclusion and booster intervals exceeding recommended limits. Neutralizing antibody titers of $\geq 1:10$ (reliable level of protection) were present in 86-96% depending on age group, with lower percentages in participants >60 years. TBE antibody levels remained stable for many years in most vaccinees. However, in a few persons a shorter period of protection against TBE was indicated. Therefore, recommendations on booster intervals in TBE endemic areas should be adapted by weighting the risk of infection against the risk of short-lived immunity (Vaccine 2009; 27(50):7027-30).

Influenzaviren: Rückblickende Analyse und Vorausschau

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Influenza A und B Viren gehören zu den wichtigsten Pathogenen des Menschen.

Influenzavirus-Infektionen treten in den Ländern der nördlichen Hemisphäre regelmäßig in der kälteren Jahreszeit in epidemischer Form auf und verursachen hochfieberhafte Erkrankungen bei ca. 20% der Kinder und 5 % der Erwachsenen.

Ein charakteristisches Merkmal der Influenzaviren ist, dass sie starken Veränderungen unterworfen sind, von denen vor allem die beiden an der Virusoberfläche gelegenen Antigene, das Hämagglutinin (HA) und die Neuraminidase (NA), betroffen sind.

Kontinuierliche Veränderungen werden als Antigen drift bezeichnet und kommen sowohl bei Influenza A als auch bei Influenza B Viren vor. Plötzliche und drastische Veränderungen durch eine Neu-Assortierung der 8 Gensegmente des Virus werden als Antigen shift bezeichnet und treten in unvorhersehbaren Intervallen nur bei Influenza A Viren auf. Antigen-Drift und -Shift sind die Ursachen dafür, dass Influenzavirus-Infektionen keine lang anhaltende Immunität hinterlassen und dass es daher immer wieder zu Reinfektionen, jährlichen Epidemien und unerwartet auftretenden Pandemien kommt. Die starke genetische Variabilität der Influenzaviren stellt vor allem für die zeitgerechte Produktion ausreichender Mengen effizienter Impfstoffe ein erhebliches Problem dar, da die Wirksamkeit der Influenzaimpfung in erster Linie von der Übereinstimmung der in den Impfstoffen enthaltenen Stämme mit den tatsächlich zirkulierenden Viren abhängt. Das überraschende Auftreten des neuen pandemischen Influenzavirus A/H1N1v im Frühjahr 2009 und seine rasante weltweite Ausbreitung innerhalb nur weniger Wochen hat uns dieses Problem klar vor Augen geführt.

Diagnosis of *Dirofilaria repens* infection

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Dirofilaria repens is a filaria species of dogs and other carnivores, which is transmitted by various mosquitoes. It is endemic in many tropical and subtropical countries as well as in the Mediterranean region. Single cases of infected dogs have also recently been reported from north of the Alps. *D. repens* can accidentally infect humans usually resulting in a subcutaneous nodule containing a single infertile parasite.

We have recently reported an atypical case of a human *D. repens* infection with a subcutaneous female gravid worm in a patient with eosinophilic meningoencephalitis. Subsequently, we received multiple *D. repens* samples, which had been removed from humans who were infected in various parts of the world. In all cases we confirmed the phenotypic diagnosis by PCR and sequencing of the mitochondrial 12SrRNA-gene. Phylogenetic analyses indicated the existence of regional genetic variants of *D. repens*.

It has been postulated that climate change will lead to spread of *D. repens* infections to regions north of the Alps. In a preliminary molecular survey we analyzed more than 16,000 mosquitoes captured in Southwest Germany and in one pool of *Culex* spp. mosquitoes *D. repens* DNA was detected.

Development Cooperation as Potential Focus for the Centre for Geographic Medicine

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The Medical University of Vienna is one of the leading medical schools and is renowned for high quality medical services. The success of international health care projects established the Medical University of Vienna as a global health player. We propose a development collaboration between the Medical University of Vienna and a Central African community. Based on a sustained North-South collaboration we aim to establish a training platform for both clinical and scientific specialists and to drive capacity building in both partner institutions.

Tick removal – A matter of removal instruments and/or pulling or twisting?

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Tick removal seems to gain importance due to the increasing outdoor activities of humans together with their animals. Many questions arise regarding best way to get rid of already attached ticks on humans and pets. It is known that time span until removal is an important factor for the transmission of several pathogens, e.g. *Borrelia*. Glue, oil and chemicals like hair sprays cannot be recommended since they increase salivation of the attached ticks and may favor transmission. The best way to remove the ticks quickly and efficiently is by using mechanical tools. There are many different devices available and the question about pulling or twisting is still not answered.

Therefore we started a study with five commercial tick removal devices, card, forceps, pen-tweezer, “lasso” and tick twister. The first two should be used to pull, whereas the latter three a supposed to twist the ticks. We supplied veterinarians and persons having massive contact to ticks e.g. dog holders with these instruments and ask them to remove at least 5 ticks with each tool. The ticks were stored in 70 % ethanol in prenumbered tubes. A questionnaire about host species, time required for removal, effort to remove, reaction of the host species etc. had to be filled for each removed tick. In the laboratory the mouth parts were examined according to the degree of injury and determined the level of engorgement by measuring the suctal-, coxal index and dry weight.

To date we received 525 removed ticks. 311 were taken from dogs, 187 from cats and the rest was found on humans, hedgehogs and ferrets. The majority (95%) of the ticks were female *Ixodes ricinus*. We found no significant different for the instruments according to the condition of the mouthparts. However, there are significant differences in reaction of the animal, the time required to remove, easiness to grab the tick, force needed to extract and handling of the devices. The card and the forceps were ranked last in all points. The pen-tweezer was evaluated best before lasso and tick twister. Further investigations and calculations have to be done according to e.g. the injury of the whole tick or the removal success at different levels of engorgements.

Health risks for global travellers: knowledge management for governmental and individual use

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A variety of health risks and threats can affect, harm and kill travellers worldwide. Communicable diseases, traffic accidents and conflict related injuries are most common reasons for increasing sickness absence rates and fatalities. Governmental organisations, both civilian and military, NGOs as well as individual travellers need updated and valid information for planning and executing their missions, holidays, business trips or duty travels. Destination, duration of travel, purpose of visit and living circumstances are known to be crucial factors to be considered when travelling.

The presentation demonstrates challenges and solutions in information gathering and processing as well as communication between the poles of science, epidemiology, hypotheses and rumours.

Case report

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The patient, born May 29th 1963 in Bosnia, has been living in Austria since 1992.

April 12th 2010 K.M. came to hospital with fever of unknown origin, pain in head, joints and stomach; inpatient admission followed.

A month before the outset of the disease he spent 2 weeks in Bosnia. His blood culture of April 19th 2010 shows *Brucella melitensis*.

The resistance screening of Tetracylin, Rifampicin and Sulfametoxazol-Trimethoprim was sensitive. Therapeutic treatment has been done with Tetracylin and Rifampicin for 2 weeks.

Significant improvements in his symptoms were achieved. Following blood cultures were negative and K.M. was released from hospital. He was recommended to continue therapy for 4 more weeks.

August 3rd 2010 the patient was again travelling to Bosnia and came back with fever („undulierendes Fieber“) and extreme fatigue.

His blood culture of August 5th 2010 again shows *Brucella melitensis*.

Resistance screening results via E-Test were the same than in April 2010. Additionally Gentamycin and Streptomycin were tested, they were sensitive.

***Oesophagostomum dentatum* suppresses allergen-specific immune responses in a mouse model of birch pollen allergy**

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Recent epidemiological studies have shown that prevalence of allergic diseases negatively correlates with parasitic infections. These observations have led to the idea to investigate the effect of experimental nematode infections on the development of allergic immune responses both in mouse and human. Moreover, latest work in rodents indicates that the infection is not mandatory and the allergy suppression can be achieved as well by parasite-derived products. We investigated in a mouse model of birch pollen allergy whether *Oesophagostomum dentatum* adult worm extract can protect mice from the development of allergy. Stimulation of naïve splenocytes with *O. dentatum* extract induced a population of T cells with low proliferative capacity that produces high levels of IL-10 and TGF- β . Moreover, immunisation of BALB/c mice with this extract led to antigen-specific IL-4 and IL-5 production in re-stimulated splenocytes and mesenteric lymph node cells. Furthermore, *O. dentatum* extract induced production of specific Th2-related antibodies (IgG1/IgE) in serum. This data suggests that an active infection is not a prerequisite for the development of Th2 responses. The application of *O. dentatum* extract to mice simultaneously with sensitization with the major birch pollen allergen Bet v 1 suppressed cellular Th2 responses, as demonstrated by reduced production of IL-4 in bronchoalveolar lavages, in allergen re-stimulated lung and lung lymph node cells. Strikingly, levels of Bet v 1-specific antibodies (IgG1/IgG2a/IgE) were impaired in serum from *O. dentatum*-extract treated mice. We hypothesize that *O. dentatum*-derived products contain immunosuppressive molecules that could be novel therapeutics for the treatment of allergy in humans.

A spatial assessment of *Culicoides* spp. distribution and bluetongue disease risk areas in Austria

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Bluetongue Disease (BT) is internationally recognised as a notifiable disease with great economical relevance. In the summer of 2006 this vector-borne disease was introduced into Northern Europe and has affected most European countries since. *Culicoides* biting midges are cyclic vectors of the bluetongue disease virus (BTV). In the recent outbreaks the main vector *C. imicola* was absent and palearctic *Culicoides* species like *C. obsoletus* and *C. pulicaris* were detected. In this study the distribution of *Culicoides* spp. in Austria were analysed and the BT risk zones were determined.

Culicoides abundance data were collected from weekly catches of 14 months at 51 trap locations. The corresponding weather data of the trapping day originated from neighbouring meteorological stations. From the total of 7523947 *Culicoides* caught 90.3 % were classified to the *C. obsoletus* complex. 186 meteorological stations (years 1997 – 2007) were analysed to detect correlation of weather and *Culicoides* distribution. The regression model using R (R 2.8.0, <http://CRAN.R-project.org>) assigned a highly significant effect of mean temperature ($P < 0.001$) and wind ($P < 0.001$), a significant effect of relative humidity ($P = 0.019$) and a weakly significant value of altitude ($P = 0.059$) on *Culicoides* spp. abundance. The majority of catches (>1000 individuals) were found at temperatures above 10° C and at relative humidity between 65 to 75 %. The point data of the significant parameters mean temperature and relative humidity were subsequently interpolated using the ESRI ArcGIS TM version 9.3 Geostatistical Analyst tool Kriging.

In a raster analysis those regions providing optimal temperature and humidity conditions were separately investigated in all four seasons. In addition the data of cattle density was included to create a risk map. The season of summer holds the greatest risk of a BT epidemic with 25.9 % of the analyzed area providing optimal conditions for vector abundance and 12.4 % providing contact risk with ruminant hosts.

The results of this project (i) provide fundamental data on the distribution of *Culicoides* spp. in Austria, (ii) determine limiting climatic parameters, (iii) model most favourable *Culicoides* habitats and (iv) identify risk areas by including possible parasite-host interactions. These high-risk areas can subsequently be given special attention for precautionary monitoring measures.

Menigokokkenepidemiologie 2009/2010 in Österreich

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Dengue fever in rural Bangladesh

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Since 2000 Bangladesh has been experiencing a resurgence of endemic dengue (Rahman, M. et al; 2000). The majority of cases are reported from urban areas (Islam MA. et al; 2006). In an attempt to assess the pattern of dengue infection in rural areas we analyzed blood samples from febrile patients collected in the course of a cross sectional febrile illnesses survey during the monsoon season 2007, the dry season 2007/08, and in a hospital-based survey between 2007 and 2010. The study was conducted in Bandarban District in the Chittagong Hill Tracts in the very southeast of Bangladesh, a rural hilly area bordering Myanmar and India. Dengue seropositivity was diagnosed using ELISA-based detection of the presence of IgM-Ab (E-DEN01M, Panbio, Australia).

During the cross sectional survey among febrile patients living in remote villages low seropositivity rates of only 1.2% and 0% were found during the rainy and dry season, respectively. Among 315 febrile patients from semi-urban areas enrolled at the Sadar Hospital in Bandarban 38 patients (8.29%) were IgM seropositive for dengue. The age group most affected were adults between 21 and 30 years. Our data confirm a relatively low dengue transmission in rural areas as compared to urban environments and a seasonal transmission with a major peak during the monsoon months.

***Trichomonas vaginalis*: Susceptibility to Pentamycin and Response to long-term Treatment**

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The parasitic protozoon *Trichomonas vaginalis* is the causative agent of trichomonosis which is with more than 170 million new cases each year the most prevalent non-viral sexually transmitted disease (STD). Metronidazole has been the drug of choice since the 1960ies, but emerging resistances are pushing the search for alternative drugs. Pentamycin is a polyene macrolide used in the treatment of candidiosis.

In this study, four *T. vaginalis* strains (ATCC 30001, ATCC 30236, TV2 and ATCC 50138) with different metronidazole resistances were tested for their susceptibilities to pentamycin. The inhibitory and effective concentration (IC₅₀, IC₉₀, EC₅₀, and EC₉₀) of pentamycin against *Trichomonas* were evaluated in microtiter assays. Moreover, in order to investigate the ability of *Trichomonas* to develop *in vitro* resistance against pentamycin, all four strains were subjected to resistancy stress by long-term permanent treatment at low doses of pentamycin.

Trichomonads treated with pentamycin showed cell lysis or changes in shape and structure, which were recorded by photography and staining. There were only very small differences in susceptibilities to pentamycin between the strains – independently from their susceptibilities to metronidazole. The recorded IC₅₀ies range from 0.869-1.350 µg/ml, IC₉₀ies from 2.725-3.778 µg/ml, the EC₅₀ies from 1.744-2.62 µg/ml and the EC₉₀ies 4.909-6.514 µg/ml pentamycin. Resistancy trials revealed that temporary tolerance to higher concentrations of pentamycin compared to the wild type strains can be induced, but no true resistances developed in any of the strains after one year of permanent low dose treatment.

Altogether, this study established the efficacy of pentamycin against *Trichomonas vaginalis* and suggests pentamycin as promising drug candidate being also effective against metronidazole-resistant *Trichomonas*.

Sensitivity of *Plasmodium vivax* to chloroquine, mefloquine, artemisinin and atovaquone in north-western Thailand

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The advent of chloroquine resistance in *Plasmodium vivax* in sub-equatorial areas between the Pacific and the Indian Ocean in 1989 led to the development of in vitro tests for the evaluation of the drug-sensitivity of *Plasmodium vivax* and the establishment of programs for the monitoring of the drug sensitivity of *Plasmodium vivax*.

Chloroquine is still the first line treatment of vivax malaria in most areas of the world where *P. vivax* is endemic. It usually still effects the elimination of the blood stages, but the chloroquine-sensitivity of *P. vivax* is decreasing and there are sporadic reports of chloroquine-resistance from all continents where *P. vivax* is endemic, except North America.

This study was carried out at the Malaria Clinic of Mae Sot during the rainy season of 2008 and at the Institute of Specific Prophylaxis and Tropical Medicine in Vienna. Mae Sot is located in Tak province in the north-west of Thailand near the border to Myanmar. The majority of the infections originated from Myanmar. For this study isolates from 48 patients were analyzed using a slightly modified version of the methodology of Tazanor et al.

The IC₅₀ and IC₉₀ values for chloroquine were 167 nM and 5445 nM, those for mefloquine 139 nM and 5282 nM, those for artemisinin 32 nM and 466 nM, and those for atovaquone 30 nM and 650 nM respectively.

All tested substances were found to be effective. However, as compared to earlier studies the chloroquine sensitivity decreased. The IC₅₀ and IC₉₀ for chloroquine increased from 51 nM and 680 nM in 2001 to 130 nM and 1058 nM in 2003, and 167 nM and 5545 nM, respectively, in 2008. While the clinical-parasitological results of treatment with chloroquine, followed by antirelapse medication with primaquine, remained still satisfactory in the area of Mae Sot, this may be expected to change in not too distant a future.

The influence of the vaccines adjuvant system on allergic sensitisation

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It is an increasing matter of debate, whether certain vaccines influence the risk of allergy development and few data are available concerning the timing of vaccinations in respect to pollen season and the subsequent risk of hay fever.

Using a murine model we sought to investigate whether the vaccine antigen, the adjuvant formulation or the time point of vaccination (during or before allergic sensitisation) can alter the pattern of allergic immune responses. We therefore selected the commonly applied vaccine antigens hepatitis A virus (HAV) and tetanus toxoid (TT), and administered both of them either adjuvanted with aluminiumhydroxid or virosomes. Sensitisation with the major birch (BP) allergen Bet v 1 served as a clinically relevant model of type 1 allergy.

Simultaneous application of either aluminiumhydroxid adjuvanted HAV or TT with Bet v 1 sensitisation did not increase but rather diminish allergen-specific IgE antibody levels and Th2 cytokine production after BP stimulation of splenocytes *in vitro* when compared to sensitised control mice. On the contrary coimmunisation with virosomal adjuvanted HAV and Bet v 1 led to increased allergen-specific IgE antibody levels and IL-5 production upon BP stimulation, when compared to sensitised controls. Coapplication of virosomal adjuvanted TT and Bet v 1 led to similar results. HAV immunisation one week before Bet v 1 sensitisation resulted in increased allergen-specific humoral and cellular responses. However, when the interval between HAV immunisation and Bet v 1 sensitisation was extended to 4 weeks no difference in allergen-specific IgE antibodies were detected.

Our data indicate that a virosomal based vaccine is able to favour allergic immune responses. Furthermore the time interval between vaccination and allergic sensitisation affected the magnitude of allergic immune responses. Therefore we conclude that in children with a positive family history of allergies, attention should be drawn to the choice of the adjuvant and adequate intervals between vaccine application and pollen season.

Head Nodding Syndrom – 4 years follow-up: Semiology, EEG and Video of an unusual seizure type in Tanzania

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Head nodding syndrome (HNS), a new epilepsy disorder, has been described only very recently (Winkler et al 2008). The major clinical feature is an acute loss of the muscle tone of the autochthonous neck musculature in a brief and repetitive way leading to the characteristic head nodding (HN) (Winkler et al, 2010).

This type of seizures has been observed mainly in children and adolescents. This study was conducted since only very little is being known about the natural history and the evolution of this until now unknown epileptic disorder.

In the initial study in the year 2005, 62 patients were identified as suffering from (HN) during a large study on epilepsy and parasitic disorders in Southern Tanzania. Out of these 62, 55 patients could be re-evaluated with respect to seizure -frequency and -semiology. After this evaluation by means of a standardized questionnaire, a neurologic examination by specialists in neurology was done and an EEG recorded in 25 patients.

In 23/55 (41,8%) patients the HNS had stopped, however in 21/23 (91,3%) of the former HN the disease had evolved into a generalized epilepsy with tonic clonic seizures. More than half (30/55 54,5%) still suffered, four years after the first examination, from HNS, 14/30 (46,7%) of the HNS patients showed now also generalized tonic clonic seizures. In 17/55 (30,9%) the frequency of seizures was less, in 5/55 (9,1%) the frequency had increased whereas in 8/55 (14,5%) it had remained unchanged. Since the first neurological examination 2 patients had died, one in a status epilepticus, the other one had sustained a severe traumatic brain injury as a consequence of a generalized tonic-clonic seizure.

For logistic purposes only in 25 patients an EEG could be recorded; in 9/25 (36%) the EEG was abnormal with intermittent slowing of the basic rhythm and paroxysmal generalized theta and delta groups, in 8/25 patients (32%) an additional slow sharp wave activity (2,5-3, Hertz) and 1 intraictal EEG could be recorded.

There were only 3 anticonvulsive therapeutic options available. Whereas Phenobarbitone and, partially, Phenytoin is rather easily available in subsaharan Africa, Carbamazepin is still too expensive and not easily available in rural African areas. The EEG of head nodding patients showing mainly generalized slow sharp wave activity, potentially corresponding to absence epilepsy, the therapy with Carbamazepin could even be detrimental in such patients.

Winkler AS, et al. The Head Nodding Syndrome – Clinical classification and possible causes. *Epilepsia* 2008; 49:2008-2015

Winkler AS, et al. Clinical characteristics of people with head nodding in Southern Tanzania. *Trop Doct* 2010, 40:173-175

Tricky cases of leishmaniosis

Problems in *Leishmania* diagnostics

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Approximately 12 million individuals are infected with *Leishmania* spp. worldwide and around 60,000 die from leishmaniosis every year. Leishmanias are transmitted by sandflies (Phlebotominae) and they can cause two different disease entities, visceral leishmaniosis (VL) on one hand and various different forms of cutaneous leishmaniosis (CL) on the other. Major endemic areas are in the tropics and subtropics – however, VL is also common around the Mediterranean and with AIDS an important new risk factor for developing VL has emerged. Most important reservoir hosts are dogs and rodents.

The standard diagnostic technique for leishmanioses is the examination of stained smears and tissue sections, respectively. Alternatively, leishmanial antigen can be detected in clinical specimens. In the recent past PCR and also realtime PCR have gained more and more relevance for routine diagnostics. Targets for molecular diagnostics are usually the kinetoplast DNA (kDNA) or the ribosomal DNA (rDNA). The PCR can be performed with bone marrow, blood and generally also with skin biopsies, however, in CL the achieved sensitivity is clearly below 100%. Serological tests are highly sensitive only for VL.

The number of leishmaniosis cases diagnosed in Central Europe has increased significantly in the past years, mainly due to increased traveling, but probably also due to improved diagnostics. In Austria, most patients with VL and also CL have gained their infections in the European Mediterranean countries, followed by South America and Asia. However, atypical infections are frequent and species identification and strain typing is often problematic. More than 30 different species have been described, but there is no generally accepted system and new species continue to be identified. This presentation gives an overview of possible problems in *Leishmania* diagnostics.

Immunodiagnosis of tuberculosis

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Probleme bei der Befundung von Hepatitiden und tropischen Virusinfektionen

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Immunomodulatory properties of nematode-derived glycans – phosphocholine and fucose dependent effects

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The effect of nematode-derived phosphocholine (PC) and fucosylated glycans in modulation of the immune responses have been analyzed by using the non-parasitic nematode *Caenorhabditis elegans*.

In our studies antigen extracts of the wild-type, Trigly and Bre-1 mutant strains were used. The Trigly strain does not decorate N-glycans with PC, whereas Bre-1 shows a lack of fucosylated N- and O-glycans.

Whether and how the antigen extracts of the *C. elegans* wild-type and its mutants influence the immune responses have been investigated by *in vitro* and *in vivo* studies. An absence of fucose in the Bre-1 mutant strain lead to a better ligation by the Toll-like receptor (TLR) 2 compared to the wild-type, which might be the effect of a conformational change of the surface molecules. The necessity of PC for recognition by TLR2 could be also demonstrated. Furthermore, the data provide clear evidence that PC is important for the induction of interleukin (IL) 10 release by dendritic cells.

On the humoral level, data show a bias of the immune response towards a Th2-answer by all three antigen extracts, demonstrated by high IgG1 production in the sera of immunized mice. However, the wild-type extract showed the lowest IgG1 level, whereas the Trigly extract was the strongest inducer of this antibody subtype. In addition, a significant higher IgG2a release was observed in the sera of mice that were immunized with the wild-type extract in comparison to mice immunized with the mutant antigens. In contrast, immunizations with the Bre-1 antigen extract induce an IgG1 but no IgE production. Furthermore, higher IL-4 levels were detected after stimulation of mesenteric lymphocytes with the Bre-1 antigen extract, but no detection of IL-4 was possible by stimulation with the wild-type extract.

This work demonstrates that the removal of a single sugar component can influence the quality of the immune responses.

Imported malaria in Belgrade, Serbia, between 2001 and 2009

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Since 2000, travel of Serbian citizens to tropical regions has been steadily increasing. To determine the epidemiological trend and the main features of imported malaria in the last decade in Serbia, we analyzed all travelers to the tropical areas who presented at the Institute for Infectious and Tropical Diseases in Belgrade between 2001 and 2009. Diagnosis of malaria was based on microscopic examinations of Giemsa-stained thick and thin blood smears. The result of the initial blood smear was available within 3 hours of blood drawing. If the initial smear was negative, examination was repeated in at least three additional smears within 48 hours.

Diagnosis of malaria was attempted in the whole series of 2981 travelers, including those clinically suspect (febrile) for malaria (n=847; 28.4%), and those without health problems (n=2134; 71.6%). Most travelers (79.3%) were male and 74% were aged between 40 and 59 years. Africa represented by far the most visited region (94.6%), with Nigeria, Cameroon, Benin and Equatorial Guinea the most visited countries. The most common reason for travel was business (92.3%), followed by tourism (4.7%). A vast majority (92.6%) did not take any prophylaxis.

Malaria was diagnosed in 102 cases (3.4% of all travelers, 12.0% of travelers with febrile episodes.). Occurring at a rate of 6 to 16 cases per year, it was predominantly imported from Africa (96.1%), especially from Equatorial Guinea (38.2%) and Nigeria (15.7%). The reason for travel was dominantly work/business (forest or building workers or air crew personnel). Patients were predominantly (87.3%) male, and the majority (66.7%) was between 40 and 59 years of age. Of the 102 patients, 15 (14.7%) took chemoprophylaxis, of which 13 (12.7%) claimed to have been compliant. The dominant species was *Plasmodium falciparum* (n=78; 76.5%), alone (n=70) or in mixed infection with *P. vivax* (n=5) and *P. malariae* (n=3). *P. vivax*, *P. ovale* and *P. malariae*, as single agents, were identified in 11, 1 and 1 cases, respectively. In 11 cases *Plasmodium* was not detected and in these, the diagnosis was based on clinical presentation, travel history and therapeutic effect. The course of the disease was severe in 13 patients with *P. falciparum* malaria, with 3 fatal cases. Two relapses with *P. vivax* and one recrudescence with *P. falciparum* malaria occurred.

Malaria must be considered in all travelers with fever irrespective of chemoprophylaxis history. Inadequate sensitivity of conventional diagnosis of imported malaria, illustrated by the cases of “submicroscopic” malaria, requires introduction of routine molecular diagnosis.

Hospital-based prevalence of neurological diseases in Kathmandu Model hospital and comparison with Western Regional hospital in Nepal

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The aim of the present study was to investigate the hospital based prevalence of neurological diseases in two cities of Nepal, which are located 198 km away in two different regions. Planned as a retrospective neurological analysis, all data obtained from the admitted patients of neurosurgery department from Kathmandu Model Hospital (KMH) in Kathmandu during the period from 2006 -2008 and from Western Regional Hospital (WRH) in Pokhara during the period from 26th of May- 31st of December 2008 were collected. Altogether 1239 patients admitted during the period of 3 years (2006-2008) in KMH whereas 109 patients were admitted in WRH during the period of 7 months (26th May-31st Dec 2008) were listed in a SPSS database regarding age, sex, zones, date of discharge, no of days spent in hospital, group classification according to ICD 10, group classification according to neurological diseases, main diagnosis at discharge, subgroups of main diagnosis and second diagnosis at discharge. The mean age of patients at KMH was 40.6 years and 63.3% were males whereas at WRH only 32.05 was mean age of patients and 62.4% were males. In KMH, Bagmati zone presented with the highest majority of patients (46.7%) followed by Gandaki zone (15.1%). In WRH, Gandaki zone presented with the highest majority of patients (80.7%) followed by Dhaulagiri zone (10.1%). The most frequent diagnoses found in the present study were Neurotraumatology (29.6%) followed by Spinal SOL (25.4%) at KMH whereas at WRH Neurotraumatology presented solely with 67.9% and followed by Intracranial SOL (9.2%). The other frequent diagnoses were vascular diseases, epilepsy, inflammatory diseases of nervous system, development disorders and anomalies. Not frequent clinical diagnoses were headache, extrapyramidal syndrome, cranial nerve lesion, peripheral nerve lesion, psychiatric disorder, polyneuropathy and demyelinating disease. The present study pointed out the need of primary prevention and training primary physicians and other primary health care providers to reduce the burden of neurological diseases by providing acute services in remote locations overall in the country. Trauma, poorly equipped health care facilities, poverty and infections are daunting health challenges in Nepal. Due to the limitation of access to medical aid in Nepal, more studies are definitely needed to assess not only the hospital-based but also the community based prevalence of neurological disease.

Application of GIS in mapping geohelminth parasites in Serbia

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Intestinal parasites represent a major health concern among schoolchildren in developing countries, and therefore require constant surveillance and control of potential risk factors. Since GIS (Geographic Information Systems) technology has not yet been used in the studies of intestinal parasites in Serbia, we here present a first attempt to analyse the distribution of *Ascaris lumbricoides* and *Trichuris trichiura* in the schoolchildren population according to geographical parameters.

Parasitological data obtained in a series of 4913 children (age range 7-11) from 96 settlements, whose stool samples were collected in Central Serbia between 1983 and 1993, were analyzed according to the findings and the elevation of the settlements in which the children resided. The study included both urban and rural settlements. The elevation of settlements ranged from 44 to 1474 metres above sea level, thus, for the purpose of analysis, we divided the settlements in three groups – up to 500, from 500-1000, and above 1000 m.

Geohelminths were found in children from 56 (58.3%) settlements. The prevalence according to elevation level differed significantly – for *A. lumbricoides*, 1.6%, 5.4% and 2.1% ($p_{\text{Chi square}} = 0.0000$); and for *T. trichiura*, 1.3%, 2.6% and 0.6% ($p = 0.0009$). Also, a significant difference was found between *A. lumbricoides* and *T. trichiura* prevalence in the 500-1000 m elevation group ($p = 0.0002$), while this difference approached significance ($p = 0.0506$) in settlements at elevations above 1000 m.

In conclusion, the presented results, obtained with using of GIS for evaluation and presentation of findings, established significant differences in geohelminth prevalence according to settlement elevation, an analysis not possible at the time of the collection of samples and the initial study. These results show that GIS can be used in planning further analysis according to other geographical parameters (temperature, humidity, etc.), and that its use may help in planning targeted public health intervention measures.

Dirofilarioses in Hungary nowadays

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In the recent decade the importance of *Dirofilaria* spp. is increasing. The climate changes and travelling with pets may help both the spreading of mosquito vectors and the appearance of worm infection at risk for human health in non-endemic or previously free areas. The first three autochthonous *Dirofilaria repens* cases recorded in dogs were published in Hungary in 1998/1999. The results of our research work started in 2005 in the Department of Parasitology and Zoology (SZIE), including a PhD programme, showed us 14-18% prevalence among dogs. We detected the presence of *D. repens* in cats, as well. It was found the first autochthonous *Dirofilaria immitis* infection in a dog (published in 2009) and in a pet ferret (published in 2010) in Hungary, too. This latter is the first published infection of a ferret with *D. immitis* in Europe.

The first human filarioid infection in Hungary was detected by Babes in 1879 (cited by Kotlán, 1951). Seven cases have been published between 1999 and 2000, all of them confirmed as *D. repens* infections. The autochthonous occurrence of human *D. repens* infections in Hungary has long been suspected but has not been undoubtedly confirmed till 2000. It seems that recently more and more new autochthonous human cases become known in our country. At the Department of Parasitology (NCE) in the period 2001–09 we diagnosed 54 cases of dirofilariosis caused by *D. repens* in 29 male and 25 female patients. Twenty-five cases had ocular localization, 28 were subcutaneous and one case was diagnosed in a histopathological section of removed axillary lymph node in patient with lymphoid leukemia. Visiting or living near riverbanks where mosquitoes are abundant appears to be a significant risk factor in contracting the infection of animals and humans. Dirofilariosis is an emerging zoonosis in Hungary. The spread of the “greenhouse effect” leading to the extension of the Mediterranean climatic belt to the north giving better opportunity for both vectors, and worms to thrive and spawn infection. A close cooperation not only with the parasitologists, but also between human and veterinary clinicians is needed to organise the control against these helminthozoonoses.

Target identification of novel antimalarials by photolabelling and ligand capture: development of tool compounds

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Background

According to the WHO World Malaria Report 2009, half of the world's population is at risk for contracting malaria, and an estimated 243 million cases led to nearly 863 000 recorded deaths in 2008. With resistance spreading to almost all classes of antimalarials, including artemisinins (Noedl et al., 2009) there is an urgent need for the development of antimalarials that belong to new classes and have different molecular targets. For several antimalarials in the market, including mefloquine and artemisinins, the targets have not been established unequivocally.

Objective

The project aims at:

- 1) Synthesis and identification of highly active compounds with a growth inhibitory potential against the blood stages of *Plasmodium falciparum* (chloroquine sensitive 3D7 and resistant K1 strains) in the low nanomolar range using an HRP2 ELISA as an *in vitro* drug sensitivity assay. (Noedl et al., 2005).
- 2) Identification of the mode of interaction of these compounds in combination with antimalarials in clinical use.
- 3) Introduction of chemical functionalities, a photoactive group and a capture group for exploration of molecular targets.

Results

Substituting previously identified propafenone analogues with a 2-adamantyl moiety at the nitrogen atom increases growth inhibitory activity. Further alkyl substitution at the nitrogen atom yielded the so far most active compounds, which have an IC₅₀ value in the low nanomolar range. Interaction of these compounds showed an additive behaviour with artemisinins, but was antagonistic with 4-aminoquinolines. In chloroquine resistant strains this antagonism was alleviated. Further modification of these compounds included introduction of the following chemical functionalities: *a*) a photoactive diazirine, *b*) an alkyne substructure allowing ligand-directed target-purification via alkyne/azide click chemistry. This rendered tool like compounds with an unperturbed pharmacophore. Data show that a protonated nitrogen atom is important for high biological activity.

Outlook

Photolabelling of magnetically enriched parasite populations, ligand directed target purification and subsequent high resolution MS and MS/MS experiments are ongoing and will pave the way for the identification of molecular targets, which will then be validated by an siRNA approach.

This research was funded by a grant from the Austrian National Bank (grant 12099 to PC).

Activity of plant-derived compounds against *Plasmodium vivax*

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According to the World Health Organization, 2.5 billion people are at risk of *Plasmodium vivax* infection worldwide and up to 300 million clinical cases are estimated to occur annually. *P. vivax* is the causative agent of tertian malaria, which rarely causes death. However, patients usually suffer acute debilitating clinical symptoms and the recovery is slow. Additionally, persistent liver stages of the parasite allow relapse up to five years after elimination of red blood cell stages.

The first-line blood schizontocidal therapy in *P. vivax* infections relies on chloroquine which is still efficient in many parts of the world, however resistances were reported from South-East Asian countries, e.g. Indonesia and Myanmar, whereas at the study site in Thailand only a decrease in the *in vitro* sensitivity of *P. vivax* was observed. In addition, primaquine has to be given to treat the liver stages of the parasite to achieve radical cure.

In malaria therapy, two plant-derived compounds, namely quinine and artemisinin, have been successfully established. Therefore, the aim of the current study was to evaluate the anti-plasmodial activity of new plant-derived compounds in order to find new drug candidates.

The following six compounds were isolated and purified from three different plant families (Rutaceae, Meliaceae and Stemonaceae) *via* methanol extraction from plant materials followed by purification *via* preparative column and thin layer chromatography: aglafoline and rocaglamide, two flavaglines isolated from the rootbarks of *Aglaia odorata*, tuberostemonine, a *Stemona* alkaloid derived from the rootbark of *Stemona tuberosa*, the acridone arborinine and the quinazoline arborine, both extracted from the leaves of *Glycosmis pentaphylla* and kokusagenine, a furoquinoline found in the leaves of *Glycosmis chlorosperma*.

The specific sensitivity of *P. vivax* to the compounds was assessed according to a recently established method. Briefly, 200 µl fresh blood from patients from the area of Mae Sot, Thailand, infected with *P. vivax* was diluted with 3.8 ml of a 1:1 mixture of RPMI-1640 (Sigma) and Waymouth medium (GIBCO), completed with HEPES and sodium bicarbonate. 50 µl aliquots of this mixture were inoculated into pre-dosed microtiter plates (concentration range: 10 nM to 10 µM) and incubated at 37.5°C for 42 h with 5% CO₂. After incubation, the sediments of the wells were transferred on microscope slides, stained with Giemsa at pH 6.9 and the inhibition of schizont maturation was measured microscopically by comparing the parasite stage composition prior to and after incubation.

Preliminary results show that the two flavaglines, aglafoline and rocaglamide, have promising, high anti-plasmodial activities, whereas all other compounds did not show any activity. Interestingly, aglafoline and rocaglamide also showed high efficiencies against *Plasmodium falciparum* and *Leishmania infantum* in previous studies.

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Molecular confirmation of high prevalence of asymptomatic malaria in Bangladesh

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In spite of its known limitations microscopy remains the gold standard of malaria diagnosis in the field. Typically rapid diagnostic devices (RDTs) and/or microscopy are the only diagnostic tools available in malaria-endemic countries. This may lead to a significant underestimation of the true malaria burden, especially of the less prevalent and less documented species *P. ovale*, *P. malariae*, and *P. knowlesi* in Asia. We used a genus- and species-specific nested polymerase chain reaction (nested PCR), targeting highly conserved regions of the small subunit ribosomal RNA (SSU rRNA) gene (sensitivity approx. 6 parasites/ μ l) to diagnose malaria. 1900 filter papers originating from non-febrile, asymptomatic participants were collected in the course of a cross-sectional prevalence survey in the Chittagong Hill Tracts of Bangladesh in the year 2007. We conclude that asymptomatic malaria is highly prevalent. *Plasmodium falciparum* is the dominant species in the Chittagong Hill Tracts, followed by *P. vivax*. A high number of mixed infections was observed, which are frequently missed in microscopic diagnosis.

Establishment of a reference database for *Legionella*, atypical Mycobacteria and *Acanthamoeba* using MALDI TOF MS (Matrix Assisted Laser Desorption Ionisation Time of Flight Mass Spectrometry)

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The genus *Mycobacterium* including more than 100 described species is divided into three subgroups: the *M. tuberculosis* complex, *M. leprae* and NTM – non-tuberculosis Mycobacteria. The latter have been isolated from hospitals, water, humid rooms, soil and from the mucosa of humans and animals. NTM can provoke potentially lethal lung infections in children or immunocompromised persons.

Legionella spp. an anaerobic, gram-negative, rod-shaped, non-spore forming bacterium is the causative agent of legionellosis (Legionnaires' disease). Legionellosis, which represents 4% of community-acquired pneumonia cases worldwide, can have a lethal outcome in 18-20% of cases if untreated. *Legionella* spp. has been isolated from air condition units, swimming pools, ground- and surface water. Legionnaires' disease is acquired by the inhalation of infectious aerosols.

Acanthamoeba spp., single-celled eukaryotic organisms, can provoke severe infections, including *Acanthamoeba* keratitis, GAE (granulomatous amoebic encephalitis) and infections of the lung and the skin. *Acanthamoeba* have two life cycle stages – a trophozoite and a cyst – and play a significant role as vectors for bacteria (particularly also *Legionella* spp. and NTM).

The aim of the present study is the establishment of a reference database for protein mass spectra of *Legionella* spp., NTM and *Acanthamoeba* spp. using MALDI TOF MS and the MALDI Biotyper software. This reference database is aimed to serve as an essential tool for the identification of *Legionella* spp., NTM and *Acanthamoeba* spp. and furthermore for the detection of *Legionella* spp. and NTM in *Acanthamoeba* spp.

Intestinal Parasites of Pet Leopard geckos

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To maintain preventive welfare for a widespread exotic pet animal and contentment to serious reptile keepers, parasitological testing of 250 feces samples of 332 Leopard geckos (*Eublepharis macularius*, Blyth 1854) of 32 pet stocks located in Vienna, Lower Austria, Thuringia, and Bavaria was performed between 2006 and 2009. Test procedures applied to the feces samples were (1) a microscopical examination of an aqueous suspension, (2) a modified Ziehl-Neelsen staining, and (3) polymerase-chain-reactions for the detection of Cryptosporidium-, Entamoeba- and Blastocystis-DNA, respectively.

Leopard geckos are insectivore nocturnal ground-dwellers naturally found in the deserts of Southern Central Asia; but all the geckos investigated were bred in captivity in Europe, and all animals were kept indoor exclusively, a substantial fraction of them was overaged, and pet Leopard geckos are traded and shipped frequently throughout Central Europe. Thus, only a few intestinal parasites, most of them are facultative pathogens and opportunists, meet these epidemiological preconditions by their mode of living. Examples of such parasites and the significance of their endurance in pet stocks for a cost-effective animal breeding, and illustrations of the compliance of the animal keepers and of the rating of such preventive surveys within an efficient conservation medicine will be presented.

Toxoplasmosis in Naturally Infected Rodents in Belgrade, Serbia

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Toxoplasma gondii is the most successful parasites on Earth, able to infect an incomparably wide array of hosts, including all warm-blooded animals. The organism's complex life cycle includes an asexual cycle in which encysted parasites circulate between prey and predators. Accordingly, infected rodents can serve as a source of *Toxoplasma* parasites (tissue cysts) for pigs and cats. The main goal of this study was to assess the role of synanthropic rodents in the epidemiology of urban toxoplasmosis.

Toxoplasma infection was examined in 144 rats (*Rattus norvegicus*) and 12 mice (*Mus musculus*) captured by live animal traps in three locations in Belgrade city, all characterized by poor housing and degraded environment. Brains were available from all animals, while blood samples were available from 80 rats and all mice.

In rats, specific IgG antibodies were detected by modified agglutination test in 22 (27.5%) of the 80 blood samples available. *Toxoplasma* brain cysts were microscopically detected in 11 (7.6%), while *Toxoplasma* DNA was demonstrated by real-time PCR in 15 (10.4%) animals. Of these, both cysts and *Toxoplasma* DNA were detected in five (3.5%) rats. In mice, cysts were detected in three (25%), all of which were confirmed by PCR, which was positive in another seven animals (a total of 83.3% positive by PCR).

The presented results show a considerable level of *Toxoplasma* infection in rats and mice collected in Belgrade city. Existence of an urban rodent reservoir of infection provides an important link in the epidemiology of toxoplasmosis, and represents a significant public health risk.

***Toxoplasma gondii* infection in goats in Serbia (preliminary results)**

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Virtually no data on *Toxoplasma gondii* infection in goats are yet available in Serbia, but are much needed due to the expansion of (medium-sized) goat farms, a trend instigated by the recently increasing share of goat cheese and other milk products on the market in Serbia. Nevertheless, use of goat meat is in the Serbian cuisine rather limited to open air roasting of whole kids in rural and semi-rural areas on holidays.

We therefore, in January 2010, initiated a cross-sectional survey of goats from throughout Serbia. So far, 194 serum samples from six (out of 12) epizootiological regional units have been examined, using the modified agglutination test. The cut-off titre was set at 1:25. The seroprevalence in the examined regions ranged from 60 to 97.7%. The overall seroprevalence was 83.5%, similar to the 84.5% obtained in a cross-sectional survey of a representative sample of sheep (511 ewes) from different regions of Serbia conducted between June 2002 and June 2003, and slightly higher than the 76.3% in 611 cattle in the same study. Also, similarly to the previous study, which showed a significantly higher prevalence in sheep and cattle from the western part of the country, the highest regional seroprevalence in goats of 97.7% was recorded in the only epizootiological unit examined from Western Serbia, a region characterized by more rainfall than the rest of the country.

Upon completion of sampling the goats from all regional epizootiological units, factors associated with *T. gondii* infection in goats will be determined. Such a nation-wide survey of this infection in goats is expected to provide data on the seroprevalence and risk factors, and point to the preventive measures to be applied in goat husbandry. The impact of these data would include the areas of public health (goat products as a source of human infection), animal health (risk of abortion) and economy (abortions and birth of stillborn or unthrifty kids).

Parasitic diseases of human and veterinary importance in Zoo Hellbrunn, Salzburg

Michaela Lechner

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Parasites are creatures, which benefit at the expense of the host and ingest nutrition. The simplest classification describes endo- and ectoparasites. The habitation of the stages can change, for instance the development of the first stage in the environment and continuing until to an adult worm inside the host. Most of the parasites are transmitted through dirt and smear infection. Further causes of infection are faeces (most frequent disposal of parasites to the environment) contaminated food and water.

In this bachelor thesis the appearance of human- and veterinary pathogenic parasites in animals of the zoological garden Hellbrunn in Salzburg and the combined risk of infection for animal care workers, veterinarian and visitors are described.

All animals seemed to be healthy, so the attention was concentrated on the diagnostic of stool parasites.

Characterization of DNase activity in *Entamoeba histolytica*

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The protozoan parasite *Entamoeba histolytica* causes amoebiasis and affects millions of people worldwide. The disease is treated with metronidazole. *In vitro*, DNA damage is observed in metronidazole-treated amoebae, but is this the cause or the consequence of the breakdown of cellular processes in *E. histolytica*? It is not known if the DNA is damaged chemically by metronidazole metabolites such as the nitroradical anion, or enzymatically by parasite DNases. To address these questions, several DNase assays were established. Incubation of *E. histolytica* lysate with plasmid DNA resulted in endonucleolytic digestion, shown by agarose gel electrophoresis. The Mg⁺⁺-dependent DNase activity was also measured photometrically. The matter is complicated by the presence of bovine DNase I from the adult bovine serum in the amoeba culture medium. Amoebae grown in media in which the bovine DNase I had been heat-inactivated still had nuclease activity. Moreover, this activity was not inhibited by actin in contrast to bovine DNase I in the medium. These results suggest a constitutive nuclease activity originating from *E. histolytica*. In the *E. histolytica* genome database we found more than 60 genes encoding nucleases, many of which are predicted to be involved in DNA repair, but no homologs for classical DNases I or II, endonuclease G, or caspase-dependent DNases. To assign the observed activity to a gene product it will be necessary to purify the DNase in order to obtain sequence information by mass spectrometry. The ultimate aim of the work is to understand the function of the DNase in *E. histolytica* and its possible role in the mechanism of metronidazole action.

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Ex vivo* drug interaction of tigecycline with dihydroartemisinin and chloroquine in clinical field isolates of *Plasmodium falciparum

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In the light of spreading multidrug resistance the development of novel antimalarial drugs and drug combinations is of utmost importance. Virtually all malaria-endemic countries have recently adopted one of the WHO-recommended artemisinin-based combination therapies (ACTs) as first or second line therapy for the treatment of uncomplicated falciparum malaria. In ACTs the combination of antimalarial drugs with different modes of action is expected slow down the development of resistance.

A relatively novel approach is the use of antibiotics with antimalarial activity, such as azithromycin, clindamycin, or doxycyclin, in combination with conventional antimalarial drugs. Their advantage is that they are already licensed and known to be safe and relatively well tolerated. Their slow onset of antimalarial activity makes them a perfect match for the fast acting artemisinin derivatives.

In this study we tested the *ex vivo* activity of tigecyclin, a glycylcycline antibiotic, in combination with dihydroartemisinin and chloroquine. Tigecyclin is a novel antibiotic with a broad antibacterial spectrum and is currently used in the treatment of severe skin and intraabdominal infections. Our recent studies have also proven that it has considerable antimalarial activity on its own.

The study was conducted at the MARIB field research center in Bandarban, in the Chittagong Hill Tracts of Bangladesh. Patient samples originating from patients infected with *P. falciparum* mono-infections were tested in a histidine-rich protein 2-based drug sensitivity assay with tigecycline, DHA, and chloroquine combined in a checkerboard design. Isobolograms were designed to assess the drug interaction profiles.

Wound Myiasis- infestation of ulcera prolonged by chronic venous insufficiency

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Case report

In August 2009 a 65 year old man was admitted to our hospital in substandard hygienic condition after he was found by ambulance in a park. Physical examination showed superficial ulcera on his lower legs infested by hundreds of fly larvae which showed grey colour and a size of 8-10 mm. At admittance our patient was unorientated, had a body temperature of 35,6 °C, blood pressure 140/90 mmHg, heart rate of 85 /min, respiratory rate of 24/min, main lab parameters were: CRP 216 mg/dl, wbc 24.4, creatinine 2.22 mg/dl, Hemoglobine 10.9 g/dl, potassium 7.1 mmol/l.

The larvae were removed by simple lavage with copious sodiumchloride 0.9%, widespread superficial necrotic ulcera on the legs were treated with bandages and conservative wound care, no surgical intervention was necessary. Wound cultures showed growth of *Proteus mirabilis* and *Staphylococcus aureus* and antibiotic treatment with intravenous cefuroxime and clindamycin was established.

Co-Morbidities were a chronic venous insufficiency, type II diabetes mellitus and an acute renal failure which could be managed by conservative treatment. The patient made an uneventful recovery and was discharged in good condition after 5 weeks.

Background

While the infestation with larvae of different genus is common in tropical areas and the third world it is extremely rare in Europe. Either it is diagnosed in travellers returning from tropical areas or it tends to develop under substandard hygienic conditions in open wounds. Therapeutic management of myiasis can be difficult if initially misdiagnosed. Our patient showed a case of „opportunistic myiasis nostra” by larvae of Calliphoridae home to middle European countries. Risk factors like a chronic venous insufficiency, chronic open wounds promoted by non-treated diabetes mellitus and bad hygienic conditions prolonged a massive infection with larvae and eggs.

The patient had a benefit of larvae by having only a superficial bacterial superinfection, which could be treated with antibiotics without complications for 10 days.

Conclusion

Infestations with larvae of other genus found in tropic areas tend to occur through healthy skin and shows infections which are more likely to disseminate in lower tissue. In Western countries on the other hand infestations only occur in open wounds, an antibacterial effect of larvae of Genus Calliphoridae could be proved in vitro-studies.

Human giardiasis in Serbia: Asymptomatic vs. symptomatic infection

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Despite the public health importance of giardiasis throughout Europe, reliable data on the incidence and prevalence in Western Balkan Countries (WBC, including Serbia, Bosnia and Herzegovina, Croatia, Montenegro and FYR Macedonia) are scarce, and the relative contribution of waterborne and foodborne, or person-to-person and/or animal-to-person, transmission of human giardiasis is not yet clear. To provide baseline data for the estimation of the public health risk caused by *Giardia*, we here review the information available on the epidemiological characteristics of asymptomatic and symptomatic human infection in Serbia.

A study of asymptomatic *Giardia* infection in Serbia (carried out over the past decades 1985-2005) involved a total of 6645 schoolchildren, 7-11 years of age, from 115 settlements within 20 regions throughout central Serbia. The results showed *Giardia* infection in all examined regions, with an overall prevalence of 6.1%, and highly significant ($P=0.001$) differences among regions (3.2-14.2%). Of the 115 settlements examined, only 21 were *Giardia*-free. Reporting of symptomatic giardiasis in Serbia is mandatory, with a total of 1193 symptomatic cases reported between 2005 and 2008. While giardiasis is spread throughout Serbia, the northern region of Vojvodina consistently reported more cases annually per 100,000 populations than Central Serbia. The incidence of *Giardia* infection varies greatly not only among regions within Serbia, but between Serbia and other WBC as well, with the greatest number of cases reported in Serbia for each of the four years of the reporting period.

Although asymptomatic cases of *Giardia* represent a major proportion of the total cases of infection, high rates of *Giardia* infection were found in both asymptomatic and symptomatic populations. No waterborne outbreaks of giardiasis have been reported, and it thus seems that giardiasis mostly occurs sporadically in our milieu. Under such circumstances, control measures to reduce the high prevalence of giardiasis in Serbia have focused on person-to-person transmission, encouraging proper hygiene, but for more targeted intervention measures, studies to identify other risk factors for asymptomatic and symptomatic infections are needed.

In vitro activity of antifungal agents against *Plasmodium falciparum* field isolates.

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The increasing resistance of the malaria parasite *Plasmodium falciparum* to currently available drugs necessitates a continuous effort to develop new antimalarial agents. In this quest, the characterization of the antimalarial activity of drugs already in use for other indications represents an attractive approach with potentially rapid clinical applications. It is known that some azole derivatives are effective against *Plasmodium falciparum* in vitro [1-5]. That is why we aimed to assess the in vitro activity of clotrimazole, fluconazole, ketoconazole, itraconazole, voriconazole, flucytosine, amphotericin B, and caspofungin against clinical isolates of *P. falciparum* from Lambaréné, Gabon. The aim of this study was to obtain baseline data on their activity. Using the histidin-rich protein 2 (HRP-2) assay we determined the drug susceptibility (EC₅₀, EC₉₀) of twenty-one isolates obtained from outpatients attending the Albert Schweitzer Hospital. Non-linear regression with a four parameter logistic regression function was used for the statistical analysis of the data. In case of acceptable fit and visible growth inhibition of the cultivated parasites mean EC 50 and EC 90 values were computed. Our data indicate that clotrimazole, fluconazole, itraconazole and caspofungin show mean EC 50 values of 18.1 µg/ml, 2.2 µg/ml, 1.1 µg/ml and 7.3 µg/ml and EC 90 values of 177.3 µg/ml, 6.5 µg/ml, 1.9 µg/ml, 94.7 µg/ml respectively. Ketoconazole, voriconazole, flucytosine and amphotericin B showed no significant inhibition of growth within the range of drug concentrations used in this study.

- 1) Saliba KJ, Kirk K. Clotrimazole inhibits the growth of *Plasmodium falciparum* in vitro. *Trans R Soc Trop Med Hyg* **1998** Jan 1;92(6):666-7.
- 2) Tiffert T, Ginsburg H, Krugliak M, Elford BC, Lew VL. Potent antimalarial activity of clotrimazole in in vitro cultures of *Plasmodium falciparum*. *Proc Natl Acad Sci USA* **2000** Jan 5;97(1):331-6.
- 3) Hatabu T, Takada T, Taguchi N, Suzuki M, Sato K, Kano S. Potent plasmodicidal activity of a heat-induced reformulation of deoxycholate-amphotericin B (Fungizone) against *Plasmodium falciparum*. *Antimicrob Agents Chemother* **2005** Jan 28;49(2):493-6.
- 4) Chong CR, Sullivan DJ. Inhibition of heme crystal growth by antimalarials and other compounds: implications for drug discovery. *Biochem Pharmacol* **2003** Nov 12;66(11):2201-12.
- 5) Roth EF, McKittrick JC, Herz F. The use of 5-fluorocytosine and ketoconazole in the culture of the erythrocytic stages of *Plasmodium falciparum* and some tumor cell lines. *Experientia* **1989** May 15;45(5):478-80.

Minocycline drug interaction profile with dihydroartemisinin and chloroquine in clinical field isolates of *Plasmodium falciparum* in Bangladesh

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Malaria remains one of the biggest health problems in less developed countries and concomitant bacterial infections are frequent. In these cases the clinical presentation of the bacterial infection is frequently superimposed by malaria symptoms. As malaria is relatively simple to diagnose, treatment typically focuses on malaria only. It therefore seems logical to combine commonly used antibacterial agents with known antimalarial activity in new combination therapies.

Minocycline is a relatively inexpensive broad-spectrum antibiotic without the disadvantage of evoking phototoxicity during sun exposure (unlike many other tetracyclines, such as doxycycline, which is frequently used in malaria prophylaxis and therapy). However, due to its slow onset of antimalarial action minocycline needs to be combined with a faster acting antimalarial. In this study we tested serial dilutions of minocycline in combination with dihydroartemisinin (DHA) or chloroquine. At the MARIB field site in Bandarban, Bangladesh, we measured the antimalarial activity using a histidin-rich protein 2 (HRP2) ELISA-based assay. For this purpose patients' blood was cultured on 96-well plates in an 8x8 checkerboard design. The plates were coated vertically with serial dilutions of minocycline and horizontally with dilutions of DHA or chloroquine. We quantified HRP2 by measuring the absorption in an ELISA plate reader and calculated the fractional inhibitory concentrations in order to determine the degree of interaction.

Neurocysticercosis in an Austrian traveller after a trip to India

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Background

Neurocysticercosis is the most common helminthic disease of the central nervous system caused by ingestion of the tapeworm *Taenia solium*. Especially in low-income countries neurocysticercosis has become a major public health problem due to the high prevalence and represents one of the most common causes of symptomatic epilepsy. We present a case of neurocysticercosis in a traveller after a trip to India.

Case report

In March, 2010, a 63-year-old woman with a history of breast cancer presented with a subcutaneous, non-tender node on her right sternocleidomastoid muscle to a hospital in Austria. Further clinical examination and routine laboratory diagnostics were unremarkable. Subsequent surgical excision of the node and histological evaluation lead to the suspected diagnosis of a cysticercosis. She was then transferred to the Section of Infectious Diseases at the Medical University of Graz, Austria for further evaluation. The patient reported a frequent travel history to Goa, India over the past few years. Computerised tomography (CT) of the head revealed multiple calcified cystic lesions in both cerebral hemispheres up to 6 mm in size, but with no perilesional oedema. Further chest radiography and sonography of the abdomen was normal. Although, laboratory findings were unremarkable, travel history and histological findings as well as CT scan strongly suggested neurocysticercosis. The patient was started on praziquantel (600 mg) po x 1 dose, followed by albendazole (400 mg bid) for 18 days and dexamethason (8 mg per day) for 20 days. During the following two weeks she developed two episodes of seizure and was therefore admitted to the hospital for medical observation. Laboratory tests showed a low-grade eosinophilia. Subsequently she has been seizure free without any antiepileptic therapy. Over the next four weeks she developed headache and vertigo. Repeated CT scan of the head showed an increasing number of the cystic lesions as well as multiple perilesional oedemas. Fortecortin therapy (8 mg per day) was revisited and continued for additionally 14 days; headache and vertigo disappeared and the patient had no further complaints.

Conclusion

Neurocysticercosis must be considered in the differential diagnosis of seizures with subcutaneous nodules in patients with a travel history from endemic areas.

Disease acquired in the tropics – is it tropical disease?

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Tropical medicine is the branch of medicine that deals with health problems that occur uniquely, are more widespread, or prove more difficult to control in tropical and subtropical regions. Since climate is not the main reason why various infections remain endemic in tropical areas, there is a trend towards renaming this speciality as "Geographic Medicine" (wikipedia). Touristic activities bring a growing number of persons from developed countries far abroad to exotic landscapes and in contact with tropical diseases - as well as migration mixes persons who grew up in the tropics living with autochthonous central European people. These facts may reveal diagnostic uncertainty even in Austrian hospitals, when a possible impact of geographic medicine has to be considered in clinical history.

We present two cases of patients who were remitted to the Wagner-Jauregg Hospital in Linz, which is a dedicated neurological hospital, to illustrate these considerations.

Case 1:

A 36yr old male Upper Austrian Caucasian native was sent back to Austria in 2005 after narrowly escaping the Tsunami catastrophe in Thailand. Immediately afterwards he developed a diffuse pain syndrome including pectangiform sensations, arthralgia and lumbago. After years of suffering variable symptoms he was ingressed to our hospital because of possible polyradiculitis in April 2010. A thoroughly diagnostic approach including MRI, ENG, EMG, myelography and bone scan was performed. MRI presented a suspicious inflammatory or infectious process of the equinal cauda. The patient remembered a positive serology (IgG and IgM) examination with antibodies against *Burkholderia pseudomallei* from 2005. Does there exist a relation of the then stay in Thailand - and a suspected infectious process of the central nervous system or a possibly parainfectious Guillain-Barré syndrome? Might any part of the clinical symptoms mentioned by the patient be related to that experience?

Case 2:

A 53yr old clergyman, a black African, who grew up in Nigeria but lived for 10 years in Upper Austria since his university studies. He was sent to our hospital in October 2009 because of rapidly evolving demential syndrome. Nearly every year he made holidays in Nigeria for some weeks. Since one year a progressive cognitive decline was accompanied by severe personality changes. MRI of the brain showed generalized older and recently acquired ischemic microvascular lesions. In a German tropical center, where the patient was treated first, a cerebral biopsy was done, with unspecific results. CSF and various serological serum examinations were normal. Biopsy of the skin excluded CADASIL and Lafora disease. All vasculitis parameters were negative. Other rare hereditary endotheliopathies, hypertensive leucencephalopathy, amyloid angiopathy and Binswanger disease were considered for diagnosis – as well as some unidentified infectious agent including parasitosis. Clinically the patient progressed and experienced sudden death at his third ingression in our hospital in April 2010.

Both cases show how considerations of geographic medicine influenced patient management.

Treatment of patients with visceral leishmaniasis – problems and challenges

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The treatment of visceral leishmaniasis (VL) is very complex because drug resistance has become a major impediment in the effective treatment. In Mediterranean basin VL is caused by *Leishmania infantum*. The predominant VL risk in Serbian citizens is a stay at the Montenegrin sea coast.

A retrospective study of the VL treatment effectiveness was conducted from 2004-2009 and included 25 patients with VL who had been diagnosed and treated at the Institute for Infectious and Tropical Diseases in Belgrade, Serbia.

All patients were citizens of Serbia or former Yugoslavia, who have lived (n=19) or who were been in VL endemic areas during summer. No one was traveled out of Europe. All 17 male and 8 female patients were adults, mean age of 40.24 years (range, 22-78). Medium duration of illness before treatment was longer than 4 months. Illness was presented with fever, anemia or pancytopenia and splenohepatomegaly. Diagnosis of VL was established by serology methods and confirmed by microscopic examination of Giemsa-stained bone marrow smears.

As a first line therapy we used: antimony (Glucantime®) in the doses of 20 mg/kg during 21-28 days in 21 patients; Pentostam® in 1 patient; amphotericin B in 3 patients. 17 (81%) patients treated with antimony had good outcome. Five patients had unchanged clinical findings with persistent splenohepatomegaly and pancytopenia. Parasitological assessment was repeated and persistent finding of parasites was reason for repeating therapy with antimony compounds. One patient had good outcome, but other 4 needed amphotericin B. All of them were treated during 15-28 days, given intravenously a total dose of 20 mg/kg. After two courses of amphotericin B, two patients had persisted clinical findings longer than 6 months. They were treated with liposomal amphotericin B (Ambisome®) in daily dose of 2 mg/kg/5 days. Resolution of the symptoms was achieved during first month after this therapy. Patients treated with amphotericin B initially had favorite outcome.

Unresponsiveness to antimony therapy is becoming problem in Asia during past decade. In former Yugoslavia, such problems are not recorded until now. Almost, we perceive patients with VL that was unresponsive to antimony therapy. Favorite outcome was achieved by use of liposomal amphotericin B, and that will be probably the therapy of choice until now. Therapeutic effects of newer drugs (miltefosine and paromomycin) would be the subjects of further evaluation in Serbia.

Severe infestation with fur mites (*Lynxacarus mustelae*) of a stone marten from Tyrol

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The mites of the genus *Lynxacarus* belong to the astigmatid listerophorid mite family which also are categorized as fur mites. *Lynxacarus* species are obligate permanent parasites of the hair coat of insectivores, small carnivores and subhuman primates. Infestation is usually asymptomatic; however, scabby patches and a scurfy appearance of the skin have been reported in *L. radovskyi* infested domestic cats (Hawaii, Fiji, Florida).

In February 2010 we received a stone marten (*Martes foina*) from Tyrol which showed numerous whitish particles attached to the hairs over the whole body surface resembling a “salt and pepper” appearance. The cause of this clinical appearance was a massive infestation with mites of the species *L. mustelae* (Megnin, 1885). The close examination of the pelage and skin did not reveal lesions; however, one *Ixodes rugicollis* nymph and biting lice, *Stachiella retusa*, were found. According to the authors’ knowledge, all three species of ectoparasites were described for the first time in Austria.

The examination for endoparasites revealed 3 *Capillaria aerophila* in the lungs, 1 *Molineus patens* and 39 *C. mustelorum* in the digestive tract, *C. paranalisis* in the anal sacs, and 13 *C. plica* in the urinary bladder. No nematodes were found in the frontal sinus or nasal cavity or the subcutaneous tissue.

First report on *Toxoplasma gondii* genotypes in Serbia

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Toxoplasma gondii is one of the most successful parasites on Earth, with a highly unusual clonal population structure. Three main clonal lineages are designated as type I, II and III, but there are also atypical and recombinant strains mostly present in South America. The main genotypes are most frequent in Europe and North America, with type II being largely predominant. However, recent studies from Mediterranean countries (Greece and Cyprus) have shown presence of type III as well. The aim of this study was to assess the *T. gondii* genotypes in Serbia.

DNA was extracted from human clinical samples (blood, cord blood, amniotic fluid, ocular fluid, cerebrospinal fluid), and from mouse brains after bioassay (of the same materials). For detecting *T. gondii* infection by Real Time PCR we used the 529-bp repeat element that exists in 200-300 copies/genome using specially designed primers and probes. The lineage type of *T. gondii* was determined by restriction fragments of amplified SAG1, SAG2 and GRA7 genes using RFLP-PCR.

A total of 109 samples from patients serologically suspected of acute toxoplasmosis were available, 86 of which were bioassayed in mice. *T. gondii* DNA was detected in 33 (30.3%) clinical samples. Of the 86 bioassay experiments, 16 were positive for cysts on microscopic examination, and all were further passaged in mice for strain maintenance. In addition, part of homogenized cyst-positive murine brain tissue was used to inoculate mice *i.p.* and peritoneal exudate harvested after 6-8 days in order to enrich the amount of DNA for successful genotyping. So far we determined genotypes of two samples and both belonged to the type II lineage.

This is the first successful genotyping of *T. gondii* strains originating from the central Balkans. Further research on *T. gondii* population structure in Serbia will reveal current strain distribution in this region.

Tracking *Toxoplasma* induced cells with suppressive properties against allergy

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In previous studies we demonstrated that infection with *Toxoplasma gondii* prior or after sensitisation reduced humoral and cellular allergic immune responses and prevented allergic airway inflammation in a model of birch pollen allergy. Additionally, in mice infected prior to sensitization, immunomodulation was associated with the induction of TGF-beta⁺, IL-10⁺ and Foxp3⁺ cells possibly mediating these immunosuppressive effects at the chronic stage of infection. In order to investigate whether these cells were indeed responsible for the immunosuppression, cell transfer experiments were performed.

Donor BALB/c mice were orally infected with *T. gondii* oocysts. At the chronic stage of infection splenocytes or sorted CD4+CD25+Foxp3+ cells (trags) were transferred into naïve recipient mice, which were thereafter sensitized with the major birch pollen (BP) allergen Bet v 1, followed by an aerosol challenge with birch pollen extract.

In the first experiment when unselected splenocytes were transferred, donor splenocytes expressing CD4 exhibited high mRNA levels of regulatory cytokines, IL-10 and TGF-beta and the transcription factor Foxp3. After transfer of these unselected splenocytes humoral and cellular allergic immune responses as well as airway inflammation were reduced compared to sensitised controls.

In a second experiment we transferred Tregs derived from Foxp3 GFP-reporter mice to further investigate their allergy reducing capacity in our model. Transfer of Tregs led to a decrease of allergen-specific IgE versus an increase of allergen-specific IgG2a in recipients receiving the transfer from infected donors compared to controls receiving cells from non-infected donors. IL-5 production of splenocytes after BP restimulation was marginally lower in the recipients of Tregs from infected versus non-infected donors. Additionally, eosinophilic lung inflammation was reduced in mice receiving the transfer from infected donors compared to controls receiving cells from non-infected donors. These results were accompanied by an increase in IL-10 and TGF-beta production in splenocytes of recipients of Tregs from infected donors.

Thus, our results indicate that chronic *T. gondii* infection elicits regulatory immune responses able to prevent allergic sensitization and lung inflammation and that immunosuppression can be transferred with splenocytes from *Toxoplasma* infected mice. Characterisation of cells in mice injected with inactivated *T. gondii* extracts is currently performed.

Absence of timely prenatal diagnosis of congenital toxoplasmosis can lead to fatal fetal outcome – case report

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Toxoplasma gondii infection acquired during pregnancy may lead to transplacental transmission and jeopardize the course and outcome of pregnancy, leading to life-threatening disease in the fetus and the newborn. Although most congenitally infected children are symptom-free at birth, sequelae may develop during infancy, childhood or even later. Chances of severe outcome as a result of central nervous system affection oblige us to provide prompt and precise prenatal diagnosis in every case of maternal seroconversion, so that proper treatment of the fetus may be introduced in a timely manner.

Here we present a case of medically terminated pregnancy due to clinically manifest congenital toxoplasmosis which was proven serologically, as well as by bioassay.

Ultrasonographically visualized severe fetal ventriculomegaly in a seven-month pregnant 33-year old woman with a history of three months of lymphadenopathy was an indication for extensive testing in our laboratory. Serology included high-sensitivity direct agglutination and TXG-VIDAS (Bio-Merieux, France) for specific IgG, and ISAgA and TXM-VIDAS for specific IgM antibody. IgG avidity was measured by TXGA-VIDAS.

Based on the serological results obtained (positive TXM and ISAgA, high specific IgG of borderline, close-to-low avidity, corresponding with the onset of lymphadenopathy) maternal infection was dated to the second trimester.

Cord blood serology indicated fetal infection (IgG levels similar to mother's, but both IgM and IgA ISAgA tests were highly positive). Although *Toxoplasma* DNA was not detected in the cord blood sample by real-time PCR, fetal infection was definitely confirmed after six weeks by cord blood bioassay results. While no morphologically recognizable *Toxoplasma* cysts were found, murine serology (HSDA) was positive.

Since fetal morphological abnormalities, which could not be reversed by subsequent treatment, were already advanced at the time of serological testing, the patient opted for induced abortion.

This case emphasizes the need for the introduction of an efficient systematic program for the prevention of congenital toxoplasmosis in Serbia, and also shows the significance of continuous testing of seronegative pregnant women for timely detection of seroconversion, consequently allowing for timely application of adequate fetal treatment.

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