47. Jahrestagung der Österreichischen Gesellschaft für Tropenmedizin, Parasitologie und Migrationsmedizin

47th Annual Meeting of the Austrian Society of Tropical Medicine, Parasitology and Migration Medicine

"Migration of people and pathogens"

Programm
Programme

ÖGTPM

Kurzfassungen
Abstracts

Veterinärmedizinische Universität Wien
Wien
21. – 23. November 2013

www.ögtpm.at

Tagungsort – Veterinärmedizinische Universität Wien (Campusplan)
Venue – Veterinary Medicine University Vienna (Campus)

Information zur Anreise unter:
http://www.vetmeduni.ac.at/de/universitaet/allgemeines/anreise/

Festsaal [FS], Gebäude/*Building* CA

Umschlagbild: Festsaal of the Vetmeduni Vienna
Foto: © Dr. Michael Bernkopf /Vetmeduni Vienna

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(in chronologischer Reihenfolge, fett: Plenarvorträge, Stern: Bewerb um Junior Award)
(*in chronological order, bold: plenary lectures, asterisk: applicant for Junior Award*)

21.11.2011

22.11.2011

23.11.2011

KURZFASSUNGEN DER POSTER/*ABSTRACTS OF POSTERS*

(in chronologischer Reihenfolge, Stern: Bewerb um Posterpreis)

(*in chronological order, asterisk: applicant for Poster Award*)

THURSDAY, NOVEMBER 21st

08.30 – 09.30 Arrival and registration

09.30 – 09.40 **WELCOME ADDRESS**
Otto DOBLHOFF-DIER (Vice-Rector of the University of Veterinary Medicine Vienna)
Georg DUSCHER (Local Organiser)
Anja JOACHIM (President of the ÖGTPM)

09.40 – 10.45 **VIRUSES & VECTORS**
Chair: Anja JOACHIM & Georg DUSCHER

09.40 – 10.15 **PLENARY LECTURE**
Till RÜMENAPF (Vienna): Emerging virus diseases: Why viruses conquer new hosts?

10.15 – 10.30 **Egbert TANNICH**: Surveillance of invasive and indigenous mosquitoes and pathogens in Germany
10.30 – 10.45 **Christian MELAUN**, A. WERBLOW, J. SAUER, S. BOLIUS, S. KLIMPEL: *Culex pipiens* and *Culex torrentium* in Germany – Diversity of two potential vectors of filaria and arboviruses

10.45 – 11.15 *Coffee break*

11.15 – 12.00 **EXPERIMENTAL / MOLECULAR PARASITOLOGY I**
Chair: Michael DUCHÊNE & Julia WALOCHNIK

11.15 – 11.30 **Hans-Peter FUEHRER**, E. FLECHL, K. SILBERMAYR, A. WERBLOW, C. MELAUN, G.G. DUSCHER, C. ZITTRA, B. EIGNER, S. KLIMPEL, A. JOACHIM: The use of Direct PCR for the analysis of vectors and parasites
11.30 – 11.45 **Georg G. DUSCHER**, R.C. GALINDO, A. TICHY, K.M. KOCAN, J. DE LA FUENTE: Glutathione S-transferase (GST) affects the permethrin detoxification in the brown dog ticks, *Rhipicephalus sanguineus*
11.45 – 12.00 **Irma SCHABUSSOVA**, O. UL-HAQ, G. LOUPAL, A. JOACHIM, B. RUTTKOWSKI, R.M. MAIZELS, U. WIEDERMANN: Extract of the pig parasite *Oesophagostomum dentatum* prevents immune privilege of the eye and intraocular infections

12.00 – 13.15 *Lunch break / or*

12.10 – 13.05 Lunchsymposium und Ärzte-Fortbildung
SELTENE PARASITOSEN I (in German language)
(in Zusammenarbeit mit ÖQASTA und INSTAND)
(sponsored by Gilead Sciences)
Chair: Horst ASPÖCK & Wolfgang GRANINGER

12.15 – 12.30 **Ingrid REITER-OWONA**, A. HOERAUF: Importierte *Leishmania tropica*-Infektionen bei syrischen Migranten
12.30 – 12.45 **Claudia OESER**, W. PÖPPL, K. GRABMEIER-PFISTERSHAMMER, J. WALOCHNIK, H. BURGMANN: Management von Leishmaniose-Fällen am AKH Wien
12.45 – 13.00 **Julia WALOCHNIK**, H. ASPÖCK: Humane Babesiose – die kleine Schwester der Malaria

13.15 – 14.30 **HELMINTHS & HOSTS**
Chair: Petr HORAK & Helmut SATTMANN

13.15 – 13.30 **Jana BULANTOVA**, P. HORAK: Many ways how to look at a bird schistosome
13.30 – 13.45 **Jana CHALOUPECKÁ**, L. MIKEŠ: Glycocalyx changes in bird schistosome cercariae transforming to schistosomula
13.45 – 14.00 **Marta CHANOVÁ**: The cruise of *Trichobilharzia* infection in mice with induced T_H1-polarized cell immune response
14.00 – 14.15 **Libuše TURJANICOVÁ**, L. MIKEŠ: Serodiagnostics of bird schistosome infections caused by *Trichobilharzia regenti* in ducks
14.15 – 14.30 **Helmut SATTMANN**, C. HÖRWEG: Invading helminths and hosts – examples from Central Europe

14.30 – 15.00 Coffee break

15.00 – 16.30 **EXPERIMENTAL / MOLECULAR PARASITOLOGY II**
Chair: David LEITSCH & Hans-Peter FUEHRER

15.00 – 15.15 **Sarah SCHLOSSER***, M. DUCHÊNE: Metronidazole treatment of the human protozoan parasite *Entamoeba histolytica* leads to a redox shift of thioredoxin due to inhibition of thioredoxin reductase
15.15 – 15.30 **Erik KÜNG***, J. PIETRZAK, C. KLAUS, J. WALOCHNIK: Metronidazole-resistant *Trichomonas vaginalis*: Testing octenidine dihydrochloride
15.30 – 15.45 **David LEITSCH**, B. JANSSEN, D. KOLARICH, P. JOHNSON, M. DUCHÊNE: *Trichomonas vaginalis* flavin reductase 1 (FR1): Its function and its role in metronidazole resistance
15.45 – 16.00 **Petra GANAS**, I. BILIC, B. JASKULSKA, D. LIEBHART, A. WALLNER, K. SCHÖPF, M. HESS: Isolation and identification of *Trichomonas gallinae* from outbreaks of finch trichomonosis in Austria
16.00 – 16.15 **Simone GABNER**, H.L. WORLICZEK, F. MEYER, A. JOACHIM: Pattern recognition receptors and immunomodulatory cytokines in the small intestine of *Cystoisospora suis*- infected piglets
16.15 – 16.30 **Max WINKLER***, L. SCHWARZ, A. JOACHIM, H.L. WORLICZEK: Infection of sows with oocysts of *Cystoisospora suis* ante partum as a passive immunization strategy against cystoisosporosis in suckling piglets – the role of IgA

16.30 – 17.00 Coffee break

17.00 – 19.00 **HIDE & SEEK – CAN U SEE ME NOW? VISUALIZING PARASITES & THEIR MOLECULES**
(organized by NYP@ - Network for Young Parasitologists Austria)
Chair: Irma SCHABUSSOVA & Hanna L. WORLICZEK

17.00 – 17.30 **Freddy FRISCHKNECHT**: Imaging motile parasites during transmission of malaria

17.30 – 17.50 **Sevil YAVUZ**, K. ELSAYAD, G. WARREN: Understanding the molecular mechanism of Golgi biogenesis in *Trypanosoma brucei*

17.50 – 18.10 **Hanna L. WORLICZEK**, K. SCHLANGEN, D. BLAKE, S. HANDSCHUH, M.-J. GUBBELS: To bind or not to bind – Study of *Cystoisospora suis* coccidial development through *Toxoplasma*-specific reagents

18.10 – 18.40 **Iain B.H. WILSON**, S. YAN, B. SCHILLER, A. HYKOLLARI, K. PASCHINGER: Mass spectrometry as a tool for identifying parasite-specific glycan modifications of proteins.

18.40 – 19.00 **Martina ONDROVICS***, K. SILBERMAYR, M. MITREVA, R.B. GASSER, A. JOACHIM: Proteomics elucidates key molecules involved in the exsheatment process in *Oesophagostomum dentatum*

19.15 **GENERALVERSAMMLUNG für Mitglieder der ÖGTPM**
GENERAL ASSEMBLY (members of the ÖGTPM only)

in the meantime/afterwards

MEET THE EXPERTS / GET TOGETHER at the meeting area (in front of the Festsaal)
GUIDED TOUR through the
VETERINARY PATHOLOGICAL MUSEUM

FRIDAY, NOVEMBER 22nd

08.30 – 09.00 Arrival and registration

09.00 – 10.45 **MIGRATION – ITS INFLUENCE ON EPIDEMIOLOGY/IMMUNOLOGY/VACCINOLOGY**
Chair: Ursula WIEDERMANN & Georg ROSENMAYR

09.00 – 09.40 **PLENARY LECTURE**
P. CICHOŃ, **Norbert VETTER (Vienna): Tuberculosis and HIV: are migrants hit harder?**

09.45 – 10.00 F. WANECK, K. KACZIREK, M. FRAUNSCHIEL, M. PRINZ, H. HASLACHER, T. PERKMANN, R. SCHNEIDER, H. AUER, **Michael RAMHARTER**: Establishing an Interdisciplinary Outpatient Department for Echinococcosis at the Medical University Vienna
10.00 – 10.15 **Libuše KOLÁŘOVÁ**: Alveolar hydatidosis in the Czech Republic
10.15 – 10.40 **Ulrike WINTER**: Health threats in Mali and actual mission statistics

10.45 – 11.15 *Coffee break*

11.15 – 12.45 **CASE REPORTS & HOST MODELS OF VETERINARY & MEDICAL IMPORTANCE**
Chair: Èva FOK & István KUCSERA

11.15 – 11.30 **Walter GLAWISCHNIG**, J. WEIKEL, K. SCHÖPF: Case report: An outbreak of fasciolosis with high mortality in a Tyrolean sheep flock
11.30 – 11.45 **Èva FOK**, O. JACSÓ: Dirofilarioses in Hungary
11.45 – 12.00 **Katja SILBERMAYR**, B. EIGNER, G.G. DUSCHER, F. ALLERBERGER, A. INDRA, P. HUFNAGL, A. JOACHIM, H.-P. FUEHRER: Autochthonous *Dirofilaria repens* in Austria - novel strategies for parasite detection
12.00 – 12.15 **István KUCSERA**, I. VINCZE, J. DANKA, E. OROSZ: Tungiasis: an imported human case in Hungary
12.15 – 12.30 **Ute SCHEIKL***, A. TSAO, M. HORN, A. INDRA, J. WALOCHNIK: Free-living amoebae (FLA) as reservoir for *Legionella pneumophila* and other bacteria: Development of a screening system for water facilities in Austria
12.30 – 12.45 **Elisabeth DIETERSDORFER***, B. SCHRAMMEL, A. KIRSCHNER, J. WALOCHNIK: *Acanthamoeba* as host model system for intracellular growth of legionellae

12.45 – 14.00 *Lunch break* / *or*

12.55 – 13.50 Lunchsymposium und Ärzte-Fortbildung
SELTENE PARASITOSEN II (in German language)
(in Zusammenarbeit mit ÖQASTA und INSTAND)
(sponsored by Gilead Sciences)
Chair: Klaus JANITSCHKE & Herbert AUER

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13.00 – 13.15 **Herbert AUER** & R. SCHNEIDER: *Ascaris suum*, ein weiterer Erreger eines Larva migrans visceralis-Syndroms
13.15 – 13.30 **Egbert TANNICH**: *Dirofilaria repens*: Ein zoonotischer Arbonematode mit zunehmender Bedeutung auch in Zentraleuropa
13.30 – 13.45 **G. HAASE**: Importierte *Mykosen* - Implikationen für die Labordiagnostik und deren Qualitätssicherung

14.00 – 15.00 **EMERGING INFECTIONS & CO-INFECTIONS**
Chair: Erich SCHMUTZHARD & Harald NOEDL

14.00 – 14.45 **PLENARY LECTURE**
Martin HADITSCH (Leonding & Hannover): (Re-)Emerging Infections

14.45 – 15.00 **Angelika WAGNER**, E. GARNER-SPITZER, J. JASINKA, M. PAULKE-KORINEK, M. HOFER, K. STIASNY, F.X. HEINZ, H. KOLLARITSCH, U. WIEDERMANN: Is the immune response/protection to primary immunisation with a Japanese Encephalitis vaccine sufficient in the travelling elderly?

15.05 – 15.45 guided **POSTERSESSION I – MEDICAL ISSUES**
Chair: Peter G. KREMSNER

M01 **Mirjana DRINIĆ**, I. SCHABUSSOVA, A. WAGNER, B. RUTTKOWSKI, A. JOACHIM, U. WIEDERMANN: *Toxoplasma gondii*-derived immunomodulators for prevention and therapy of allergy
M02 **Ursula FÜRNKRANZ**, B. HENRICH, J. WALOCHNIK: *Trichomonas vaginalis* as a host and reservoir for *Mycoplasma hominis*: an in vitro infection model to study impacts on drug susceptibility and cytopathogenicity
M03 **Julia MATT***, S. SCHLOSSER, M. DUCHÊNE: TatD as a possible cause for DNA degradation in *Entamoeba histolytica* after metronidazole treatment
M04 **Stefan HOPF**, E. GARNER-SPITZER, M. HOFER, I. DEMEL, M. KUNDI, O. KISTNER, U. WIEDERMANN: Comparison of subcutaneous and intramuscular application of FSME-Immun® vaccine: characterization of cellular and humoral vaccine specific immune responses
M05 **Adelheid G. OBWALLER***, W. PÖPPL, G. MOOSEDER, A. FAAS, J. WALOCHNIK: Antibodies against *Leishmania* spp. in Austrian soldiers returning from missions in the Lebanon, Syria and Bosnia: A cross-sectional survey
M06 **Christina STÖCKL**, M. MEILINGER, M. POLLHEIMER, P. KERN, E.C. REISINGER, K. SEEBER, R. KRAUSE, H. FLICK, M. HÖNIGL: Alveolar echinococcosis – still a deadly disease
M07 L. KOLÁŘOVÁ, **Jana CHOUTKOVÁ**, P. KOLBEKOVÁ, M. LEISSOVÁ: Czech National Reference Laboratory for Tissue Helminthoses
M08 **Michael DUCHÊNE**: James P. Grant - a silent hero

15.45 – 16.15 *Coffee break*

16.15 – 17.45 guided **POSTERSESSION II – VETERINARY ISSUES**
Chair: Georg DUSCHER & Christoph HÖRWEG

V01 **Imtiaz HUSSAIN**, P. GANAS, M. HESS: Attempts to improve the *in vitro* cultivation system for *Histomonas meleagridis*

V02 C. STENGL, K. WILDING, C. EDERER, E. FLECHL, H.-P. FUEHRER, **Barbara HINNEY**, A. JOACHIM: Feline Protozoa – is there a risk for cats and owner?

V03 H. DVOŘÁKOVÁ, **Martin KAŠNÝ**, L. JEDLIČKOVÁ, K. SKIPALOVÁ, J. ILGOVÁ, E. DZIKA, B. KOUBKOVÁ, M. GELNAR, L. MIKEŠ: Bioactive molecules of the blood-feeding monogenean *Eudiplozoon nipponicum*

V04 E. ŠRÁMOVÁ, L. ŠKORPÍKOVÁ, J. ILGOVÁ, B. KOUDELA, M. GELNAR, **Martin KAŠNÝ**: The functionally molecules from excretory-secretory products of three *Trichinella* species

V05 J. KLUGE, A. BLUTKE, T. ROMIG, **Martin KNAUS**: Alveolar echinococcosis in an Australian shepherd dog from Upper Bavaria, Germany

V06 **Sarah DOLL***, B. HINNEY, A. JOACHIM: Variability of strongyle egg shedding in standardbred horses stabled in Vienna

V07 **Steffen REHBEIN**, M. VISSER, I. JEKEL, C. SILAGHI: Endoparasites of fallow deer (*Dama dama*) of the Antheringer Au in Salzburg

V08 **Shi YAN**, S. SERNA, N-C. REICHARDT, A. JOACHIM, I.B.H. WILSON, K. PASCHINGER: Novel glycoepitope as a potential anthelmintic agent and the perspective of antigen biosynthesis

V09 A. O'DONOGHUE, **Lenka ULRYCHOVA**, P. FAJTOVA, C.R. CAFFREY, J.H. McKERROW, M. MARES, M. HORN, C.S. CRAIK, J. DVORAK: A global profiling of specificity of secreted proteases at multiple stages of *Schistosoma* life-cycle

V10 A. SMETKO, **Katja SILBERMAYR**, A. SOUDRE, S. MÜLLER, S. BURGSTALLER, J. SÖLKNER: Trypanosomosis tolerance in crossbred West African cattle: different ancestries in different regions of the genome

V11 **Christian MELAUN**, A. WERBLOW, S. KLIMPEL: *Culex* spp. – Vectors of various arboviruses

V12 **Carina ZITTRA**, J. WARINGER: Species inventory, ecology and seasonal distribution patterns of Culicidae (Insecta: Diptera) in the National Park Donau-Auen

V13 I. STAUDINGER, E. KAHNT, **Barbara GUßNER**: An assessment of parasitological examination methods of feces, with particular emphasis on practicality and diagnostic value, as well as a quantitative validation of the modified McMaster method and a subsequent comparison with the semi-quantitative glucose-sodium chloride flotation

V14 **Katja SILBERMAYR**, C. HORVATH-UNGERBÖCK, B. EIGNER, A. JOACHIM, N. SASTRE, L. FERRER: New genetic tools for the detection and discrimination of the three feline Demodex mites

V15 **Karl SCHÖPF**, C. HEBEL, J. WEIKEL, W. GLAWISCHNIG, E. HOFER, S. REVILLA-FERNÁNDEZ, L. STADLMÜLLER, F. SCHMOLL: Evaluation of diagnostic testing tools for bovine tuberculosis

V16 **Christoph HÖRWEG**, H. PROSL, G. DUSCHER, A. JOACHIM: Zur Geschichte und Entwicklung der ÖGTP(M)-Homepage – in memoriam Karl Sieber (1960-2013)

18.20 Bus transfer to the Evening Event – Departure Vetmeduni Main Entrance

19.00 **EVENING EVENT at the Naturhistorisches Museum Wien**
(Burgring 7, 1010 Wien, Main Entrance Maria-Theresien-Platz)

with HANDING OVER of the JUNIOR-AWARD *(sponsored by Pfizer)*
HANDING OVER of the POSTER-PREIS *(sponsored by Pfizer)*

Musical accompaniment by the Walter Fend Quartett (Korneuburg)
(sponsored by Verein für Veterinärmedizinische Parasitologie)

SATURDAY, NOVEMBER 23rd

FORTBILDUNG ÄRZTE/APOTHEKER (in German language)

08.30 – 09.00 Entrance and registration

09.00 – 11.00 **MIGRATION & INFEKTION**
Chair: Ursula WIEDERMANN

09.00 – 09.30 **Herwig KOLLARITSCH**: Reiseimpfungen - Update
09.30 – 10.00 **Anja JOACHIM**: Parasitäre und vektorübertragene Zoonosen als Reisekrankheiten aus Sicht des Veterinärmediziners
10.00 – 10.30 **Maria PAULKE-KORINEK**: Meningokokken – Epidemiologie und Impfungen
10.30 – 11.00 **Angelika WAGNER**: Japanische Enzephalitis: Risiko für den Reisenden & Prävention

11.00 – 11.30 Coffee break

11.30 – 12.30 **FRAGEN ZUR REISEMEDIZINISCHEN PROPHYLAXE: QUIZ mit VOTING** *(sponsored by MSD)*
Moderation: Herwig KOLLARITSCH

12.30 END

Ascaris suum, another parasite causing a visceral larva migrans syndrome

Herbert Auer, Renate Schneider

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Since the mid-20th century we know that *Toxocara canis* and *T. cati* are causing organisms of a visceral (VLM) and ocular larva migrans-syndrome (OLM). The infection occurs when infective *Toxocara* eggs or raw or undercooked meat (i. e. poultry, feasons, rabbits) containing *Toxocara* larvae are ingested orally. Today we know at least five different clinical pictures (VLM sensu stricto, OLM, covert toxocarosis, common toxocarosis, cerebral toxocarosis) within the VLM-syndrome sensu lato.
Since a considerable outbreak in Japan in the 1990ies also *Ascaris suum*, the pig roundworm, could be recognised as parasite causing a visceral larva migrans-syndrome. Numerous casuistic reports document that *Ascaris suum* can induce eosinophilia, pulmonal and hepatic symptoms, skin (urticaria) and eye-disorders, encephalo-, cardiopathies and myositis.
Our institute has established a Westernblot test, using *Ascaris suum*-excretory-secretory antigen, for the detection of specific antibodies in the serum of patients with suspected visceral larval migrans syndrome many years ago. Hundreds of sera have been examined meanwhile by serological tests using *Toxocara canis*-E/S antigen (ELISA and Westernblot) on one hand and *Ascaris suum*-E/S antigen (WB) on the other. Our studies show that not only *Toxocara* spp., but also *Ascaris suum* may be considered as serious cause of a VLM-syndrome sensu lato.

Many ways how to look at a bird schistosome

Jana Bulantová

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Imaging of parasites belongs to techniques used in all areas of parasitology, from education of students and basic research, up to clinical diagnostics and subsequent therapy in medical and veterinary practice. Nevertheless, any of these fields requires its own specific approach to the use of imaging techniques.

The simplest way how to observe a parasitic worm is a native installation of living specimens under the light microscope where activity of important organs (e.g. flame cells and excretory ducts) can be seen better than in fixed material. Application of DIC or phase contrast is helpful in these cases, as well as addition of contrasting intravital dyes.

Further characterization of various organs of worms or host tissues surrounding the parasite body can be performed by use of various staining protocols for whole mounted worms as well as histological sections. Resulting (usually) permanent slides are valuable for subsequent morphometrical analysis or detection of pathological processes in the host tissue.

Modern imaging methods are often accompanied by application of fluorescent dyes and their subsequent detection by fluorescence microscopes, confocal laser scanning microscopes, spinning disc systems or light sheet microscopic systems, i.e. instruments that enable specific detection of structures/organs/organelles in 2D or 3D. If these approaches are linked up to scanning and transmission electron microscopy, we obtain benefits of specific labeling together with resolution on ultrastructural level.

Properly chosen imaging methods applied to our model bird schistosomes of the genus *Trichobilharzia* helped us to acquire data about thorough morphology of muscle system during worm ontogeny, revealed new ways how to visualize chaetotaxy or parts of excretory system, enabled 3D reconstruction and volume estimation of penetration glands in cercariae and shown localization of main antigens in various stages of the worms.

Also combination of modern imaging methods and molecular/biochemical approaches may produce valuable data. *In situ* hybridization enabling localization of specific genes, microdissection of organs for subsequent mass spectrometry analysis or microtomography can be mentioned as examples of techniques which are now tested in our laboratory.

The project is supported by the Czech Science Foundation (Grant No. 13-29577S)

Glycocalyx changes in bird schistosome cercariae transforming to schistosomula

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The flukes *Trichobilharzia* spp. (Trematoda, Schistosomatidae) are avian pathogens related to the medically important human parasites of the genus *Schistosoma*. Penetrating cercariae are well known as causative agent of cercarial dermatitis in humans; this is regarded as a re-emerging disease in many countries all over the world.
Cercarial stages, which leave the snail intermediate host, actively penetrate the skin of birds and mammals including man and transform to schistosomula. During the transformation, cercarial surface undergoes extensive changes. Schistosomulum creates a double outer tegumental membrane with protective function, and the highly immunogenic glycocalyx which represents a protective coat in the aquatic environment is actively shed. Glycocalyx has a specific composition of saccharide molecules which are bound to lipids or proteins on the membrane of cercarial tegument. There is only limited information about the mechanism of its shedding. Hypotheses based on indirect evidences suggest that peptidases or (phospho)lipases from cercarial penetration glands might be involved.
We described changes in surface glycosylation of cercariae of *T. regenti* and *T. szidati* during transformation using fluorescent lectins and monoclonal antibodies against Lewis X antigen. The reactivity of cercariae with fluorescent lectins dramatically changed in context with the secretion of penetration glands induced by linoleic acid. Upon the contact with the content of glands, the surface did not bind these lectins anymore; glycocalyx has been shed. This process was also induced by lectins themselves, especially by those possessing specificity to fucose. Saccharide profiles on surfaces of cercariae and schistosomula of *T. regenti* are significantly different. Lectins UEA-I, LTA and PNA have been chosen as markers of transformation. Our results showed, that Lewis X antigen is gradually expressed on the surface of *T. regenti* schistosomula. The expression started on the anterior end of 1 day old schistosomula and then expanded over the entire body of schistosomula during their maturation.
In following step of our project, we would like to find and optimize a method for isolation of cercarial glycocalyx for further employment in immunological studies, and characterization of its saccharide composition.

Acknowledgements: Czech Science Foundation grant no. 13-29577S.

The cruise of *Trichobilharzia* infection in mice with induced T_H1 - polarized cell immune response

Marta Chanová

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Cercariae of bird schistosomes of *Trichobilharzia* spp. are able to penetrate the skin of mammals including human as non-specific (abnormal) hosts. Experimental infections lead to their successful transformation into schistosomula - the larvae partially developing, migrating through several tissues/organs and causing more or less severe pathologies. However, schistosomula do not mature and parasite life-cycle fails.
Previous studies on schistosomula migration in experimentally infected mice revealed the majority of successfully penetrating cercariae being localized in skin; the rest migrate through the host body using specific migratory routes. Our recent findings showed that the ratio of worms which migrate from the skin and invade particular tissues/organs may change under certain immunological conditions. The aim of the present study was to evaluate the impact of non-specific immunostimulation (and subsequent change in polarization of systemic cell response) on the cruise of *Trichobilharzia* infection in mamals.
For this reason, naive and non-specifically immunostimulated BALB/c and C57/BL6 mice (predisposed for development of T_H2 and T_H1 polarized response, respectively) were infected with cercariae of *T. regenti*. Host-parasite interactions (localization and abundance of schistosomula, histopathological changes in invaded tissues and systemic cell response) were followed 1-15 days post infection. Particularly, spinal cord, brain, heart, lungs, liver and kidney were tested for parasite presence; histological and immunohistochemical methods for histopathological observation were applied on sections of spinal cord and brain. Markers of T_H1 and T_H2 cell immune response were followed in the blood using flow cytometry.
The study revealed that induced shift towards T_H1 response positively correlates with the speed and intensity of schistosomula migration towards CNS and with the severity of accompanying tissue injuries. These observations indicate increased health risks associated with *Trichobilharzia* infection for mammalian hosts (potentially also human) with previously modulated cell immune response, which may occur under natural conditions e.g. due to exposure to other infectious agent.

Acknowledgment: Czech Science Foundation (P302/12/P548); Charles University in Prague (PRVOUK P25/LF1/2; UNCE 204017).

Tuberculosis and HIV: are migrants hit harder

Piotr Cichoń, Norbert Vetter

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The incidence of tuberculosis in the European WHO region has fallen continuously since 2001 (42 cases per 100,000 inhabitants in 2011) [1]. There are dramatic differences in the incidence among the countries of the region, ranging from lower than 1 to over 200 cases /100,000.
In contrast to low TB rates in Western Europe, there is a remarkable proportion of cases in patients of foreign origin, reaching 70% (UK) to 89.4% (Sweden) of cases notified 2011.
Although less prominent, this disproportion also exists in Austria: 43.8% of 685 cases notified in 2011 had foreign citizenship, and 52.9% of 649 were born abroad, meaning 4.75 incident cases/100,000 among native Austrians and 34.9 among foreigners. There has been a long-term drop in TB incidence in Austria in both subpopulations since 1997, appearing as two separate and parallel falling curves [2].
The migrants represent the majority of drug-resistant cases in Austria 2011: in comparison to native Austrians they showed a 5.9 times higher incidence of monoresistant TB (16 vs.12 cases respectively); all cases of multidrug and extensively drug-resistant tuberculosis were found in migrants (13 and 6 cases respectively) – the rates have increased since 1997.
There are several phenomena that could explain the above epidemiological discrepancies:

- The migrants in each country are divided in subpopulations, showing different TB rates depending on patients' origin [3].
- The risk of active TB persists several years beyond the time of arrival (50% of TB cases occurred within 7 years after arrival according to an Australian study), suggesting the possibility of active transmission in the host country [3], within the individual ethnic subpopulation [5].
- Atypical clinical presentation with frequent extrapulmonary manifestation may be responsible for delayed diagnosis in migrants [1] [4].
- Several European studies have shown that there is no relevant risk of active TB transmission from the migrant to the native population [5][6].

The epidemiology of HIV infection in the European WHO region shows similar inhomogeneity – the HIV incidence has remained stable in Western Europe (6.5/100,000 in 2011), AIDS and mortality rates are falling slowly, whereas in Eastern Europe the statistics increase (incidence 22.4/100,000 in 2011). [7].
Whereas in Eastern Europe HIV transmission occurs mostly through heterosexual contacts and intravenous drug use, in the Western regions the epidemic is fuelled mostly by homo-/bisexual men, followed by heterosexual contacts, among which the migrants were the strongest group until recently. 37% of all cases of new infections through heterosexual contacts in the EU/EAA Region in 2011 came from high prevalence countries, mostly from sub-Saharan Africa.
The estimated HIV incidence of 3.5/100,000 in Austria in 2011 is lower than the overall incidence in the EU/EAA region (5.7/100,000). This estimate originates from the Austrian HIV Cohort Study (AHIVCO) that is based in 7 HIV treatment centres in Austria and has studied the data of over 85% of all treated people living with HIV (PLWH). An estimated number of 7,524 to 8,465 people were living with HIV at the beginning of 2013 in Austria [8].

Since 1997 migrants have represented an increasing proportion of PLWH in Austria, accounting for approx. 50% of all new infections since 2006. 10.6% of all 3,694 patients treated in AHIVCO 2011 came from countries with a higher prevalence: 70% from sub-Saharan Africa, 15% from South-East Asia and 13% from Russia and Ukraine. Most of them were females (57.7%) and were infected through heterosexual contact (88%) [9].
Substantial differences were shown in migrants in comparison to native Austrian patients of AHIVCO for several characteristics (odds ratio in brackets, adjusted for age, gender, mode of transmission, city-dwelling and treatment changes):

- delayed HIV diagnosis: expressed in immunologic parameters showing lower CD4-cell count at the diagnosis (1.6).
- delayed or lacking antiretroviral therapy despite clear indication (2.5).
- inefficient treatment: positive HIV viral load under antiretroviral therapy (1.8).
- more frequent treatment interruption and loss of follow-up (2.9).

Summary: Tuberculosis and HIV still pose a substantial problem in Europe and Austria. Therefore, the strategies for prevention and treatment should consider particular epidemiological patterns as well as socioeconomic and cultural characteristics of migrant subpopulations.

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Acanthamoeba as host model system for intracellular growth of legionellae

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Our central hypothesis is that the abundance of medically relevant legionellae in diverse anthropogenic water systems is being severely underestimated, mainly due to the non-culturability of a considerable percentage of the *Legionella* populations. *Legionella pneumophila* can infect the human lung, replicate within alveolar macrophages and cause, besides milder forms, Legionaires' disease. Free-living amoebae are known to be reservoirs and vehicles for *L. pneumophila*, which, in some cases, like under poor nutrient conditions, may enter the viable but non-culturable (VBNC) state. There is evidence that a formerly non-culturable *Legionella* strain may become resuscitated and be converted into a culturable state by – eventually multiple – passages through amoebae. Furthermore intracellular replication in amoebae may trigger the ability of pathogenic legionellae to infect human macrophages. The final aim of the project is to isolate *VBNC* legionellae from environmental water samples and investigate their infectious potential. The establishment of two amoeba (*Acanthamoeba* genotype T4 and *Vermamoeba vermiformis*) and two macrophage-models (THP1, U937) is planned. The amoeba models will be used as "training grounds" for legionellae to test the survival and resuscitation potential of VBNC legionellae in their hosts. The infectivity for human macrophages before and after passage through amoebae will be tested in human cell lines. In the *Acanthamoeba* host model the presence of viable, replicating intracellular bacteria was already assessed by FISH. Contrary to expectations, the infection process was more successful when the amoebae felt comfortable, concerning environmental conditions like pH, nutrients and temperature. When they were exposed to osmotic stress or the incubation-temperature was not optimal, legionellae were only attached to the amoebal surface but could not penetrate the amoebae and replicate. This was not only due to the rapid encystation of the amoebae because of bad environmental conditions, but also in the trophozoites no penetration was observed. We will investigate whether this finding is also valid for *Vermamoeba vermiformis* and macrophages.

Variability of strongyle egg shedding in standardbred horses stabled in Vienna

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A theoretical basis for the selective treatment approach in horses with strongyle infestation is the assumption that strongyle egg shedding is constant in individual animals. To test this assumption, in this study we examined the predictive value of single faecal examinations for strongyle egg shedding over a one-month time span. The study was performed in a population of standardbred horses without access to pasture.
To increase reliability, two egg-counting techniques were carried out for each sample: the combined sedimentation/flotation technique (semiquantitative) (S/F) and the McMaster technique (quantitative) (McM).
60 horses from 6 stables (picked randomly from a population of about 200 horses from 14 stables) were examined with S/F and McM. Both methods demonstrated very good correlation (R = 0,844). Furthermore, it could be shown that the accuracy of the McM method increased with higher strongyle egg counts.
In a second step, 20 horses from 4 stables (from the population already examined in the first phase) were examined in a one-month longitudinal study to test the predictive value of a single faecal examination. Half of these horses showed strongyle egg shedding in the original evaluation. Animals that were positive for strongyle egg shedding were tested every other day for a time span of one month. Animals with a negative finding were tested every other week.
There was a clear tendency for horses with high strongyle egg shedding to remain high egg shedders and for those with low strongyle egg shedding to remain low egg shedders. Both are separated by an evident “critical EpG range and limit” (CRL) specific for this population. CRL is an EpG limit defined within a range outside of which the population is divided in two groups of either high or low shedding horses. CRL depends mainly on three factors: casual composition of different egg shedding, types of individuals in each population, climate period within year and effectivity of McM. Even though it was not possible to predict the exact heights of egg shedding for a short time span, there is a characteristic EpG-width for longer time span (coefficient of variation). Therefore as a specific result selective treatment approaches are assumed to be applicable on this population relating to CRL. The optimal cut off value for selecting horses that are suitable for treatment will be discussed.

Toxoplasma gondii-derived immunomodulators for prevention and therapy of allergy

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The inverse relationship between infection with certain parasites and a reduced incidence of allergic disease has been repeatedly confirmed in numerous epidemiological and experimental studies. The so called "hygiene hypothesis" has opened a new field in allergy research aiming at identifying parasite-derived immunomodulators.
In this respect, we have previously shown that infection with *Toxoplasma gondii* prevented allergic immune responses and airway inflammation in a mouse model of type I allergy.
More recently, we have shown that the infection is not prerequisite and allergy can be reduced by application of inactivated parasites. Aim in this study is identification, characterization, and production of *T. gondii*-derived molecules with immunomodulatory potential.
The lysates of two infectious stages of the parasite, namely tachyzoites and oocysts, were prepared in order to test their protective effect on the development of allergic inflammation in a mouse model of birch pollen allergy by investigating airway inflammation, lung histology, serum antibody titers, as well as cellular responses. Different biochemical and proteomic techniques such as normal- and reversed-phase HPLC, 2D gel electrophoresis, followed by MALDI-TOF-MS and ESI-MS/MS will be used for characterization and fractionation of *T. gondii* lysate with the final aim to identify specific compounds with immunomodulatory/anti-allergic properties. The promising candidates will be tested in experimental *T. gondii* model *in vivo* as well as on human cells.

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James P. Grant - a silent hero.

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Poliomyelitis is also called polio or infantile paralysis. This viral infectious disease has been with mankind for a long time, but it became really widespread towards the end of the 19th century and in the beginning of the 20th century. Polio infections mostly cause no symptoms, in 10% of the cases the symptoms are flu-like. In 1% of the patients there are neurological symptoms that can be peripheral or in severe cases, can lead to respiratory paralysis. So in 1914 there was a grave epidemic in the USA killing 27000 young people. After the invention of the iron lung in 1928, patients could be saved but after further epidemics, thousands had to be treated with this complex respirator. In the Western World, the disease lost its horror through the development of a vaccine from killed virus by Jonas Salk in use from 1955 and soon afterwards the attenuated live virus vaccine by Albert Sabin in use from 1962. By 1980 only about 15% of the children were immunised and every year, about 400000 children were crippled for life by polio. In 1980, James P. Grant became executive director of UNICEF (United Nations Children´s Fund) and decided to change this. Jim Grant as he was called was born in China in 1922 to parents from the USA, his father was Director for Hygiene and Public Health at the Union Medical College in Peking. He was soldier in the Second World War and took part in programs for refugees, afterwards he studied at the Harvard Law School. When he finally was hired for his UNICEF post, he used his chances to meet the Country Rulers to the utmost to propagate child vaccination. In some cases like in El Salvador, he even managed to stop a civil war for the purpose of child immunisation. By 1995, about 80% of all children worldwide were immunised and the number of severe crippling polio cases had dropped to one fourth and continued to drop until today, so that eradication of polio is in sight. Jim Grant also strongly pushed measles, tetanus, diphtheria and TB vaccination, breast feeding, oral rehydration therapy for children´s diarrhea as well as iodination of salt. Jim Grant died in office in 1995, and we owe him the knowledge, that all the children of the world can be immunised at high enough rates that serious diseases of mankind can really be eradicated.

Glutathione S- transferase (GST) affects the permethrin detoxification in the brown dog ticks, *R. sanguineus*

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The brown dog tick, *Rhipicephalus sanguineus*, is distributed worldwide in temperate climates. Although mammals including humans are attacked, this tick species prefers dogs as hosts. Countermeasures against ticks are performed by using acaricides and repellents, often composed with permethrin as active substance.
During application in the field, sublethal doses of this acaricides can be expected due to the lack of compliance with manufacturer instructions by the owners.
By using RNA interference (RNAi) we studied the impact of glutathione S-transferase (GST) during detoxification of ticks poisoned with sublethal doses of permethrin. Therefore ticks were injected with double stranded dsRNA of the GST gene and thereafter were exposed to different dilution steps of permethrin. Then the ticks were put on a host (sheep) to evaluate biological parameters like feeding duration etc. Silenced ticks displayed a higher susceptibility to permethrin than the control groups. In the highest dose group (50.3 ppm) all injected ticks died, whereas in the corresponding control ticks were able to overcome the poisoning.
We also observed different attachment patterns of intoxicated and non-intoxicated ticks. Latter groups fed clustered together in groups, while poisoned ticks attached in a scattered pattern. Intriguing was, that repletion times of ticks expose to the highest permethrin concentration were shorter than in the groups of ticks with a lower dosage of permethrin. The observation of other biological parameters, like engorgement and egg mass weight, did not reveal significant differences.
In summary, silencing of one GST gene led to an increased susceptibility of ticks to permethrin. Our findings will provide an important basis near future for developing new countermeasures against ticks.

Bioactive molecules of the blood-feeding monogenean *Eudiplozoon nipponicum*

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Monogeneans of the family Diplozoidae are ectoparasitic blood-feeders inhabiting the gills of cyprinid fish. They can be significantly virulent to their hosts, causing mechanical damage to gill filaments accompanied by a risk of secondary bacterial and mycotic infections or anemia. In contrast to other blood-feeding parasites, the host-parasite "communication" at the molecular level is among monogeneans largely unknown.
We performed the first insights into molecular biology of diplozoid parasites by exploring the transcriptome of the adult stage of *Eudiplozoon nipponicum* (group Heteronchoinea), using 454 sequencing technology (GS FLX System, ROCHE). We are primarily focused on identification and characterization of selected molecules involved in host-parasite interaction. Special attention is paid to molecules participating on digestion of host´s blood (e.g. proteolytic enzymes - peptidases) and other molecules (e.g. anticoagulants) playing essential role in biological processes in the parasite.

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Dirofilarioses in Hungary

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During the last ten years it has been shown that *Dirofilaria repens* infection in dogs is more frequent than it is currently considered in Hungary. The aim of our surveys was to collect data about the infection of dogs (and cats) from different regions of the country by detecting the microfilariae in blood samples. The first autochthonous *D. immitis* dog case was found in 2007 in Hungary. After this, in the last five years the number of cases of heartworm infection detecting by autopsy are increasing in certain areas. The background of the frequent infection with these species was investigated, such as the environmental circumstances, the lack of applying of preventive methods by the owners, too. Visiting or living at the coastal areas of rivers seems to be a significant risk factor to acquire the infection. Unfortunately, it can be concluded that the administration of the information about the spreading and importance of dirofilarioses is still deficient in spite of the frequency of these helminthoses. In addition, due to the economical crisis the most of the dog owners cannot spend enough (or not at all) money for the mosquito control or prevention.
The studies highlighted the possible zoonotic risks for humans living in the regions where the positive animals were found. These works were conducted not only with the supporting of different grants, but these were done in the frame of PhD, graduate and postgraduate studies, too. The baseline records of these works would be useful for veterinarians working in the small animal praxis to help them in the recognition and prevention of dirofilarioses.

Imaging motile parasites during transmission of malaria

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Malaria parasites are transmitted to the vertebrate host by mosquitoes. For over hundred years it was believed that they are directly injected into the blood. However, in vivo imaging has shown that they are injected into the skin of the host opening a new field for research and intervention. The parasites migrate with high speed to find and enter a blood vessel (1). Parasite motility is based on an actin-myosin motor and the formation and turnover of substrate adhesion sites by integrin-like surface proteins (2). Curiously, these parasites are curved and migrate on flat substrates in only one clock-wise direction. Electron tomography revealed a chiral arrangement of the microtubule cytoskeleton that suggests a polarized secretion of adhesion receptors, which are coupled to short actin filaments to provide traction (3). This suggests that the parasite evolved a unique way of achieving extremely rapid cell motility by coupling an acto-myosin based motor to microtubule dependent cellular shape. In the lecture I will focus on the different microscopy approaches we use in combination with techniques from physical chemistry (e.g. 4, 5) to study the molecular mechanism that underlie malaria parasite motility in the hope that they stimulate the audience to apply them to their own research paradigm.

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The use of Direct PCR for the analysis of vectors and parasites

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For diagnosis and phylogenetic analyses, of both vectors and parasites, novel molecular techniques are needed. These should not only provide accurate results but also save time and samples (e.g. use of one mosquito leg only).
In the past decades the improvement of molecular diagnostic tools (e.g. PCR, real-time PCR) has resulted in the availability of far more sensitive tools. The use of Direct PCR allows for PCR amplifications without any prior DNA extraction and purification steps. The Phusion® blood DNA polymerase used in the assay is reported to lead to a 25-fold lower error rate in comparison with common *Taq*-polymerase.
The aim of this study is to adapt this novel Direct PCR technique for use in the rapid lab-based diagnosis of parasites and vectors and validate the sensitivity in comparison to conventional diagnostic techniques.
This technique has shown to be useful for the molecular diagnosis/classification of protozoan blood parasites (e.g. *Plasmodium*), filarioid helminths, insects (e.g. mosquitoes) and mites (e.g. ticks).

Trichomonas vaginalis as a host and reservoir for *Mycoplasma hominis*: an in vitro infection model to study impacts on drug susceptibility and cytopathogenicity

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Trichomonas vaginalis can provoke several clinical symptoms and infection during pregnancy can seriously affect the foetus. However, approximately 50% of all infections with *T. vaginalis* (mainly in men) do not cause illness. The differences between *T. vaginalis* strains causing symptoms and those not causing symptoms have not been completely elucidated yet. Interaction of *T. vaginalis* with *Mycoplasma hominis* – a small cell wall-lacking bacterium that is also known as a pathogen of the urogenital tract – has been reported in up to 94% of clinical isolates of the parasite. This interaction is assumed to enhance pathogenicity of the parasite *in vitro,* and to influence the drug susceptibility of *T. vaginalis.* The overall goal of the project is to elucidate the impacts of this interaction on several behaviours of both pathogens, as well as the benefit(s) for the respective organism. First steps will be the creation of a stable *in vitro* co-culture of *T. vaginalis* with *M. hominis* and characterization of the requirements for perpetuation. During the three-year duration of the
project it is aimed to further characterize these *T. vaginalis/M. hominis* co-cultures in detail: the role of this interplay in cytotoxicity and drug sensitivity of *T. vaginalis* and *M. hominis*, a possible transport-function of *T. vaginalis* for the bacteria to host cells or other bacteria-free *T. vaginalis*, localization of the bacteria inside their parasite and human hosts, as well as changes in the transcriptome of the human host-cells due to infection with *M. hominis*.

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Pattern recognition receptors and immunomodulatory cytokines in the small intestine of *Cystoisospora suis* – infected piglets

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Cystoisospora suis, the causative agent of neonatal porcine coccidiosis, infects the enterocytes of the small intestine. The resulting non-haemorrhagic diarrhoea leads to reduced weaning weights and considerable economic losses in pig breeding industries worldwide. Little is known about the local reaction in the intestinal mucosa to this parasite. To further investigate the innate immune responses, mRNA expression of pattern recognition receptors (TLR-2, TLR-4, TLR-9, and NOD2) and pro-inflammatory and immune-regulatory cytokines (TNF-α and TGF-β1, respectively) was analysed using RT-qPCR. *C. suis*-infected piglets (infection with 1000 oocysts on the third day of life) were compared to non-infected control animals. Snap frozen mid-jejunum of 51 animals of 5 age groups (day of life 7, 9, 12, 15 and 18, respectively) were examined. In infected piglets the TLR-2 mRNA levels were significantly increased on day 7 (3.1-fold; $p = 0.016$) and day 15 (3.6-fold; $p = 0.008$) compared to non-infected animals. Also significantly higher NOD2 mRNA levels in infected animals were found on day 7 (3.7-fold; $p = 0.032$), day 12 (2.1-fold; $p = 0.032$) and day 15 (2.4-fold; $p = 0.016$). Infection with *C. suis* led to a significant increase of TNF-α mRNA level on day 7 (2.8-fold; $p = 0.032$). No differences between infected and non-infected piglets were found for mRNA expression levels of TLR-4, TLR-9 and TGF-β1. Our results indicate that TLR-2 and NOD2 are involved in the etiopathology of a *C. suis* infection and may be responsible for recognition of the parasite. The simultaneous increase of TLR-2, NOD2 and TNF-α mRNA levels might suggest an interaction between these factors.

Isolation and identification of *Trichomonas gallinae* from outbreaks of finch trichomonosis in Austria

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In recent years, *Trichomonas gallinae* emerged as the causative agent of an infectious disease of passerine birds in Europe leading to epidemic mortality of especially greenfinches *Chloris chloris* and chaffinches *Fringilla coelebs*. After the appearance of finch trichomonosis in Great Britain and Fennoscandia, the disease spread to Central Europe. Finch trichomonosis first reached Austria in 2012. In the present study *in vitro* cultures of Austrian *T. gallinae* isolates were established from oesophagus and/or crop lesions collected at *post mortem* examination of birds. For some of the isolates, cultivated under xenic condition, clonal cultures were generated by micromanipulation and *in vitro* propagation. Moreover, a clonal culture of the finch-trichomonad isolates was successfully used for axenization. The axenically grown isolates *Trichomonas gallinae*/Greenfinch/Austria/11490-C1/12 showed equivalent growth behaviour in regard to other axenic clones of *T. gallinae*, cultivated in Trichomonas Medium, Oxoid. Furthermore, the genetic heterogeneity of *T. gallinae* isolates from incidents in Austria was investigated and compared with British isolates. For this purpose comparative sequence analyses of the four genomic loci ITS1-5.8S-ITS2, 18S rRNA, *rpb1* and Fe-hydrogenase were performed. The results corroborate that one clonal *T. gallinae* strain caused the emerging infectious disease within passerine birds and that the disease is continuing to spread in Europe. The same clonal strain was also found in a columbid bird from Austria. Additionally, the present study demonstrates evidently the importance of multi-locus sequence typing for discrimination of circulating *T. gallinae* strains.

Case report: An outbreak of fasciolosis with high mortality in a Tyrolean sheep flock

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Fasciola hepatica, the common sheep liver fluke, is a tapeworm of the class trematoda and causes great economic losses in sheep and cattle.
End of October 2012 several sheep carcasses from a farm located on a plateau above the inn valley where submitted by the local veterinary practitioner to the AGES laboratory for post-mortem examination. The premise keeps about 300 sheep from the breed "brown mountain sheep". Besides sheep also cattle are farmed. The sheep were distributed over 5 different alpine mountain pastures during summer pasture season. Coming back from the mountain pastures about 150 animals where temporarily hold on a wet pasture located not far from the home farm.
After taken indoors about forty animals suddenly fell ill with inappetence and weakness. Out of this group 14 animals showed severe clinical symptoms, such as pallor, loss of condition, lethargy and ascites. Death occurred within a few days. Meat inspection of slaughtered juvenile animals revealed pathological lesions in the liver.
Post mortem findings were severe ascites with massive fibrin exudation. The liver was highly enlarged and multiple bleedings on the surface of the organ could be detected. In histology large areas of haemorrhages were observed in liver tissue. In some histological slides parasitic organisms could be detected and could be diagnosed as mesocercariae of the trematode *Fasciola hepatica*.
After diagnosis the sheep flock was immediately treated by the local veterinarian. In total 72 animals died causing great economic loss for the farm.
Our results give evidence that sheep were infected on the pasture located near to the farm. We suppose that special weather conditions in the past caused a high increase of the intermediate host which was responsible for the dramatic parasitic infection.

Importierte Mykosen - Implikationen für die Labordiagnostik und deren Qualitätssicherung

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(Re-)Emerging Infections

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Traditional infections usually show stable, undulating or dropping numbers. In contrast (re-)emerging infections are characterized by increasing numbers and thus – depending on the awareness – are more likely to be perceived as a threat.
In seems important to differentiate pseudo-emerging infections (i.e. perceived increase, only) from proven re-emerging infections (steady, sometimes even dramatic increase after a substantial decrease of a traditional pathogen) and truly emerging infections (by „new" pathogens which includes those entering new regions, those crossing the species barrier and those really new).
Based on the unknown threat posed by some of these infectious agents the three pillars of prophylaxis (to avoid exposure – to stimulate immunity – to take (prophylactic) anti-infective drugs) are important to know and should be followed whenever possible.
The phenomenon of pseudo-emergence may be due to several reasons and should be considered whenever comparative data are analysed (examples will be provided). If ruled out and a sufficient surveillance system as well as adequate diagnostic tools are in place a rise in cases may be attributed to a real (re-)emerging pathogen and / or infection.
The list of examples includes re-emerging diseases like African trypanosomiasis, anthrax, Chikungunya, cholera, Dengue fever, gonorrhoea, hepatitis A, malaria, measles, pertussis, poliomyelitis, Q-Fieber, scrub typhus, tuberculosis and yellow fever.
Well-known agents / diseases entering new regions (like Chagas disease, Dengue, rabies, WNV and TBE) or crossing the species barrier (like Sarcocystis nesbitti, P. knowlesi, Baylisascaris procyonis and Balamuthia mandrillaris) as well as really new pathogens affecting humans (like new influenza viruses, MERS-CoV, SARS-CoV, and the metapneumovirus) are usually classified as emerging agents.
In addition there will be a focus on new resistance patterns / newly resistant agents like e.g. MRSA, GISA, VRE, ESBL, Carbapenemases (e.g. NDM1).

Comparison of subcutaneous and intramuscular application of FSME-Immun® vaccine: characterization of cellular and humoral vaccine specific immune responses

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Each licensed vaccine has a recommended route of vaccination. As a rule, studies to determine the optimal vaccination route are being done during the licensing studies in dependence of vaccine composition, immunogenicity and safety.
In various situations, either because of medical indications (i.e. anticoagulation) or due to a lack of sufficient muscular tissue (adipositas), these vaccines might be applied differently. However, data on immunogenicity and efficacy of differentially applied vaccines are sparse.
As Austria belongs to a TBE high endemic area, vaccination coverage with TBE vaccine is quite high. Nevertheless, no information is available if TBE vaccines, such as FSME-Immun® can be subcutaneously applied with the same effectiveness as after intramuscular application.
In the following study we will determine if the subcutaneous application of FSME-Immun® leads to an immune response comparable to the intra muscular vaccination. For this we will investigate the humoral and cellular immune response after intramuscular and subcutaneous TBE vaccination in adult individuals. Blood samples will be collected from gender matched 116 participants prior to vaccination and 7 days after FSME-Immun® booster vaccination. Peripheral blood mononuclear cells, isolated from those blood samples, will be re-stimulation with TBE-antigen and cytokine production (IL-2, IFN-γ, IL-10, TNF-α, IL-6) will be evaluated by LUMINEX. We will also make assessments of surface markers on lymphocytes (CD19, CD3, IgD, CD27, CD8, CD4, CD28, CCR7, CD45RA, CD45R0, CD25 and FoxP3) via flow cytometry. Furthermore plasma samples collected prior to vaccination, after 7 days, 1 month and 6 months will be used to assess TBE antibody titer levels.
The results of this comparative study will allow conclusions on whether individuals vaccinated via the subcutaneous route will or will not require different or modified vaccination schedules based on the observed immune responses. In continuation of this study we will compare the humoral and cellular immune response to TBE vaccination of adipose and people with normal weight.

History and development of the website of the ÖGTP(M) – in memoriam Karl Sieber (1960-2013)

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The era of the ÖGTP in the World Wide Web started with the presidentship of Heinrich Prosl in 1997. It was on Karl Sieber, technician at the Institute of Parasitology of the University of Veterinary Medicine, to create and host the first homepage. He was responsible for it until the end of 2012, even though Christoph Hörweg started to create the pages since 2005, but he did the updates on the server. In November 2012, with the name change of the society to ÖGTPM a new website has been created, the server and also the domain changed to www.ögtpm.at . An English version will be created soon. We want to thank Karli Sieber for 15 years of voluntary but very professional assistance!

Zur Geschichte und Entwicklung der ÖGTP(M)-Homepage – in memoriam Karl Sieber (1960-2013)

Im November 1997 wurde Univ.-Prof. Dr. Heinrich Prosl Präsident der Österreichischen Gesellschaft für Tropenmedizin und Parasitologie (ÖGTP) und er meinte, es sei Zeit für eine Homepage der ÖGTP im World Wide Web.
Karl Sieber, technischer Angestellter am damaligen Institut für Parasitologie und Zoologie der Veterinärmedizinischen Universität bekam u. a. auch aus diesem Anlass, einen neuen Apple-Mac G3 und er verwendete das sehr einfach zu bedienende Programm Claris® Homepage 3.0 (http://www.monitor.at/398/story/clarhome.html). Die Website wurde von der Veterinärmedizinischen Universität Wien über das damalige Institut für Parasitologie und Zoologie gehostet. Als Gestaltungsmerkmal der Homepage wurde das erste Logo, die vier Buchstaben mit der Schlange und als Hintergrundbild die Stechmücke, verwendet. Mit einigen Unterlagen war die erste Version der Homepage gestaltet. Primär wurden damals die Jahrestagungen angekündigt.
Ein paar Snapshots der alten Seite finden sich noch auf waybackmachine.org (leider ohne Hintergrundbild): Mai 1999: http://web.archive.org/web/19990504232202/http://www.vu-wien.ac.at/i116/OeGTPverst.htm
2005 übernahm Christoph Hörweg die Bearbeitung der Homepage und gestaltete diese zunehmend ausführlicher (http://web.archive.org/web/20050913184930/http://www.vu-wien.ac.at/i116/OeGTPverst.htm). Die Seiten wurden mit dem Web-Editor HTML-Kit geschrieben und erstellt, an Karl Sieber geschickt und nach seiner Kontrolle wurden die Dateien aufgespielt bzw. erfolgte das Update.
Nach der Umbenennung der ÖGTP im November 2012 in Österreichische Gesellschaft für Tropenmedizin, Parasitologie und Migrationsmedizin (ÖGTPM) wurde beschlossen, eine professionelle Homepage erstellen zu lassen, diese ist nunmehr auf www.ögtpm.at zu finden. Für die Inhalte, die mittels TYPO3 System eingespielt werden können, ist nach wie vor Christoph Hörweg verantwortlich. Eine englische Version ist angedacht.
Karl Sieber ist im Januar 2013 nach schwerer langer Krankheit von uns gegangen – die ÖGTP(M) verdankt ihm die frühzeitige Präsenz im Internet und eine 15jährige ehrenamtliche Betreuung der Webseiten. Aber nicht nur das, sein technisches Wissen war auch für das Institut von unschätzbarer Bedeutung: Karli, DANKE!

Attempts to improve the *in vitro* cultivation system for *Histomonas meleagridis*

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Histomonas meleagridis is the causative organism of the histomonosis in gallinaceous birds. Since 1924, different media have been used for the *in vitro* cultivation of *Histomonas meleagridis*. Presently, medium 199 supplied with Earle's salts, L-glutamine, 25 mM HEPES and L-amino acids, 0.22% rice starch and 15% FBS is one of the most suitable media available for the cultivation of histomonads. The present study was done to increase the *in vitro* cell number of *H. meleagridis* using different types of tubes and different sizes of rice starch particles in standard culture medium. A rapid increase in the cell number of *H. meleagridis* was seen in tissue culture flasks as compared to falcon tubes and Eppendorf tubes. In contrary, steady prolonged growth of histomonads was observed in falcon tubes. Particle size of rice powder had little effect on the number of histomonads. A slight increase in the cell number of *H. meleagridis* was observed in the culture medium containing rice starch particles of 0-25µm, compared to 25-50µm or 50-100µm and commercially available mixed size rice starch particles. Furthermore, a decrease in bacterial count was observed in the culture medium with the increase in the number of histomonads.

Parasitäre und vektorübertragene Zoonosen als Reisekrankheiten aus der Sicht des Veterinärmediziners

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Zoonoseerreger werden von Wirbeltieren über deren Ausscheidungen, durch direkten Kontakt, durch wirbellose Vektoren oder durch den Verzehr tierischer Lebensmittel auf den Menschen übertragen. Fast 60 % der etwa 1400 bekannten Krankheiterreger des Menschen sind zoonotisch. Während in Mitteleuropa durch etablierte und wirksame Hygienemaßnahmen solche Infektionen auf die meist eher seltenen Erreger mit Wildtierreservoirs wie Borreliose oder alveoläre Echinokokkose beschränken, besteht in vielen Ländern ein erhöhtes Risiko der Infektion mit verschiedensten Erregern. Nicht alle Infektionen, mit denen die Bevölkerung des jeweiligen Landes regelmäßig konfrontiert wird, sind jedoch auch für Reisende relevant. Der Expositionsgrad und damit das Infektionsrisiko steigen naturgemäß mit der Dauer des Aufenthaltes, aber auch der unmittelbare Aufenthaltsort, persönliche Hygiene und Verzehrgewohnheiten können die Infektionsgefahr beeinflussen. So ist etwa die Infektion mit *Trypanosoma cruzi*, des durch Raubwanzen übertragenen Erregers der Chagas-Krankheit, für Reisende nur von Bedeutung, wenn der Aufenthalt in einer Umgebung stattfindet, in der sich auch der Vektor aufhält. Auch die in vielen Ländern Südamerikas und Afrikas noch häufigen Infektionen mit Bandwurmfinnen aus Rind- oder Schweinefleisch (Täniose) und andere alimentäre Infektionen einschließlich der auch in Osteuropa gelegentlich auftretenden Trichinellose finden nur bei Verzehr ungenügend gegarter Lebensmittel statt. Einen „Sonderfall“ stellt die Infektionen mit *Fasciola hepatica* dar, dessen Stadien zwar lebensmittelübertragen aber nicht mit tierischen Lebensmitteln, sondern mit Grünpflanzen assoziiert sind. Hingegen ist die Infektion mit Umweltstadien von Parasiten schwieriger zu kontrollieren. Vor allem Hunde sind häufig Träger und auch Überträger parasitärer Zoonoseerreger, allen voran der zystischen Echinokokkose sowie zoonotischer Genotypen und Spezies von Giardien und Kryptosporidien.

Der Kontakt mit Wildtieren oder deren Ausscheidungen kann auch für Reisende ein Risikofaktor sein. In Nordamerika kann etwa der Kot von Waschbären, einem häufigen Gast auf Campingplätzen, Eier des neurotropen Spulwurms *Bayliscaris procyonis* enthalten. Auch von Flöhen verschiedener Wild-und Haustiere übertragene Erreger, wie *Yersinia pestis* oder *Bartonella henselae*, kommen in Nordamerika häufiger vor als in Mitteleuropa.

Grundsätzlich steht die Prophylaxe durch Risikoabschätzung, Aufklärung insbesondere bezüglich der Risikofaktoren und möglicher Verhütungsmaßnahmen bei der Kontrolle der Infektionen im Vordergrund. Die aktuellen Berichte des CDC und der WHO geben Auskunft über die aktuelle Verbreitung von Zoonoseerregern.

Alveolar Echinococcosis in an Australian Shepherd dog from Upper Bavaria, Germany

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Alveolar echinococcosis (AE) must be considered the most important helminth zoonosis in central Europe. The life cycle of *Echinococcus multilocularis* is predominantly sylvatic with foxes, raccoon dogs but sometimes dogs as definitive hosts and small mammals, predominantly rodents, as intermediate hosts.
Dogs may serve both, as intermediate host when ingesting eggs and as definitive host.

A 16 months old male Australian Shepherd was presented with nonspecific clinical signs such as apathia, anorexia and enlarged abdomen. Breathing appeared labored. Initial antibiotic and glucocorticoid treatment did not improve this condition.
Further clinical examination including x-ray, sonography (incl. biopsy) and blood analysis revealed sanguineous ascites, substantial enlargement of the liver, and a slightly increased activity of ALP and GOT.
Examination of the biopsy sample indicated that the proliferation may be of AE origin. The owner agreed to perform a laparotomy after clinical signs became worse. The appearance and size of the liver lesion confirmed a bad prognosis. The dog was euthanized and liver samples were subjected to patho-histological examination and molecular-biological techniques.
Gross morphological examination revealed a tumor-like cystic infiltration of major parts of the liver tissue, resulting in the drastically increased organ size. Other organs appeared normal.
Patho-histological examination of liver samples confirmed the presence of germinative cyst walls. However, no protoscolices were detected. A nested PCR targeting a species specific sequence of the mitochondrial 12S rRNA gene revealed the identity with *E. multilocularis*.
To evaluate a potential owner's risk the gastrointestinal content was examined but there was no evidence of intestinal *E. multilocularis* infection.
As suggested by several authors, dog ownership may be one of the risk factors for human AE. Suitable antiparasitic treatment of pets might therefore reduce the risk of human AE. Furthermore the incidence of echinococcosis in dogs could be an indicator for the risk of human disease.

Alveolar hydatidosis in the Czech Republic

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Alveolar hydatidosis (echinococcosis, AE) is an infection caused by larval stages of *Echinococcus multilocularis* tapeworms. In the parasite life cycle, various carnivores (foxes, dogs, etc.) and rodents take place as definitive and intermediate hosts, respectively. Humans are accidental intermediate hosts and they become infected by faecal–oral route after ingestion of the parasite eggs which pass with faeces of definitive hosts.
In the Czech Republic, the adult and larval parasites were detected in foxes (*Vulpes vulpes*) and bank vole (*Myodes glareolus*, syn. *Clethrionomys glareolus*) for the first time in 1996 and 1998 respectively. The first case of human AE was registered during autopsy of 74–year old woman living in western Bohemia in 1978. Further cases of the disease were diagnosed up to a long term period – in 2007. Since that time our laboratory register 14 AE cases (10 females and 4 males). The disease was diagnosed using immaging, serological, histological and molecular techniques.
Age of the patient ranged from 25 to 82 years at the time of the first examination; in four cases no data on travelling outside the Czech Republic were recorded. In patients, mostly the liver were affected and the infections resulted in significant hepatomegalia; immaging (US, CT, MRI, and in certain cases also PET) and histology revealed typical *E. multilocularis* lesions; in 13 cases serology showed elevated anti-*Echinococcus* antibodies. Currently, benzimidazoles are used for treatment of patients of which some underwent also an operation during which the liver lesions were removed.
Since 2007, the prevalence of AE seems to be increasing in the Czech Republic similarly as for other European countries. In our country, however, number of patients with cystic hydatidosis caused *E. granulosus* is also increasing at present. And factors responsible for re–emergence of the mentioned diseases are, therefore, discussed.

We would to thank Professor Herbert Auer from the University of Vienna for invaluable help during examination of the first laboratory AE samples. The investigation on hydatidosis in the Czech Republic is supported by the Charles University in Prague (Research Programs PRVOUK No. P25/LF1/2 and UNCE–Grant No. 204017) and the Grant Agency of the Ministry of Health (IGA MZ CR NT 13108–4/201.

Czech National Reference Laboratory for Tissue Helminthoses

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National Reference Laboratory for Tissue Helminthoses is the workplace of the General University Hospital (VFN) and the First Faculty of Medicine of the Charles University in Prague. Using indirect (serology) and direct (microscopy, DNA detection, etc.) methods, the main activity consists of laboratory diagnosis of infections caused by helminths affecting various human organs, confirmation of results obtained by other Czech and foreign laboratories, and preparation of samples for external quality assessment (EHK) in the range of *serological diagnosis of larval toxocarosis*. The laboratory examinates patient samples from the Czech Republic (residents, foreigners, immigrants) as well as human materials sent from abroad (mostly within Europe, e.g., Slovakia, Austria, Great Britain) not only through participation in external quality assessment programs. Here we summarize the number of examinations, positive cases and ratio of imported/autochtonous infections recorded in the last years. Interesting is a lower reported seroprevalence of *Toxocara canis/cati* infection then expected. Further, according to no traveler´s anamnesis of several patients with diagnosed alveolar, cystic echinococcosis and trichinosis, we very likely detected autochtonous cases of these infections in the Czech Republic. We also present some interesting parasitological findings such as *Dirofilaria* and *Thelazia* infections in czech patients.

Reiseimpfungen – Update

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Tungiasis: an imported human case in Hungary

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Introduction: Tungiasis is a parasitic skin disease due to the permanent penetration of the female sand flea *T. penetrans* (Linnaeus, 1758) into the skin of its host.
Case report: A 39-year-old male patient was observed in May 2005 at the Outpatient Department of Dermato-Venerology Szent Rókus Hospital in Budapest because he felt the sensation of a foreign body growing under the skin of his left big toe. When the lesion occurred he was at Brazilian seaside, where he often walked barefooted. 6-7 days after, at the left big toe he saw on the margin oedematous, at the center brownish punctuated lesion, 6-7 mm in diameter. Dermatological examination showed at the medial surface of the left big toe 6 mm in diameter, prominent, pustule-like lesion with approximately 2 mm rim of hyperemia. Surgically 4 mm in diameter whitish softish sheath was extracted. At the Department of Parasitology National Center for Epidemiology, Budapest, the parasite-like form was identified as *Tunga penetrans.*
Conclusion: With this case report we would like to call physicians attention to this importable exotic disease. To the best of our knowledge, this is the first imported human case of tungiasis in Hungary.

Metronidazole-resistant *Trichomonas vaginalis*: Testing octenidine dihydrochloride

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Trichomonosis is the most common non-viral sexually transmitted disease and it is associated with a wide spectrum of indispositions, including also increased susceptibility to HIV. Rising numbers of reports on strains resistant to metronidazole, the standard drug for systemic treatment, and tinidazole, the alternative drug, drive the search for new compounds.
The aim of the current study was to evaluate the efficacy of the common antiseptic octenidine dihydrochloride (Octenisept®) against *Trichomonas vaginalis*.
Tests were performed in vitro under micro-aerophilic conditions in a microtitre plate system with a separate test series under protein pressure. All experiments were performed with metronidazole-resistant as well as with metronidazole-susceptible strains.
It was shown that octenidine dihydrochloride is highly effective against *T. vaginalis*, a 10% solution causing total killing of all cells within 30 seconds.
Octenidine dihydrochloride is already established for intravaginal therapy of vulvovaginal candidosis and bacterial infections, therefore it might be an affordable and effective alternative to antibiotic treatment, particularly in regions with low socio-economic status and high prevalence of trichomonosis accompanied by higher resistance rates.

Trichomonas vaginalis flavin reductase 1 (FR1): Its function and its role in metronidazole resistance

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We isolated and identified *Trichomonas vaginalis* flavin reductase 1 (FR1), an enzyme formerly known as NADPH oxidase. Flavin reductase is part of the antioxidative defense in *T. vaginalis* and indirectly, *i.e.* via free flavins (FMN, FAD, and riboflavin), reduces molecular oxygen to hydrogen peroxide. This enzyme activity has been reported to be diminished or even absent in metronidazole-resistant *T. vaginalis*, thereby leading to elevated intracellular oxygen levels and futile cycling of metronidazole. Interestingly, FR1 has no close homologue in any other organism whose genome has been sequenced so far, but in the *T. vaginalis* genome seven full-length and three truncated isoforms exist. However, out of these, only FR1 has an affinity for flavins, *i.e.* FMN, FAD, and riboflavin, which is high enough to be of physiological relevance. In six of seven strains with lowered metronidazole sensitivity that were tested, the FR1 gene or its 3'UTR was found to be truncated, including a highly metronidazole-resistant laboratory cell line of an otherwise normally susceptible isolate, C1 (ATCC 30001). Transfection of a metronidazole-resistant clinical isolate (B7268), which does not express any FR, with a plasmid bearing a functional FR1 gene almost completely restored normal metronidazole sensitivity.

TatD as a possible cause for DNA degradation in *Entamoeba histolytica* after metronidazole treatment

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Entamoeba histolytica is the cause of invasive amoebiasis and affects millions of people worldwide. For more than 40 years, metronidazole has been the gold standard drug to treat this disease. With classical apoptosis assays DNA degradation is observed in metronidazole-treated amoebae, however, caspases, caspase-dependent DNase, DNase I and II, endonuclease G, meta- and paracaspases are all absent from the genome of this parasite. Moreover, it was found unlikely, that the reduced metronidazole metabolites, that are responsible for metronidazole toxicity, could directly elicit the DNA destruction. Observations by TUNEL assay revealed DNA fragmentation in *E. histolytica* trophozoites after twelve hours of metronidazole treatment. To better understand DNA degradation, we measured the mRNA expression of a number of possible nucleases found in the genome database.
TatD is a cytoplasmic DNase found in *E. coli* and its homologs have recently been shown to be involved in apoptotic DNA degradation in *Trypanosoma brucei* and *Saccharyomyces cerevisiae*. We also found a TatD homolog in the *E. histolytica* genome, amplified its coding sequence and expressed it in *E. coli*. The recombinant TatD showed a magnesium-stimulated DNase activity, but the protein was not up-regulated on the mRNA level in *E. histolytica* trophozoites treated with metronidazole. Nevertheless, TatD might still be involved in the DNA degradation, if it could gain access to the nucleus in metronidazole-treated amoebae. With antibodies raised against the recombinant TatD, we are currently starting to study the localisation of this nuclease in *E. histolytica* cells.

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Culex pipiens and *Culex torrentium* in Germany – Diversity of two potential vectors of filaria and arboviruses

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Culex torrentium is one of the most common mosquito species in Germany. Due to its sympatric occurrence as well as its similar morphological and ecological characteristics, it has often been confused with another common species, *Culex pipiens*. Both species are known to be potential vectors for different arboviruses, with *C. torrentium* being a possible vector for Sindbis or Ockelbo virus. The differentiation of larvae and females of both species is extremely difficult so that *Cx. torrentium* has been often not investigated or wrongly equated. This is due to their almost identical morphology as well as both species often occur sympatrically, and share comparable ecological characteristics regarding the habitat of the adult mosquitoes as well as breeding sites. The situation is even more complicated comparing *Cx. p. pipiens* and *Cx. p. molestus,* which can be only distinguished by ecological characteristics. Due to their medical importance and the unsatisfied morphological differentiation of the three taxa, clear identification methods are of great interest, as well as knowledge about their distribution and possible population-relted differences. Being ornithophilic, possible hybrids between *Cx. torrentium* and the humanophilic *Cx. pipiens molestus*, could potentially serve as important bridge vectors for zoonotic diseases like West Nile Fever, as well as hybrids between *Cx. pipiens molestus* and *Cx. pipiens pipiens*, which could be proven for the first time for Germany just recently.

Culex spp. – Vectors of various arboviruses

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Mosquitoes (Diptera: Culicidae) are blood-sucking insects. They are regarded worldwide as the major vectors of vector-borne diseases and can impact human and animal health by their ability to transmit arboviruses (arthropod-borne viruses) as well as proto- and metazoan parasites. Also species of the genus *Culex* are important vectors of many viruses and some zoonotic nematodes. However, species determination is often difficult due to their morphological similarity. Especially in Central Europe, the differentiation of *Culex torrentium* and *Culex pipiens* is difficult, because both species are morphologically almost identical, often occur sympatrically, and share comparable ecological characteristics regarding the habitat of the adult mosquitoes as well as breeding sites. The problematic differentiation is the reason why both were mistaken with each other in former studies, leading to an incomplete knowledge of the distribution of both species as well as their vector abilities. Both species are known as vectors for different arboviruses. While *C. pipiens* is the most likely vector for the West Nile virus in Europe, the Ockelbo virus has been isolated from both *C. pipiens* and *C. torrentium.*

Antibodies against *Leishmania* spp. in Austrian soldiers returning from missions in the Lebanon, Syria and Bosnia: A cross-sectional survey

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Leishmaniases are sandfly-borne diseases, endemic in 90 countries worldwide and with 0.9 to 1.4 million new cases each year according to the WHO. Moreover, the number of cases has been increasing in conflict areas, where sanitation and hygiene practices as well as medical prevention and treatment have collapsed.
The aim of this study was to assess the exposure to *Leishmania* spp. in Austrian soldiers serving in UN or EU peace-keeping missions in Syria, Lebanon and Bosnia-Herzegovina. In June and July 2013, serum samples and epidemiological data were collected from 225 healthy adults. All sera were tested for antibodies against *Leishmania* spp. using a commercial ELISA kit that covers all known representatives of the genus.
In total, 20 of the 225 individuals investigated (8.9%) were positive for *Leishmania* spp. and 10 (4.4%) were borderline. Broken down to the operation areas, the data revealed an expected higher seroprevalence in soldiers having served in Syria (13.8% positive, 4.0% borderline) and Lebanon (6.3% positive, 4.8% borderline), compared to soldiers returning from Bosnia and Herzegovina (3.3% positive).
The present data demonstrate a high exposure to *Leishmania* spp. among Austrian soldiers serving in the Middle East and underline the need of adequate education and preventive measures for the respective troops.

A global profiling of specificity of secreted proteases at multiple stages of *Schistosoma* life-cycle

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Schistosomiasis, caused by trematode parasites from genus *Schistosoma*, is ranked second among parasitic diseases with more than 200 million people infected worldwide. A prophylactic vaccine or novel drug for humans and livestock is needed. Schistosomes actively secrete bioactive molecules that facilitate their survival in the host. Among them proteolytic enzymes (proteases) critically participate in host-parasite interactions; however, they have not been systematically investigated. Our project is focused on characterization of proteases secreted by various *Schistosoma mansoni* life-stages (migratory schistosomula, adults and eggs). Many of these proteins evince significant similarities to vertebrate regulatory proteases involved in coagulation, vasodilatation and inflammation. We suppose these enzymes could be essential for survival of the parasite in the vasculature of definitive mammalian hosts including human. In order to characterize wide spectra of secreted proteases we employed novel sensitive method based on synthetic peptide library called multiplex substrate profiling by mass spectroscopy (MSP-MS) followed by liquid chromatography-tandem mass spectrometry (LC-MS/MS) (O'Donoghue A. et al., Nature Methods, 2012). Our results imply that schistosomes secrete significantly more proteolytic enzymes than previously expected. Surprisingly, most of them are unique for each life stage. We believe these findings will have substantial impact on drug/vaccine development and improvement of specific sensitive diagnostic probes.

Management of leishmaniasis at the Vienna General Hospital

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Sand flies can transmit *Leishmania* parasites, the causative agents of leishmaniasis, by their bite. Austria is currently not an endemic country. Because of increasing globalisation, however, doctors in Austria are increasingly confronted with this disease. This study aims to explain the clinical presentation and management of leishmaniasis, as well as the outcomes at the Vienna General Hospital.

The study includes 21 patients who received medical treatment for leishmaniasis at the Vienna General Hospital between 1 January 2004 and 31 December 2010. The study entails a retrospective evaluation of patients' notes and a retrospective questionnaire survey.

15 participants received the study documents; 11 of these completed the questionnaire. 17 patients had cutaneous leishmaniasis, one patient mucocutaneous leishmaniasis, and two patients visceral leishmaniasis. One patient had cutaneous as well as visceral leishmaniasis. Symptoms varied depending on the type of leishmaniasis and ranged from skin changes in the cutaneous form to serious generalised disease in the visceral form. The diagnosis was made at Vienna General Hospital in a time period of 1-15 weeks. Tissue specimens were taken from all patients for the purpose of histological work-up. PCR was undertaken in 17 patients. In 11 patients, Leishmania species were subtyped. Serological assays were used in 11 patients. The treatments given were varied and different. 11 patients were discharged as cured, in three further patients the skin efflorescences were in the process of healing. Seven patients were lost to follow-up. In the questionnaire survey, only one participant reported having heard of leishmaniasis before their own diagnosis.

In sum, the study found that the management of leishmaniasis in some cases presented a challenge for the physicians at Vienna General Hospital. Implementation of a guideline for the diagnostic evaluation and treatment of leishmaniasis would make sense and is highly desirable for Austria. Lack of knowledge about and awareness of leishmaniasis in this – albeit small – patient cohort is an indication that there is a need for information provision regarding preventive measures for people travelling to endemic areas.

Proteomics elucidates key molecules involved in the exsheathment process in *Oesophagostomum dentatum*

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The discovery of new intervention strategies against parasitic nematodes of socioeconomic impact has become increasingly important, given that anthelmintic drug resistance is now widespread. Nematode-specific gene products involved in fundamental developmental processes represent promising targets for the design of novel and selective interventions. The exsheathment of infective larvae of nematodes constitutes a crucial step in the transition from the free-living to the parasitic stage. To explore proteins involved in this process, we established a method to study the exsheathment process at the protein level in the nematode *Oesophagostomum dentatum*. Proteomic profiles displayed by differential in-gel electrophoresis (DIGE) identified 20 protein spots which are over-expressed during this transition, but not before or after exsheathment. Using MALDI-TOF mass spectrometry combined with informatics, 17 of the 20 spots were identified employing transcriptomic data for *O. dentatum*. In total, 11 different proteins could be annotated. Enzymes known to be involved in the moulting process of other nematode species, including phosphoenolpyruvate carboxykinase, and nematode-specific proteins, such as cuticlin-1 and transthyretin-like protein 5, were over-expressed in larvae in the midst of the exsheathment process. This study provided a first insight into the molecular biology of the moulting process in *O. dentatum*, an important model nematode. Key molecules involved in this step of the life cycle might represent new drug targets for parasite intervention.

Meningokokken – Epidemiologie und Impfungen

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Invasive Meningokokkenerkrankungen sind deshalb so gefürchtet, weil sie aus vollster Gesundheit plötzlich und innerhalb von Stunden tödlich verlaufen können. Weltweit zirkulieren unterschiedliche Serogruppen von Meningokokken. Beispielsweise werden in den USA besonders viele invasive Erkrankungen durch Meningokokken der Serogruppe Y und in Afrika durch Serogruppe A und W135 verursacht. In Großbritannien waren Ende der 1990er Meningokokken der Serogruppe C besonders stark vertreten, weshalb dort groß angelegte Impfkampagnen gestartet wurden. Mittlerweile sind dank der Impfprogramme invasive Meningokokkenerkrankungen verursacht durch Serogruppe C in Großbritannien eine Rarität.
In Österreich treten besonders Meningokokken der Serogruppe B und C auf, selten jedoch auch andere Serogruppen. Im Moment sind hier konjugierte Impfstoffe in Verwendung. Quadrivalente konjugiert Impfstoffe stehen seit 2012 allen Kindern in Österreich im 12. Lebensjahr gratis im Rahmen des Kinderimpfkonzepts zur Verfügung. Außerdem sind quadrivalente Impfstoffe bei Reisen in Endemiegebiete für Meningokokkenerkrankungen (auch Gruppen-/Schulveranstaltungen), bei Risikopersonen (zB. Splenektomierten) und bei Personen, welche beruflich ein Risiko für Meningokokkenexposition haben, empfohlen.
In Kürze soll außerdem auch ein Impfstoff gegen invasive Meningokokkenerkankungen verursacht durch Serogruppe B verfügbar werden.

Endoparasites of fallow deer (*Dama dama*) of the Antheringer Au in Salzburg

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Although the annual harvest of fallow deer increased significantly in the past two decades in Austria, there is only very limited data on the parasites of this species of deer dating back to the 1970s. The fallow deer population of the Antheringer Au (Salzburg) was founded in the 1930s when five and ten fallow deer originating from Germany and Hungary, respectively, were released. In order to add current knowledge on the endoparasite fauna of fallow deer in the country, viscera from six adult males and one male fawn harvested in the Antheringer Au were examined in the years 2009 and 2010 using standard parasitological techniques, and spleen samples were screened for DNA of arthropod-borne pathogens.

Gastrointestinal nematodes were recovered from all deer; four and three of the six adult deer harboured *Dictyocaulus eckerti* or *Varestrongylus sagittatus* lungworms, respectively; *Fasciola hepatica* were isolated from the liver of two of five adult deer; sarcocysts (*Sarcocystis* spp.) were demonstrated in the cardiac and/or diaphragmatic myocytes of all deer; and DNA of *Babesia capreoli/divergens* was isolated from the spleen of one adult deer. In addition, *Eimeria sordida* oocysts (30 oocysts per gram) were identified in the feces of the fawn which harboured also one *Setaria* (*altaica*?) filarioid in the abdominal cavity. No parasites were recovered from the rumen of the fallow deer.
Fifteen species (morphs in the case of the ostertagians) of gastrointestinal nematodes were identified: *Ostertagia leptospicularis* (1/7), *O. drozdzi* (5/7)/*Skrjabinagia ryjikovi* (5/7), *Spiculopteragia asymmetrica* (7/7), *S. boehmi* (1/7)/*Rinadia mathevossiani* (2/7), *Trichostrongylus askivali* (5/7), *T. capricola* (1/7), *Cooperia pectinata* (1/7), *Nematodirus battus* (1/7), *N. roscidus* (1/7), *Capillaria bovis* (1/7), *Oesophagostomum sikae* (7/7), *Oe. venulosum* (6/7) and *Trichuris globulosa* (1/7).
Total parasite counts ranged from 2 to 7 for *Dictyocaulus* lungworms, 9 to 18 for *F. hepatica* and 379 to 1294 for gastrointestinal nematodes.

Imported *Leishmania tropica*-infections in migrants from Syria

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The total number of cutaneous leishmaniasis (CL) cases imported into non-endemic countries is increasing due to travelling, military operations and migration. Refugees from Syria e.g. carry a high risk for CL. The causative agent is *Leishmania tropica* – endemic in the northwest, and *L. major* – endemic in the north east of the country. The majority of patients are children < 15 years of age with facial lesions (1).
At the University Clinics of Bonn altogether 7 patients (5 children, 4-12 years old) from Syria with CL were examined between December 2009 and August 2012. They showed single to multiple lesions and were all positive for *L. tropica*. According to the guidelines the treatment was either local or systemic or both. The follow-up of 3 children with multiple lesions indicates that chronic and recurrent CL of the face may occur. A rate of > 30% of these specific forms is reported from Syria (1). Different therapeutical approaches are discussed.

(1) M. Douba et al. Bull. WHO 75, 252-259, 1997

Emerging virus diseases: Why viruses conquer new hosts?

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Viral pathogens are an eminent threat to human and animal health. While many of the "established" diseases are hold in check by vaccination, chemotherapy or even eradication, novel pathogens appear with unprecedented speed. Almost every year, appearances of highly virulent viruses are reported such as HIV, SARS virus, avian influenza virus H5N1 or MERS virus. Many of the novel virus diseases originate in tropical or subtropical wildlife but cross species transmission is also observed in farm animals. Increasing human activities in remote areas together with increased mobility, allow rapid spread of novel pathogens. Emerging virus diseases are almost exclusively caused by RNA viruses. This is not surprising as RNA viruses comprise intrinsic capabilities of superfast evolution, a concept that implies host specificity as a transient, and never final state.

Invading helminths and hosts – examples from Central Europe

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From a parasitological point of view invasion is of manifold interest. New hosts can carry new parasites, but can get infected also by local parasites. On the opposite new parasites can adapt to local hosts, but also infest invaders. Thus there are a lot of possible interactions. Therefore invaders and any species which extend their natural distribution should be regarded as risk of further spreading parasites into unaffected regions.

The giant liver fluke *Fascioloides magna*, an invasive trematode (Digenea) species originating from North America, was recorded in Europe first time in 1875 in Italy. In Austria it was detected in the wild for the first time in the year 2000 at River Danube. The lesser pond snail *Galba truncatula*, an autochthonous snail, evidenced to act as snail intermediate host in Austria; but different other snails are known to be suitable hosts. Indigenous as well as imported cervids plus domestic ungulates were reported as final hosts in Europe. For assessing the risks of spreading it is essential to get data about abundance and ecology of hosts and epidemiology of worms. Since snail hosts must be considered to play an important role in parasite reproduction and dispersal, several species have been investigated. In Austria, *Lymnaea stagnalis, Stagnicola* sp. and *Radix* sp. did not yet evidence fascioloids, neither in Danube flood plains nor in neighbouring areas. Nevertheless these native species should be considered as possible intermediate hosts, but also potential invaders like *Pseudosuccinea columella.*

Other examples of parasitic aliens are the roundworm *Anguillicoloides crassus*, the swimmbladder-worm of eels, and the tapeworm *Bucephalus polymorphus*, using bivalves of the genus *Dreissena* (re-invaders in Central Europe) as first intermediate hosts and invasive fish species like *Neogeobius melanostomus* as second intermediate hosts.

But also zoonotic helminths may either switch to invading hosts, like the tapeworm *Echinococcus multilocularis* to the raccoon dog *Nyctereutes procyonoides* or the roundworm *Baylascaris procyonis*, which arrived with the Nearctic raccoon *Procyon lotor*.

A further selection of invading helminths/hosts will be presented and possible consequences discussed. The need to study the migration routes and the epidemiology of invasive host-parasite-systems will be argued and the importance to recognize their ecological and economical potential will be underlined.

Extract of the pig parasite *Oesophagostomum dentatum* prevents Immune privilege of the eye and intraocular infections

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One third of the human population is currently infected by one or more species of parasitic helminths. While remaining a global health problem, the fact that specific helminth infections have beneficial effects on inflammatory diseases, allergy or autoimmunity, opens the door to novel exciting therapeutic applications of certain live worms or their products for the control of immunopathological conditions. However, the overall down regulation of the immune system might cause impaired responsiveness to vaccines.

In this study we investigated whether parasite-derived products suppress the development of allergic inflammation in a mouse model. We show that extract derived from adult male *Oesophagostomum dentatum* (eMOD) induced Th2 and regulatory responses in BALB/c mice. Stimulation of bone marrow-derived dendritic cells induced production of regulatory cytokines IL-10 and TGF-beta. In a mouse model of birch pollen allergy, co-administration of eMOD with sensitizing allergen Bet v 1 markedly reduced the production of allergen-specific antibodies in serum as well as IgE-dependent basophil degranulation. Furthermore, eMOD prevented the development of airway inflammation, as demonstrated by attenuation of bronchoalveolar lavages eosinophil influx, peribronchial inflammatory infiltrate, and mucus secretion in lungs and IL-4 and IL-5 levels in lung cell cultures. Reduced secretion of Th2-related cytokines by birch pollen-re-stimulated splenocytes and mesenteric lymph node cells was observed in eMOD-treated/sensitized and challenged mice in comparison to sensitized and challenged controls. The suppressive effects of eMOD were heat-stable. Immunization with model antigens in the presence of eMOD reduced production of antibodies to thymus-dependent but not to thymus-independent antigen, suggesting that suppression of the immune responses by eMOD was mediated by interference with antigen presenting cell or T helper cell function but did not directly suppress B cell function.

Altogether, understanding of the mechanisms of immunomodulation by helminth parasites could be useful on one hand to antagonize immune suppression and thus improve vaccine efficacy, and on the other hand to utilize/modulate immune suppression induced by parasites/products/synthetic analogues to control immunopathology in humans.

Free-living amoebae (FLA) as reservoir for *Legionella pneumophila* and other bacteria: Development of a screening system for water facilities in Austria

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Free-living amoebae (FLA) are well known as potential human pathogens. *Acanthamoeba* spp. and *Balamuthia mandrillaris* can cause granulomatous amoebic encephalitis (GAE) in immunocompromised humans. Additionally *Acanthamoeba* causes keratitis in contact lens wearers. *Naegleria fowleri* causes fatal primary amoebic meningoencephalitis (PAME) in otherwise healthy humans. Furthermore, FLA may serve as vehicles of dispersal and replication for bacterial pathogens in natural and engineered water systems. In particular, *Legionella pneumophila*, the causative agent of Legionnaires´ disease, replicates in FLA. In addition, the amoebal cysts protect intracellular legionellae against disinfection measures. This can lead to colonization of air conditioning systems, cooling water devices and warm water preparation units, from where the bacteria spread via aerosols. This is a significant health hazard in hospitals and in other large public buildings. Currently, the dimension of this problem in Austria is unknown, moreover suitable screening assays for fast and synchronous detection and identification of FLA are lacking. This is why we aim to screen Austrian water facilities for FLA and bacteria as part of an interdisciplinary project. Warm and cold water systems of large public buildings and cooling towers will be sampled periodically and the water samples will be processed by filtration, cultivation and molecular biology. Until now, new real-time PCR assays suitable for routine screening have been developed and these will be implemented within the next months.

Metronidazole treatment of the human protozoan parasite *Entamoeba histolytica* leads to a redox shift of thioredoxin due to inhibition of thioredoxin reductase

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The cytosolic NADPH-dependent thioredoxin system, comprising the dithiol redox proteins thioredoxin reductase (TrxR) and thioredoxin (Trx), is essential for maintaining a reduced intracellular environment, via Trx acting as a powerful general protein disulfide reductase with a large number of functions in growth and redox regulation, for example the regeneration of oxidised peroxiredoxin which catalyses the reduction of toxic hydrogen peroxide. Both TrxR and Trx were found to be covalently modified by metronidazole, a 5-nitroimidazole drug that is commonly used to treat invasive amoebic infections in humans. TrxR of the parasite plays a central role in the molecular mechanism of metronidazole toxicity as the protein possesses a nitroreductase activity which is involved in the reductive activation of the drug. Adduct formation between products of this reaction and TrxR subsequently results in the loss of its Trx-reducing activity. However, very little is known about the direct consequences of TrxR inhibition on Trx itself.
The present study uses an electrophoretic redox western blot technique to analyse the oxidation state of Trx *in vivo* by separating the charged protein isoforms following differential alkylation with iodoacetic acid and iodoacetamide in 8 M urea. Treatment of *E. histolytica* with metronidazole did not change the levels of either TrxR or Trx as estimated by conventional western blot. However, Trx activity in cell lysates, determined by using an end point insulin reduction assay, decreased, and redox western blot analysis revealed that the oxidation state of the protein switched to a more oxidized one, as a direct result of metronidazole-mediated inhibition of TrxR activity. This consequently increased the accumulation of reactive oxygen species (ROS), such as hydrogen peroxide, within the cell. Determining the exact oxidation state of Trx may be useful in devolping and evaluating novel drugs against microaerophilic protozoan parasites, as these parasites, in contrast to their human host, lack glutathione and glutaredoxin which serve as a backup of TrxR to reduce Trx and represent the host's alternative system to detoxify ROS.

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Evaluation of diagnostic testing tools for bovine tuberculosis

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Due to the current endemic situation of bovine tuberculosis (bTB) in the Austrian province of Tyrol, caused exclusively by *Mycobacterium caprae*, screening tests for the detection of bTB were evaluated.
According to the OIE manual the following ante mortem tests are recommended for the detection of bTB: as standard method the delayed hypersensitivity test (tuberculin skin test, TST) and blood based laboratory tests like Interferon gamma assay or ELISA. As post mortem tests pathology, bacteriological examinations of lymph nodes with acid fast staining and diverse molecular tests on animal tissue are applied.
According to the national eradication strategy in Austria, the TST is performed as screening method using the comparative cervical test (CCT) measuring the dermal swelling caused by a cell-mediated immune response (using both bovine and avian tuberculin). The TST is logistically challenging (second-step visits) and has limitations concerning the interpretation of results. Antibody detection assays offer convenient and cost effective platforms for bTB surveillance.
The study was conducted with a serum panel of cattle with well-known tuberculosis status in order to determine the relative sensitivity and specificity of following diagnostic tests: CCT, molecular tests (MTBC real time and classical PCR), pathology and a M. bovis Antibody Test Kit in comparison to the results obtained by microbiological culture.
Microbiological culture results (lymph nodes and lung) served as gold standard and were compared to the mentioned diagnostic tests. Statistical analysis was done using the Fisher's exact test. Sensitivity and specificity data of diagnostic testing tools are presented and discussed.

New genetic tools for the detection and discrimination of the three feline *Demodex* mites.

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Demodex mites are causative agents of canine and feline demodicosis and have been associated with the facial erythema rosacea in humans. This year the first case of *Demodex gatoi* in an Austrian cat has been discovered and recently a third feline *Demodex* mite with distinct morphological characteristics has been described in the literature.
In order to genetically verify the phylogenetic relationships amongst the three feline *Demodex* mites new PCR based detection methods have been designed. For real-time PCR TaqMan probes with fluorescent dyes specific for each species were created for a feline *Demodex* multiplex qPCR. The sensitivity and specificity of the novel PCR was assessed by comparison to conventional and SybrGreen PCR methods. In this study we investigated these poorly known parasites in Austria and describe a novel assay for the simultaneous detection of all three feline *Demodex* mites in clinical samples. This assay will be a valuable tool for future research to shed more light on this parasitic disease.

Autochthonous *Dirofilaria repens* in Austria - novel strategies for parasite detection

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Dirofilariasis, a mosquito-borne filarial disease, is of growing concern due to the considerable increase of transmissions to dogs and humans in recent years. In the year 2012, a nationwide mosquito monitoring and surveillance program was conducted. Over 7000 mosquitoes in 437 pools from the same trapping location, date and species were caught from June - October. A qPCR followed by conventional PCR of the filarial *cytochrome c oxidase I* (*COI*) gene was used for the genetic analysis. Infestations with *D. repens* could be detected in *Anopheles* mosquito pools of two locations in Burgenland.

To follow the demand for a fast, accurate and cost-effective detection assay, a novel direct PCR for *Dirofilaria* spp. detection was designed. Direct PCR does not require the time-consuming and costly prior DNA extraction and resulted in PCR products well suited for sequencing purposes. With this new assay 1st stage larvae in the blood, 3rd stage larvae in the mosquito vector and fragments of mature stages of *Dirofilaria* spp. could be rapidly detected.

In this study we report the final proof of the autochthonous existence of *D. repens* in Austria and introduce a fast, sensitive and cost-effective direct PCR tool for *Dirofilaria* spp. detection.

Trypanosomosis tolerance in crossbred West African cattle: different ancestries in different regions of the genome

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Trypanosomosis is as serious health problem for cattle in tsetse challenged areas of Burkina Faso. Baoule, a local breed of taurine cattle is trypano-tolerant but is extremely small in body size and not usable for ploughing the arable land of the region. Farmers are continuingly bringing in much bigger but more susceptible zebu cattle from the Sahelian region of the country and cross taurine and zebuine types. A study was conducted to find whether crossbred animals have more taurine ancestry is some regions of the genome hosting genes suspected to be involved in trypanotolerance than in the background of the genome. A trend in that direction was observed but results were not significant. Big differences in ancestry proportions were found for different regions. The number of actually infected individuals, determined by a new trypanosome species specific PCR method was too small to make a valid comparison of non-infected versus infected groups within breed or crossbred subsets of animals.

The functionally molecules from excretory-secretory products of three *Trichinella* species

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The nematodes of the genus *Trichinella* are intracellular parasites of skeletal muscle cells. These organisms are able to parasitize carnivorous and omnivorous vertebrates, including man. They are causative agents of trichinellosis, an important worldwide zoonotic disease. The main source of the infections is raw or undercooked meat containing *Trichinella* larvae. Contrary to human infections, which may lead to death, within *Trichinella* positive animals no clinical sings are usually recognized. The official control of meat is carried out according to Regulation (EC) No 2075/2005, which covers rules for testing of all finisher pigs, sows, boars, horses, wild boars and some other wild species. These regulations require that all pig carcasses be tested for *Trichinella* larvae by artificial digest method. Due to the very low public health risk of trichinellosis in EU and substantial economic costs of periodic testing there is increasing requirement for modification of European Union legislative approach to trichinellosis control and for development of alternative effective and cheap diagnostic tools enabling reliable surveillance of trichinellosis, e.g. serodiagnostics (ELISA/Immunoblot).
Our study is focused on characterization of proteins from L1 larvae of three trichinella species (*Trichinella spiralis*, *T. britovi* - parasitizing mainly carnivores and wild boars) and *T. pseudospiralis* - parasitizing mainly birds) playing a role in host-parasite interaction. We used High-Performance Liquid Chromatography (HPLC) in combination with Mass Spectrometry to reveal and compare the spectrum of molecules in excretory-secretory products of these model organisms. Some selected molecules were prepared in recombinant form and their serodiagnostic potential was tested.

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An assessment of parasitological examination methods of feces, with particular emphasis on practicality and diagnostic value, as well as a quantitative validation of the modified McMaster method and a subsequent comparison with the semi-quantitative glucose-sodium chloride flotation.

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A significant increase in the parasitological samples had been felt in daily laboratory routine, so it was a look of interest how the results look like, and whether the selection of research methods (at least 2 methods per sample) fits the requirements. In the routine is it common that two different methods were used for each species (glucose-NaCl flotation and the SAF (sodium acetate-acetic acid-formalin solution) -enrichment method). It has been studied whether it is of urgent necessity to actually use both methods for finding the parasites and protozoa in all animal species. The sharp rise in infections with horse strongyles was a trigger for the comparison of the McMaster procedure with the glucose-NaCl flotation, additionally required for samples from horses. Previously, the McMaster method has been validated and studied the different distribution of parasite eggs in the stool sample.

Feline Protozoa – is there a risk for cats and owner?

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Although cats infested with protozoa are often asymptomatic, these pathogens can cause severe intestinal symptoms in young or immunosuppressed animals. Besides this risk for animal health, protozoa like *Giardia* and *Cryptosporidium* are also considered zoonotic agents. However, their zoonotic potential seems to be restricted to certain genotypes only.
In this study, we determined the occurrence of protozoa in feline samples from Austria and also correlated the degree of infection with individual animal data. We further wanted to assess the zoonotic potential of *Giardia* genotypes in cats.
We obtained 295 samples (corresponding to 76 cat owners). Pet owners were asked to complete a questionnaire asking for age, breed, intestinal symptoms and environmental data of their cats. 85 questionnaires were answered.
Faecel samples were examined coproscopically with flotation as well as with a commercial test-kit (FASTest®) for the detection of *Giardia.* We also used a culture system for the detection of *Tritrichomonas foetus* (In-Pouch™ feline). PCR analysis was conducted on 262 samples. We conducted a nested PCR targeting the β-Giardin locus of *Giardia* and the 18SrRNA Gen-locus of *Cryptosporidium,* respectively. *Giardia* positive PCR results were subsequently sequenced.
Faecal flotation revealed the following parasites: 5.8% *Giardia*, 4% *Cystoisospora*, 4.7% *Toxocara,* 0.7% Taeniidae , 0.3 % *Aelurostrongylus* , 0.3% *Sarcocystis,* and 0.3% *Capillaria*. A good correlation was observed between FASTest® results and flotation. The FASTest® was more sensitive, (prevalence of *Giardia* =12.5%). There was no correlation between positive PCR-results of the ß-Giardin and the flotation or FastTest®. By contrast, *Cryptosporidium* PCR correlated well with flotation results. One cat was tested positive for *Tritichomonas foetus* with the InPouch™ method. 53% of the animals with protozoan infections had normal faeces. By contrast, 35% and 2.94% of the cats that excreted one or more protozoa had pasty or diarrhoeic faeces, respectively. Pasty and diarrheic faeces (taken together) were significantly correlated with protozoal infection (p=0.42). Upon sequencing of *Giardia*-positive PCR-products the non-zoonotic genotype "F" was detected only. Multilocus sequencing will be carried out to evaluate these findings more closely.

Alveolar Echinococcosis – still a deadly disease

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We report the case of a 49 year-old Swiss female, who was admitted to the Division of Pulmonology with progressive dyspnoea. 20 years ago an alveolar echinococcosis with the affection of the liver, lung and brain was diagnosed and initially treated with mebendazole plus interferon gamma. In the following years therapy was switched to albendazole and stereotactic gamma knife therapy due to progressive cerebral lesions. After 4 years of stable disease antihelminthic treatment was stopped due to severe hair loss and the patient remained 14 years without any antihelminthic treatment. At the recent admission computed tomography revealed a dramatic progress of the known pulmonary bilobular lesions, so albendazole was initiated again. But soon the patient developed severe respiratory failure and was intubated. Despite using all technical facilities the patient died because of respiratory insufficiency after 20 days at the intensive care unit. To prevent such dramatic clinical courses, livelong antihelminthic maintenance therapy and livelong regular follow-up seems to be crucial.

Surveillance of invasive and indigenous mosquitoes and pathogens in Germany

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Until recently, mosquito surveillance in Germany was widely neglected and not considered to be of importance. Accordingly, Germany has been a white spot on most of the mosquito maps of the European Centre for Disease Prevention and Control (ECDC). However, the situation has changed during the last five years. Several nation-wide projects have been initiated to monitor indigenous mosquito species and to assess their carrier state for pathogens. Since 2009, a total of 150,000 female mosquitoes were analysed for the presence of viruses and parasites, resulting in the identification of different mosquito species carrying Batai virus, Sindbis virus or Usutu virus or different *Dirofilaria* species. Another project is analysing possible entry sites for the introduction of new invasive species such as sea- or airports, train stations and truck stops along main motorways. The results indicate repeated and accelerated introduction of *Aedes albopictus* into southern Germany and substantial infestation of various regions in south, west and central Germany with *Ochlerotatus japonicus*.

Dirofilaria repens: An emerging arbonematode with increasing importance in Central Europe

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Dirofilariosis due to infections with the filarial nematode *Dirofilaria repens* is considered an emerging zoonosis in Europe. The main reservoirs for the parasite are dogs and other carnivores. As with other filarial species, mosquitoes transmit infectious stage 3 larvae (L3), which develop into fertile macrofilariae in their definitive vertebrate hosts. Humans may become infected as aberrant hosts and in most cases the worms remain infertile. Infections in humans usually manifest as subcutaneous nodules, which are caused by macrofilariae that are trapped by immune mechanisms. Subcutaneous migration of the worm may result in local swellings with changing localization. In addition, severe organ manifestations have been reported, which may affect various organs including the brain, the lung, or the eye. The latter is found in particular during the migratory phase of the parasite. Transmission of *D. repens* is found in various regions of the "Old World" including Europe, Africa, and Asia. Main endemic areas in Europe are countries of the Mediterranean region, where appropriate warm temperatures allow development of infectious L3 larvae in the mosquito. However, during the last decade several autochthonous cases of canine and human dirofilariasis have been reported from countries further north, such as Austria, the Czech Republic, Poland or Germany.

Serodiagnostics of bird schistosome infections caused by *Trichobilharzia regenti* in ducks

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The schistosome *Trichobilharzia regenti* is a neurotropic parasite of aquatic birds. Its schistosomula migrate via the nerve tissue to the place of final localization in the nasal cavity of definitive hosts. Cercariae of *T. regenti* can also penetrate into mammalian hosts including humans where they cause an itchy hypersensitive skin response known as cercarial dermatitis. The immune response of nonspecific murine hosts against the antigens contained in the E/S products of cercariae was studied in previous studies (Lichtenbergová et al. 2008). IgG1 and IgE antibodies in sera from repeatedly infected mice and from human patients with cercarial dermatitis recognized 25 kDa and 34 kDa proteins characterized as trioso phosphate isomerase and glyceraldehyde 3-P dehydrogenase (unpublished).
The main goal of this research was to describe the antibody response of specific definitive hosts *Anas platyrhynchos* infected by *T. regenti* and to find antigens with possible diagnostic potential.
Sera from experimentally infected ducks were collected in predefined intervals and examined using ELISA and Western blot methods. Whole body protein extracts of cercariae and schistosomula were used as antigens. Results of ELISA confirmed that the level of specific IgY antibodies increased significantly around the 20th day post-infection. This trend in the levels of antibodies was observed regardless of age of experimental ducks or infectious dose. The level of IgM antibodies specific to the early stage of infection sequentially growed and culminated around the 15th d.p.i.. On Western blots, several antigens of cercariae and schistosomula have been recognized by IgY from infected ducks. These occurred with 2 antigens in ranges of Mw 47-45 kDa and 49-47 kDa for cercarial homogenate and 17 kDa and 34 kDa for antigens of schistosomula. Other reactions, which were recognized, have not been observed in all specimens, but in many cases reactions were observed in range of Mw 18 kDa and 55 kDa for cercarial homogenate. These antigens will be identified by mass spectrometry.

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Japanische Enzephalitis: Risiko für den Reisenden & Prävention

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Im Rahmen des Vortrags wird die Erkrankung der Japanischen Enzephalitis in Bezug auf Übertragung, Krankheitsbild und Diagnostik vorgestellt. Es wird die Epidemiologie sowie das Risiko für den Reisenden diskutiert. Der Schwerpunkt des Vortrags liegt auf den Möglichkeiten zur JE-Prophylaxe in der reisemedizinischen Praxis, im speziellen der inaktivierten JE-Impfung bei Reisenden in Risikogebiete. Es wird im Speziellen auf das Impfschema, Boosterimpfungen mit Ixiaro™ von bereits geimpften Personen und Impfung bei Kindern bzw. älteren Personen eingegangen.

Is the immune response/protection to primary immunisation with a Japanese Encephalitis vaccine sufficient in the travelling elderly?

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Background: Immunosenescence includes reduced B and T-cell responses in the elderly population. It has been shown that booster vaccination is less effective in the elderly compared to the young, however data on the efficacy of primary immunisation in the elderly is still sparse. Since traveling to South East Asia becomes increasingly popular in the elderly, the question arises whether sufficient protection can be attained after (travel-related) primary immunisation in the elderly. In a monocentric, open label, phase IV study we investigated humoral and cellular immune responses to primary (JE) vaccination in a study group of 18-40 versus >60 year old participants.

Method: Participants (n=30 per group) received a primary course of a vero-cell based adjuvanted Japanese Encephalitits vaccine. Neutralising antibody titers (NT) were analysed in serum samples taken before vaccination, one and five weeks after the second vaccination. PBMC´s were taken before and one week after the second vaccination for analysis of different T- and B-cell subsets and cytokine production upon JE-antigen restimulation.

Results: In the elderly JE-NT´s were significantly lower than in the younger participants. Furthermore 13% of young (mean age 24.3 y) versus 47% of the elderly (mean age 68.8 y) participants were non-responders not mounting measurable JE-specific antibody levels. Reduced humoral immune responses were associated with reduced cytokine production (IFN-g, IL-2) *in vitro*, CMV-seropositivity and higher numbers of regulatory T cells in the elderly study population. Additionally, higher frequencies of late-differentiated effector and effector memory cells were detected in the elderly.

Conclusion: In our study humoral and cellular immune responses to primary JE vaccination were significantly reduced in the elderly compared to young participants. Therefore primary vaccination in the elderly may require different vaccination strategies to ensure sufficient immunity such as modified vaccination/booster schedules, careful selection of adjuvants and if possible encouraging primary vaccination before the age of 60.

The baby-sister of malaria: human babesiosis

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Human babesiosis is a zoonosis transmitted by ixodid ticks. The natural vertebrate hosts are various mammals (e.g. cattle, roe deer, dogs) and also birds (Walochnik & Aspöck 2010). In the vertebrate host, *Babesia* spp. multiply within the red blood cells, particularly the early developmental stages can easily be mistaken for *Plasmodium* spp. Most human cases of babesiosis are caused either by *Babesia divergens*, which occurs exclusively in Europe, or *B. microti*, which mainly occurs in the north-eastern eastern parts of the USA. *B. divergens* seems to be pathogenic only for immunocompromised, mostly splenectomised, patients, while *B. microti* can cause disease also in healthy individuals. However, these infections usually show a milder progression. After an incubation period of one to six weeks, infected humans develop malaria-like symptoms, the severity of the infection depending on the immune status of the patient. Since rupture of the erythrocytes is not synchronized as in malaria, the fever is typically not remittent. An infection with *B. microti* usually subsides (in immunocompetent individuals), even if left untreated, but *B. divergens* infections must be treated unconditionally and rapidly, as they can be fatal, particularly, for splenectomised individuals.
The genus *Babesia* was established by Starcovici in 1893, uniting *B. bovis* and *B. ovis*, and later also including *B. bigemina*. Meanwhile, more than 100 species have been described, mainly according to their respective vertebrate hosts. In the past years, however, the validity of many species has been questioned and also new species have been described, including *B. venatorum* HERWALDT et al., 2003 and *B. duncani* CONRAD et al. 2006, both isolated from humans. Moreover, it has been shown that *B. microti* is more closely related to the genus *Theileria* than to other *Babesia* species.
In Austria, until now, three cases of human babesiosis have been described, two caused by the newly described species *B. venatorum* (Herwaldt et al. 2003, Blum et al. 2011) and one by *B. microti* (Ramharter et al. 2010). Several *Babesia* species have also been detected in Austrian ticks (Blaschitz et al. 2008, Leschnik et al. 2012).

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Establishing an Interdisciplinary Outpatient Department for Echinococcosis at the Medical University of Vienna

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Echinococcosis is amongst of the most important human helminth infections endemic in Central Europe. The diagnosis and management of echinococcosis requires an interdisciplinary approach including specialists in parasitology, radiology, surgery, and infectious diseases. At the Medical University of Vienna an interdisciplinary outpatient department has been established to ensure state of the art patient care including conservative, minimal invasive and surgical treatment options for patients based on current international recommendations. The dedicated facility also gives the opportunity to systematically collect clinical, parasitological, radiological and laboratory data to establish a cohort of patients suffering from echinococcosis in Austria for further scientific exploration. Here we present the establishment of the interdisciplinary outpatient department for echinococcosis and provide an overview of research platforms supporting the clinical research at our institution.

Mass spectrometry as a tool for identifying parasite-specific glycan modifications of proteins

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Sugars cover the surfaces of all cells, including also those from the host or the pathogen/parasite. However, there are many different types of 'sugar coatings', including those linked to proteins. Also within this category, the modifications of asparagine residues by carbohydrate structures (N-glycans) are highly diverse and vary between species, organs and cell types as well as during development and disease. In recent years we have examined the N-glycans of both protist and helminth parasite species (*Acanthamoeba*, *Trichomonas*, *Echinococcus*, *Ascaris*, *Oesophagostomum*) with mass spectrometry in combination with chromatographic separation and chemical/enzymatic treatments; we have proven the presence of unusual modifications, which are quite different to those of mammalian hosts. These include the presence of xylose, phosphoethanolamine, phosphorylcholine, methylation and mannosylation/galactosylation of core fucose residues. Some of these modifications result in epitopes recognised by antibodies, lectins and other receptors which are relevant to antigenicity or immunomodulation and may also present new targets for anti-parasitic agents.

Infection of sows with oocysts of *Cystoisospora suis* ante partum as a passive immunization strategy against cystoisosporosis in suckling piglets – the role of IgA

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Cystoisospora suis causes cystoisosporosis in neonatal piglets. With regard to its economic impact there is need for effective prophylactic strategies. *C. suis*-specific antibodies are transferred from sows to their agammaglobulinemic offspring with colostrum and milk. Correlations between higher IgA blood serum titres in piglets and more solid fecal consistency after *C. suis* infections were observed previously. We investigate whether experimental ante partum (a. p.) infections of non-naïve sows lead to elevated IgA titres in sows and nursed piglets, and whether there is a correlation with protective effects after experimental infections of the piglets. Six sows were infected 14 days a. p. with 100,000 oocysts of *C. suis*, 6 sows remained non-infected. Piglets were infected with 1,000 oocysts on the 4th day of life. Fecal consistency and oocysts shedding were monitored until the 22nd day of life. IgA titres against sporozoites and merozoites were examined in sow's blood serum and colostrum/milk and in piglet's blood serum.

The infection of sows had a significant positive effect on the course of disease of their offspring compared to piglets nursed by non-infected sows including reduced oocyst shedding and diarrhea, longer prepatency, and later onset of diarrhea.

Infected sows had significantly increased IgA titres in blood serum, colostrum and milk against merozoites and sporozoites. A significant positive correlation was found between titres in blood and milk. In piglets nursed by infected sows IgA blood serum titres were significantly higher after colostrum uptake. This was positively correlated with higher IgA titres in blood serum and milk of their mothers. For IgA against sporozoites in piglet's blood sera, significant positive correlations with a later onset of diarrhea, overall lower fecal scores and less days with heavy diarrhea were found.

Our results highlight the potential of experimental infections of sows with *C. suis* a. p. to protect piglets from severe cystoisosporosis. Although oocysts shedding and diarrhea after experimental infections of their offspring could not be inhibited completely, the presented strategy can serve as a valuable basis for further development of an effective maternal immunization. IgA blood serum titres in sows show high correlations with their milk titres and the blood serum titres of nursed piglets and may be used as an indicator for expectable protective effects in piglets.

Health threats in Mali and actual mission statistics

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The in March newly started EUTM-MALI Mission (EU-Trainingsmission) had to expect a variety of health threats and problems. The actual diagnoses were listed and analysed using the EPINATO report. Even reported incidents were sometimes high the loss of workdays was in relation unexpected low. Mainly characteristics and results of the months July – September (rain season) will be discussed.
Generally monitoring is very important to insure best possible information, prevention and if necessary commanders action.

To bind or not to bind – Study of *Cystoisospora suis* coccidial development through *Toxoplasma*-specific reagents

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We recently developed an *in vitro* cultivation system for *Cystoisospora suis* (Apicomplexa, Coccidia), a sister taxon of *Toxoplasma*, providing access to all developmental stages. Additionally, the *C. suis* genome has been sampled using Illumina sequencing. Sexual stages of coccidia are difficult to access and consequentially are only poorly understood. *In vitro* access to sexual stages and their relatively large size offer opportunities to investigate the development of micro- and macrogametocytes in a standardized system.
As a first step for analysis of *C. suis* development, antibodies targeting tubulins and relevant *Toxoplasma* cell division proteins were tested for immunofluorescence staining competence. In parallel, *C. suis* genomic sequences were aligned with selected *T. gondii* coding sequences. Identified contigs of interest were further used for gene prediction and corresponding hypothetical proteins of *C. suis* were identified.
Antibodies against acetylated tubulin led to specific staining of conoids, spindle poles and flagella. Together with staining of the kinetochore marker Nuf2 and of inner membrane complex protein (IMC)1 and IMC3 it was possible to investigate nuclear division and budding dynamics of all meront types and of microgamonts from early nuclear division through to fully developed microgametes. However, the majority of antibodies did not stain specifically. Negative results were not always correlated with the lack of homologous hypothetical proteins in *I. suis*. In the absence of antibodies specific for proteins involved in the sexual development of *Toxoplasma*, and given inadequate amino acid similarity between putative *C. suis* proteins and homologues from parasites such as *Plasmodium*, there is now a requirement for the production of *Cystoisospora*-specific reagents for detailed investigation of sexual stages. The results achieved using existing antibodies promise new insights into coccidial sexual development with early microgamonts exhibiting particular spindle pole and kinetochore patterns and the early formation of flagella detectable by specific β-tubulin staining.

Novel glycoepitope as a potential anthelmintic agent and the perspective of antigen biosynthesis

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Glycans play an important role in parasite infection due to their modulation of the host's immune response. As the glycans produced by parasitic nematodes are different from those of the host, they can be recognized by the immune system and antisera can be raised against them. We study the non-parasitic model organism *Caenorhabditis elegans* because it shares a similar N-glycomic background with parasitic nematodes. For instance, the galactosylated core fucose (GalFuc) moiety was identified in the pig parasites *Ascaris suum* and *Oesophagostomum dentatum*, the phosphorylcholine (PC)-substitution of N-glycans found in *A. suum*, and highly fucosylated chitobiose core structures (CCMs) were discovered in the sheep parasite *Haemonchus contortus*. In previous studies, we have demonstrated that the fucosyltransferases responsible for modifying the proximal GlcNAc residue are FUT-1 and FUT-8. In order to systematically study the molecular basis of nematode chitobiose core modifications, we prepared five *C. elegans* double and triple knockouts using genetic approaches. By combining glycan array technology, MALDI MS and NMR approaches, we confirmed that the enzyme modifying the distal GlcNAc residue is FUT-6, a third core fucosyltransferase. ELISA results have shown that a hexosaminidase double knockout with increased distal GlcNAc modifications displayed enhanced cross reaction against sera of pigs infected with *A. suum* and *O. dentatum* than the wild type. This indicated that this glycoepitope might be a potential target for anthelmintic agent. In order to mimic the biosynthesis of the H11 vaccine target from *H. contortus*, we employed five glyco-enzymes to process a chemically synthesised glycan and finally obtained two trifucosylated products. These findings are the basis for the chemo-enzymatic production of trifucosylated antigens in subsequent studies.

Understanding the molecular mechanism of Golgi biogenesis in *Trypanosoma brucei*

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The Golgi lies at the heart of the secretory pathway, modifying and sorting the transiting cargo. Despite a mechanistic understanding of the processes underlying selective cargo transport we know much less about the process of biogenesis, which duplicates and partitions the Golgi once per cell cycle. Here, we exploit the simplicity and genetic tractability of the protozoan parasite Trypanosoma brucei, the causative agent of sleeping sickness. This organism has a single Golgi, whose duplication can be tracked using photoactivatable fluorescent proteins and time-lapse fluorescence microscopy. Using this approach, we investigated whether the existing Golgi contributes to the formation of the new Golgi both in live cells and in a permeabilized cell system. We show that components of the existing Golgi can indeed be tracked to the newly forming Golgi. These results confirm and extend our earlier observations on the biogenetic process.

Species inventory, ecology and seasonal distribution patterns of Culicidae (Insecta: Diptera) in the National Park Donau-Auen

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Mosquitoes are known as hosts for a variety of parasites and pathogens and are therefore considered as nuisance and as vectors of human diseases. Until recently not much attention had been paid to their ecology although they play important but poorly understood role in food chains (Poulin 2010). In order to understand the ecological function of Culicidae in an ecosystem it is imperative to update information on culicid species distribution and to investigate the factors controlling it. We monitored abiotic parameters such as water level, nutrients, oxygen concentration and conductivity as well as biotic parameters (Culicidae and potential predators from March to October 2011 at 20 sampling sites in the National Park Donau Auen. A total of 34 eggrafts, 1927 larval, 80 pupal and 200 adult Culicidae were collected. We detected 15 mosquito species belonging to 6 genera (*Anopheles, Culex*, *Culiseta*, *Coquillettidia*, *Aedes* and *Ochlerotatus*), whereas *Ochlerotatus geniculatus* (68 %) and *Culex territans* (13 %) were most abundant, followed by *Culex pipiens* and *Aedes vexans* with approximately 5% and 4 % of total abundance. Biometrical data were used to reconstruct life cycles; At the study area *C. pipiens* and *C. territans* were bivoltine and *O. geniculatus* multivoltine. Based on abiotic and biotic parameters, sampling sites were grouped into 4 separated clusters. The results show that water level and persistence, pH, electric conductivity and phosphate concentrations had a significant influence on species distribution and that flood plain dynamics are a key factor for the seasonal and spatial distribution of mosquito larvae in the National Park Donau-Auen.

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