

1) Tomas Otahal

### Corruption in economic theory

The aim of this thesis is to explain the problem of corruption from the perspective of two different economic theories and to provide suitable theoretical solutions. The methodological section, identifies why the argumentation is built on the principle of methodological individualism. This is followed by deductive analysis and is supported with evidence from historical examples. Corruption is introduced through the example of bribery.

In the theoretical section, historical evolution of agency theory and rent-seeking is explained. The author explains how both the agency theory and rent-seeking understand the problem of corruption and the problems of suggested public policies deduced from both theories. It is argued that while agency theory lacks a concrete explanation of institutional environment, within which corruption occurs, rent-seekings lacks the positive definition of rules that determine how corruption should be solved.

In the analytical section, a theoretical framework is suggested for connecting both the agency theory and rent-seeking. The author explains that the suggested theoretical framework applied to historical examples implies that the system of creation of legal rules and the system of their enforcement are crucial for solution of corruption problem in every society. More precisely, it is argued that when the system of creation of legal rules is subordinated to the citizens' control and the independent judicial system is subject to competition, the problem of corruption is not so prevalent when compared with dictatorial states. The conclusion summarizes and provides explicit explanation of the author's contribution.

## 2) Jiri Palicka

Although the gene therapy achieved undeniable clinical successes, its use for cancer treatment is still limited by the low efficiency of gene transfer. One of the possibilities to achieve higher number of affected cancer cells is intercellular spread of the transgene product. Using the known signal sequences responsible for inter- and intracellular trafficking of proteins is the transgene engineered to make its product, the produced protein, capable of being secreted from the affected cells and taken up by the neighboring cells. The aim of this diploma thesis is to improve cellular uptake of the transgene product. The gene for Cre recombinase and the cell line containing reporter cassette allowing detection of presence of the Cre recombinase in a cell nucleus was chosen as a reporter system. Within this project, method of bacterial expression and purification of an enzymatically active Cre-fusion protein was established and its capability of entering the reporter cells was assessed. Furthermore, transgenes containing additional protein transduction domain TAT from the HIV virus and an endosomal escape signal from the Influenza virus were constructed. Their activity was not examined in the limited time.

3) Sarka Masova

**"Morphometric and Molecular Characterization of *Multicaecum heterotis* (Nematoda: Heterocheilidae) from *Heterotis Niloticus* (Osteoglossiformes) with Determination Key of *Multicaecum* and *Brevimulticaecum* Species"**

Ascaridoid nematode species *Brevimulticaecum heterotis* (Petter, Vassiliadès and Marchand, 1979; Khalil, 1984) were recorded from the intestine of the African bonytongue, *Heterotis niloticus* (Cuvier) (Arapaimidae, Osteoglossiformes) from the Mare Simenti in the Niokolo Koba National Park, East Senegal and from Kosti, Sudan. The study includes morphometrical and molecular approaches to identification of the nematode parasite *B. heterotis*. Specimens were examined and redescribed based on light and, for the first time, environmental scanning electron microscopy (ESEM) and SEM. These methods revealed some findings of morphological features such as dentigerous ridge with small sharp denticles on the upper edge of the lip. On the basis of this feature this taxon belongs to genus *Multicaecum* (Baylis, 1923). *B. heterotis* differs from generic diagnose of *Brevimulticaecum* (Mozgovoy in Skrjabin, Shikhobalova and Mozgovoy, 1951) mainly by presence of dentigerous ridges on lips, location of excretory pore at the level of, or behind the nerve ring, vulva location in the front half of the body. The study contains also a key for determination of species from genus *Multicaecum* and *Brevimulticaecum*, and the first published sequence of species from the genus *Multicaecum*.

#### 4) Khomaini Hasan

### Mycobacterium tuberculosis H37Rv HALOALKANE DEHALOGENASE (DmbC): BIOCHEMICAL, SUBSTRATE SPECIFICITY, AND STRUCTURAL CHARACTERIZATIONS

Haloalkane dehalogenases (EC. [3.8.1.5](#)) are enzymes which catalyze the hydrolytic conversion of various halogenated compounds to corresponding alcohol and halide ion. Because of its broad substrate specificity, haloalkane dehalogenases are promising biocatalysts for bioremediation, biocatalysis, and biosensing. Herein, we report haloalkane dehalogenases DmbC from *Mycobacterium tuberculosis* H37Rv, which demonstrate dehalogenase activity of their translational products.

DmbC was produced in recently developed *Mycobacterium smegmatis* expression host system. DmbC was purified to homogeneity by nickel affinity chromatography and its characteristics have been investigated covering biochemical, substrate specificities, and secondary structure. DmbC exhibited lower catalytic activity with 30 tested halogenated substrates, but novel specificity towards iodinated and brominated aliphatic compounds.

DmbC has temperature and optimum at 40 degrees Celcius and pH optima at 8.3, by using 1,3-diiodobutane as a substrate. Secondary structure of DmbC measured by means of circular dichroism spectroscopy revealed that DmbC is constructed by alpha/beta-hydrolase family-like structure. Even though the size of 32.9 kDa monomeric unit of DmbC estimated by SDS

PAGE is analogous to other known haloalkane dehalogenases, this enzyme is unique by forming large homo-oligomeric units. Oligomeric state characteristic of DmbC was confirmed by gel filtration, dynamic and static light scattering. Furthermore, presence of detergents in purification buffers in reaction mixture of DmbC showed clear effect on protein activity. Addition of detergent Tween 80 and DMSO to the protein sample of DmbC results in formation of lower oligomeric state and higher catalytic activity.

## 5) Dana Smerdova

The importance, advantages and difficulties in using elements of Video interaction guidance (VIG) in the preparation of student teachers

The contribution deals with the research which has been realised within dissertation aims to express importance, possibilities and difficulties in the implementation of elements of the Video interaction guidance method in the preparation of students of education, so future teachers, in the Faculty of Education.

It sets itself the task of outlining and highlighting the close interconnection between the links of the communication and interaction at school. These links include the development abilities and skills that future teachers create to enhance positive psychosocial climate at school, which is an important precondition for meaningful and effective teaching. This also enables teachers to change bad conditions of teaching and be more in tune with human nature and basic human needs. This is relevant for both pupils and teachers.

Further it presents partial findings in student teachers' conception of educational communication and interaction. VIG helps with the ability of student teachers to interpret interaction in classrooms between teachers and pupils, which can be alarming in some ways, but understandable in the context. It then describes reasons and advantages for the use of elements VIG in student teacher preparation.

6) Zuzana Petrovicova

### "Taking Responsibility in Adolescence and its Relationship to Parenting Style"

The aim of this study was to examine the relationship between components of responsibility-taking among adolescents and perceived parenting style and enabling. Participants were 140 middle (14-16 years of age) and late (16-18 years of age) adolescents and their parents from a midsize town in western Slovakia. Students were equally divided by age and gender. Adolescents completed self-report measures of identity (translated EOMEOS-2), attributional style (shortened version of ASQ), personal and family responsibilities, and well established measure of parenting style. Parents filled in a parenting style questionnaire and enabling survey for parents was conducted.

Correlations and multiple hierarchical regressions were computed. Significant positive correlations were found between parental enabling and autonomy granting ( $r=.50$ ,  $p<.01$  for mothers,  $r=.43$ ,  $p<.01$  for fathers), and between non-enabling and demandingness ( $r=.49$ ,  $p<.01$  for mothers). The relationship between personal responsibilities and paternal positive emotions was found, while family related responsibilities were related to maternal positive emotions. Hierarchical regression revealed that internality was best predicted by parental demandingness and non-enabling. For the purposes of our study, we calculated exploration and commitment score and regressed them on components of parenting, enabling, and dimension of attributional style. Exploration was best predicted by maternal negative emotions ( $\beta=-.36$ ,  $p<.01$ ), paternal demandingness ( $\beta=.29$ ,  $p<.01$ ), and stability ( $\beta=.24$ ,  $p<.05$ ). Commitment was best predicted by maternal negative emotions ( $\beta= -.45$ ,  $p<.01$ ), accounting for 26% of variance.

The study found a relationship between the autonomy component of parenting and parental enabling, both negatively related to internality. The relationship between identity statuses and components of parenting were also found, supporting the existing theories. Implications for future research will be discussed.

7) Jana Supikova

## FOCUSED MICROARRAY FOR LYMPHOMA DIAGNOSTICS

### Background

Non-Hodgkin lymphomas (NHL) represent a heterogeneous group of lymphoproliferative disorders with highly variable clinical course and outcome. In some cases, current diagnostic methods based on histopathology and immunohistochemistry may be insufficient for exact tumor classification. They may thus be subjectively influenced by pathologist's experience, especially in Burkitt's lymphoma. Prognostic markers such as the International Prognostic Index (IPI), although highly useful, do not capture all the variability that affects clinical behaviour of lymphomas. The genome-wide transcriptional profiling was reported to accurately define the biological phenotype of the tumor.

### Aims

The aim of the project was to design novel focused oligonucleotide microarray directed at molecular diagnostics and prognostication of lymphoproliferative disorders, particularly non-Hodgkin lymphomas, and to test its reliability on a cohort of newly diagnosed lymphoma samples.

### Methods

We designed custom oligonucleotide microarray (Agilent 8x15K custom array) carrying specific probes for approximately 4000 genes. The genes represented on the microarray were selected on the basis of previously published lymphoma/leukemia gene expression profiling studies. In addition, probes for the genes implicated in crucial cellular processes such as apoptosis or cell cycle control were added. To provide more information, the genes for the majority of CD antigens and „housekeeping“ genes were also included in the microarray design.

67 histologically characterised samples were analysed – 18 Diffuse Large B-cell Lymphomas (DLBCL), 34 Follicular Lymphomas (FL), 3 Burkitt's Lymphomas (BL), 1 MALT Lymphoma, 6 non-malignant lymph-nodes and 3 lymphoma cell lines (SU-DHL-4, WSU-NHL, RAMOS). RNA was obtained either from fresh-frozen lymph-node resections, or from RNAlater preserved needle biopsy samples.

### Summary

We demonstrated the benefit of gene expression profiling using novel designed focused microarray for non-Hodgkin lymphoma characterisation. The technology is more robust and less expensive compared to the whole-genome approach and it is still capable of retaining important information.

## 8) Silvie Belaskova

This paper considers an investigation of the influence of using the Mathematica program in mathematical education on the level of knowledge and skills of students at the Faculty of Applied Informatics. Program environments of dynamic mathematics systems are introduced and special attention is devoted to the most expanded product from this field, which are Mathematica, AcroTex and Maple. The main part of this paper presents the pedagogical research, through a description of structure, organization of the experiment and statistical evaluation using modern statistical methods via a the Statistica program.



9) L. Homola (A. Holcikova, M. Kyr, I. Valaskova)

### Cystic Fibrosis Patients Homozygous for F508del Are Not Different at the Beginning

**BACKGROUND:** The relation between Cystic fibrosis (CF) genotype and phenotype has often been reported. F508del is considered to be a mutation with severe symptoms. We tested whether the patients homozygous for F508del have earlier CF manifestation and different first symptoms compared to the patients with alternative CF genetic background.

**METHODS:** Data were obtained from 52 patients from the Southern Moravia CF Centre from 1977 to 2008. Patients were divided into two groups: the group of homozygotes F508del with 26 subjects and the group of other CF mutations with 26 subjects. Collected data were year of birth, very first symptom typical for CF mentioned in the personal history and very first appearance of this symptom. The data for both groups were compared.

**RESULTS:** No statistical difference has been found between the two groups for the time of manifestation ( $p=0.385$ ) and initial symptoms ( $p=0.888$ ). The most common time of the first CF symptom appearance is from 1 month to 16-20 months of age for both groups. The group of other mutations has a greater variability. A typical first symptom is a failure to thrive and loose fatty stools (49-50%). It is followed by a respiratory tract disease (32-35%). The group of other symptoms is minor (19-15%).

**CONCLUSION:** Patients homozygous for F508del are not significantly different from patients with a different CF genetic background at the beginning of the disease.

10) Josef Skopalik

### Use of Calcium-regulated Photoprotein Aequorin as Intracellular Ca<sup>2+</sup> indicators in Follicular Lymphoma Cells

Aequorin belongs to the group of Ca<sup>2+</sup> indicators called Ca<sup>2+</sup> regulated photoproteins. Aequorin is not a toxic compound and can be used for the measurement of intracellular Ca<sup>2+</sup> concentration. Aequorin has several advantages in comparison to widely used Ca<sup>2+</sup> fluorescent indicators (Fura-2, Indo-1, Fluo-3), e.g. high signal to background ratio or minor influence to intracellular Ca<sup>2+</sup> concentration. Its only one disadvantage is the relative difficult incorporation into cells, because aequorin is 22kDa protein.

Hyposmotic solution treatment was gradually modified and used for loading aequorin into cytoplasm of follicular lymphoma cells in our laboratory. The measurement of fluorescence was performed by a home-made apparatus using photomultiplier (Hamamatsu).

The improved method of incorporation is effective for aequorin loading into follicular lymphoma cells in vitro and the ratio of cell survival of the procedure is high. It could be anticipated that this method can be used for intracellular Ca<sup>2+</sup> concentration measurement in other types of nonadherent blood cells.

## 11) Pavel Nepustil

### You Can Make It Without Treatment: Transforming Identity After Quitting Long-term Methamphetamine Use

In this article I summarize the partial conclusions of my dissertation „Identity transformation of former illicit drug users.“ The main goal of my study is to describe a process of quitting long term illicit drug use in the framework of social psychological perspective with the application of social constructionist theory. I draw from my own research (Nepustil, 2008) in which I interviewed 20 people who stopped long term methamphetamine use more than 5 years ago. I offer an interpretation of the process which they were subject to at the level of self and self-identity. From this standpoint I distinguish between four inter-related components – development of self-agency, development of reflexivity, creation of commitments and finding a new ethical framework, Together, these create a form of self-identity which is always unfinished. The notion of identity which I was drawing from shows that these processes cannot be maintained without interaction with other people. Ideally, they contribute to the development of reflexivity and self-agency and they also mediate the new ethical frameworks. Even if new commitments may be formulated within these relationships, it seems to be necessary to formulate these commitments in one’s own inner dialogue. All these processes mentioned are directed to the situation when one is able to connect his past, present and future goals, to make one’s own decisions based on the choice from range of possibilities and orienting oneself in a moral space. The possible task of experts on this level is to temporarily substitute or mediate such support relationships to people who do not have them at hand.

## 12) Zdenek Novy

### Arbitration Clause as Unfair Contract Term from the Perspective of Czech and EC Law

The conflict between EU consumer protection provided for by the Directive on unfair terms in consumer contracts and principles of arbitration, came to a head in the ECJ's Claro case. This case has shown that the arbitration clause may be an unfair contract term par excellence.

I use this case as a point of departure for the considerations on unfairness of arbitration clause in contracts between businesses and consumers. Consequently, I draw a parallel between the Claro case and the lasting contractual practice in the Czech Republic, where the arbitration clauses incorporated in standard form contracts between businesses and consumers are in many instances unfair. Their unfairness stems from the fact that arbitration clauses refer to arbitrators ad hoc who are unilaterally appointed and paid by businesses. Since standard form contracts are proffered by businesses, consumers are not given an opportunity to negotiate about the contract. This state of affairs in the Czech Republic is at variance with the Directive on unfair contract terms, as well as the ECJ's case law, which provides its interpretation.

From the structural viewpoint, first I am going to briefly inform about the consumer protection provided by the Directive. Subsequently, I deal with the ECJ's cases, which is important for further considerations regarding unfair nature of arbitration clauses, while putting particular emphasis on the ECJ's Claro case. Then, I aim to show that the Directive has not been correctly implemented into Czech Law. As a next step, I will offer a possible solution for this unsatisfactory situation in the Czech Republic, with the help of comparative insight into legal orders of the Member States. Finally, the development of the view on arbitration clauses as unfair contract terms in the EU is reflected.