

[1] Jana Z.

Inhibition of Chk1 kinase sensitizes leukemia and lymphoma cells with p53 mutations to chemotherapy

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Mutations in the TP53 gene are found in hematological malignancies less frequently than in solid tumors, but their presence is associated with very poor prognosis, including strong resistance to therapy. A promising option in the elimination of aggressive tumor cells is the concept of synthetic lethality, which is based on the inhibition of Chk1 kinase. After this inhibition the block all three cell cycle checkpoints is presumed - the G1 / S (p53 mutation), S and G2 / M (both Chk1 inhibition). This should lead to unregulated cell proliferation followed by mitotic catastrophe and cell death.

The possibility of this synthetic lethality was tested in 14 cell lines of which 10 had a mutation and / or deletion of TP53. All lines were derived from the B-cell malignancies (9 x lymphoma, leukemia 5 x).

The lines were cultured in 96-hole plates (50 000 cells / well) and half of the plate were pre-treated (2 h) an inhibitor of Chk1 (SCH900776) (200 nmol / l). Subsequently, a concentration range of fludarabine, cytarabine and gemcitabine was applied. The nucleoside analogues were applied in four concentrations. These cells were cultured in a 72 h range of concentrations of all three chemotherapeutic agents, which has been optimized for each line separately according to its sensitivity. Fludarabine was applied in the range of 20-0,125 mg / ml, cytarabine 1.6 mg / ml - 0.4 ng / ml and gemcitabine 25-0,25 ng / ml. The viability of cell cultivation was determined using WST-1 reagent at the end (Roche).

Inhibitor itself served to cells minimally (decreased viability to 90%) or at all. The visible sensitization of inhibition of Chk1 (which is always at least two adjacent cytostatic concentrations) was observed as follows: fludarabine and cytarabine for each of the three lines (all with mutations in p53), and gemcitabine in five lines (four of which carry a mutation in p53). In line with expectations, the best results were achieved for gemcitabine, since this is a cytostatic agent currently in clinical trials with the inhibitor SCH900776 just for B-cell lymphomas alone. A clear sensitization effect was observed overall in 50% (7/14) lines, with 86% (6/7) carried a mutation in p53.

Our results indicate that inhibition of Chk1 kinase may indeed lead to the sensitization of cells of highly aggressive lymphoma and leukemia with p53 mutations to cytostatics. The concept of synthetic lethality is interesting and offers a promising approach for the possible future treatment of haematological patients with p53 mutations.

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[2] Zuzana

Abstract

The European Court of Human Rights stated in case *Ternovszki v. Hungary* in 2010 that women have the right to respect for the decision to give birth at home and legislation must not dissuade health professionals from providing them the requisite assistance. In the Czech Republic, the right of women is violated as well. Healthcare is not available to women who opt for homebirths, as the authorities refuse to grant permission for private midwives. Thus, women are forced to either seek illegal midwifery care or to give birth without professional assistance. As a method of implementation of the

decision and in order to enforce the right of a woman to assisted home birth, an application for injunction through a local court was chosen. In January 2012, the Metropolitan Court in Prague recognised the right of women to professional assistance provided by hospital staff. In the near future, it is expected that other women will exercise their rights through the courts and apply for a midwife at home or for compensation.

[3] Barbara

Theme: Standardization of *TP53* mutation analysis in chronic lymphocytic leukemia

Introduction

Chronic lymphocytic leukemia (CLL) represents the most frequently diagnosed hematologic malignancy in Western countries. CLL is characterized by considerable clinical and biological heterogeneity, which results in the problematic determination of disease prognosis and subsequent patient therapy. Corresponding to that, the routinely investigated prognostic factors as staging, cytogenetic aberrations and immunoglobulin heavy variable (IgVH) gene mutation status have been recently complemented with additional clinical important markers. Significantly relevant are mainly the *TP53* mutations, which repeatedly correlated with shortened overall survival, short time to treatment and poor response to chemotherapy for CLL patients.

The tumor suppressor gene *TP53* encodes key transcriptional factors acting in response to varied genotoxic stress. Defects in p53 signalling pathway limit correct DNA repair or apoptosis and generally result in an increase of genome instability and abnormal cell proliferation. Protein p53 is frequently inactivated through monoallelic deletion at locus 17p13.1 accompanied with mutations on the second gene allele. These aberrations occur in the case of 10-15 % of newly diagnosed CLL patients and are associated with successive disease progression and resistance to conventional chemotherapy and/or immunotherapy. Additionally, the presence of prognostic unfavourable monoallelic *TP53* gene mutations (in absence of 17p-) has lately been observed in significant proportion of CLL patients. It particularly involved missense mutations localized in DNA-binding domain, which is indispensable for proper protein transcriptional function. Besides the transactivation impairment, some of these p53 mutants could gain new oncogenic features, which are connected to extremely poor CLL prognosis. In relation to these facts, recent studies suggest potential benefits of supplementing *TP53* cytogenetic examinations with mutational testing.

Current methodology and the timing of *TP53* investigations vary greatly and therefore some contradictory results could be achieved. Because of this, the European Research Initiative on CLL (ERIC) has presently recommended an examination of *TP53* mutation status before each treatment using one of the following methods: direct Sanger sequencing, functional analysis, chip-based arrays, pre-screening techniques or next-generation sequencing. However, a comprehensive study specifies applicability of these approaches in routine practice and determinate the most suitable approach for *TP53* mutation analysis wasn't performed up to now. In accordance with this, we examined a cohort of 185 CLL patients using a combination of currently available methodology to standardize detection of *TP53* gene mutations.

[4] Stanislav

In this paper, the morphosyntactical status of Old-Russian participles will be discussed. Among Russian both Czech historians of language it is commonly accepted that Old-Russian participles have evolved from indoeuropean nouns. Using some viewpoints of the GG and typological parallels from nostratic languages we will disprove this hypothesis and show, that Old-Russian participles are in fact derived from verbs, but in contrast to the verbum finitum they are not able to express neither grammatical verbal time nor voice (in terms of contemporary slavonic languages) as is usually claimed. On that account we will contend that the Old-Russian participles are syntactic derivatives built from verbal

stems using the lexical suffix which plays the role of an inhibitor of the temporal verbal head (T).

[5] Hana

KNOWLEDGE AND AESTHETICAL CONCEPTION OF LITERARY EDUCATION

The emphasis of the Czech literary education system has, until recently, been in opposition to the aesthetical approach and the knowledge-based approach. We therefore compared these different concepts in the Framework Educational Program for Basic Education (current curriculum) and the textbooks for primary schools. The curriculum is regarded as the standard default frame of literacy education. The textbooks are currently the only tool that implements the curricular vision into educational practice.

Content analysis and the creation of categorical systems were used as a main methodological design. Content analysis of the curriculum led to the allocation of a categorical system. Similarly, a categorical system of 20 textbook series was devolved. The different approach to literary education was precisely defined individual categories. The results of this content analysis were then compared.

The results of the investigation provided the following data:

(1): A balance between the aesthetical approach (53%) and the knowledge-based approach (47%) in the curriculum was proven.

(2): In contrast, the textbooks demonstrated a marked preference for the knowledge-based approach (69%).

(3): The aesthetic concept was rarely represented in the textbooks (31%).

Thus, it is clear that there is a significant difference between the concept of literary education and its implementation. On the one hand, the current curriculum presents a balance between the knowledge-based approach and the aesthetic approach, whereas on the other hand, the concepts within the textbooks does not conform to the requirements of the curriculum.

[6] Simon

This paper describes the usage of concgramming as a method to identify the aboutness of a text. Concgrams of a given length were applied on selected theses from within the Information System of Masaryk University. ConcGrams are similar to n-grams, in addition they are built from cooccurring words allowing constituency variations (i.e. A*B where * represents any intervening words) and sequence variations (i.e. AB, BA stands for a single concgram). Analyses were performed using concGrams consisting of 2 and 3 words respectively. Aboutgrams were compared with human assigned key words.

[7] Jaroslav

Geography and Arts: The Site-specific Art in Kateřina Šedá's Events

In recent years, many artists have started exploring and use geographic perspectives in their work, and at the same time, an increasing number of geographers have begun to study the artistic visions and expressions investigating the space around them. The tendencies to work with place and space in the art called site-specific have also emerged in the Czech Republic.

The purpose of this study is to show how Czech artist Kateřina Šedá created "social projects" in the background of different sites or, in other words, how she worked with place and people. In order to analyze the whole process of the site-specific event we reconstructed some of Kateřina Šedá's

projects by studying the documents she produced about them and by interviewing her. We also used methods of humanistic geography and the ethnomethodology to assess socio-spatial impacts of the events on the participants.

The outcomes of this research acknowledged that site-specific art can unveil many unapparent aspects of a human spatial behaviour. In fact, the art piece itself may effectively destroy the socio-spatial barriers as, for instance, Kateřina Šedá did in project *Furt dokola*. By contrast, it is shown that the impacts of such events are temporally limited.

[8] Krystyna K.

A comparison of five decontamination methods for the isolation of nontuberculous mycobacteria from sediments

Nontuberculous mycobacteria (NTM) are important for human health. NTM cause illnesses in immunocompromised individuals, which are very difficult to treat. Water is a natural environment for nontuberculous mycobacteria and can be a source for human infection. The first step of the isolation of mycobacteria is inactivation of rapidly growing microorganisms which can cause an overgrowth in mycobacterial colonies. Some chemicals (acids, bases, detergents) are used for this purpose. Decontamination methods are well described and widely used in clinical laboratories for mycobacteria. But these procedures are not adapted for environmental samples. For this reason five different decontamination methods for the isolation of NTM from sediments of drinking water reservoirs were compared in this study. The following decontamination treatments were used: oxalic acid, NaOH, *N*-acetyl-L-cysteine-NaOH (NaLC-NaOH), HCl-NaOH and CPC (cetylpyridinium chloride). Simultaneously, three egg-based media were also compared: Herold's medium with and without PANTA and Lowenstein-Jensen medium. Our result showed that decontamination by oxalic acid in the combination with Lowenstein-Jensen medium had the highest positivity rate. This decontamination procedure in the combination with Herold's PANTA medium obtained the smallest contamination rate. Other decontamination methods had lower, but very similar positivity rates. The contamination rates of all methods didn't exceed 4 % with the exception of CPC, which was higher. We recommend the use of oxalic acid for the isolation of NTM from aquatic sediments.

[9] Vit

MUSE: A multisensor framework for touchbased interaction

ABSTRACT

The problem of continuous association of users to input events in group collaborative environments such as tabletops and interactive display walls continues to be a very challenging task. In this paper, we present an architecture and proof-of-concept evaluation of MUSE – a multi-sensor framework, which provides a scalable coupling method for sensors of the same kind to represent them seamlessly like a single device. It also enables association of users to actions they performed in an environment where multiple types of sensor devices are used (e.g., multi-touch sensor and camera tracking). The MUSE framework will allow further research in gesture extraction and multi-user control in group collaborative environments based on large, high-resolution tiled-screens, both vertical (tiled display walls) and horizontal (tiled tabletops). Thus, the MUSE framework could become a base for the design of multi-modal interfaces of next generation group collaborative environments, where a combination of touch-based, touch-less and device-based interaction is involved.

[10] Lucia

Several paragraphs of the article on mobile augmented reality:

Recent expansion of the mobile industry caused a significant change in the area of augmented reality (AR). Few years ago, the development and usage of AR systems was limited by access to expensive hardware. Most applications were highly specialized, and used by experts in the fields such as military and engineering.

By contrast, the increase in sales of smart phones and tablets renewed the interest in AR systems among the general public. The first applications were designed and developed for the commercial sector – these were mostly for e-commerce applications, marketing campaigns and games. The largest increase in the number of published AR applications emerged in 2009. The common goal of the majority of these applications was to attract the attention of potential customers. [8]

Only in recent months has a new trend towards designing applications emerged with a potential benefit for end users. This category of applications includes browsers of information about users' surroundings (Wikitude, Layar) and image recognition tools allowing users to search for information based on visual queries (Google Goggles). At the same time, the boundaries concerning displayed content are changing. There is a clear tendency to reinforce the social aspects of AR applications, for example sharing information with users, or relying on users' data inputs.

Also, the area of mobile AR development is improving, which is reflected in the increase in the number of software platforms and libraries.

However, the use of most applications is still at an experimental level, as they have not yet reached mass popularity heights. The most important reason for this is that applications often fail to meet user's expectations. There are two explanations: First, technological limitations lead to performance issues – extensive data processing is computationally demanding, causes latency and shortens the battery life. The majority of applications also require an Internet connection. Second, applications' logic often does not meet real user's needs. Most applications focus on the technology rather than on the requirements of users, real use cases or mobile usage patterns.

[11] Kristýna V.

Molecular detection of selected tick-borne pathogens

The aim of this study was to determine the minimal prevalence rate of bacterium *Rickettsia* spp. and protozoan organism *Babesia* spp. in host-seeking *Ixodes ricinus* ticks in two different ecosystems: natural (Proskovice- where a total of 1197 ticks were examined) and urban (municipal park Bělský les- here, a total of 276 ticks were examined), using molecular biology methods (single-step PCR and sequencing). This information can help to complete the scheme of locations where these organisms are endemic and where the infection could therefore be acquired.

The minimal prevalence rate for *Rickettsia* spp. was 3.33% in total. The prevalence in natural ecosystem (Proskovice) was 3.43%, most frequently infected were nymphs (3.5 %), followed by females (2.86 %) and the lowest prevalence was determined in males (2.08 %). The minimal prevalence in urban ecosystem was found to be lower: 2.90 %. The most frequently infected were females (4.44 %), followed by males (3.90 %) and nymphs (2.22 %). Bacterial species determined by sequencing were *Rickettsia helvetica* and *Rickettsia monacensis*.

Only nymphs were examined for *Babesia* spp. In total, 0.54 % nymphs were infected, 0.63 % nymphs in natural site, none in urban ecosystem. The species determined by sequencing were *Babesia* sp. EU1 and *Babesia divergens*.

For all four *Rickettsia* and *Babesia* species identified by sequencing, this is the first time isolation from questing ticks in the Czech Republic.

These results contribute to the surveillance of tick-borne pathogens in the Czech Republic.

[12] Varga

The epidemic community-associated methicillin-resistant clone *Staphylococcus aureus* USA300 is a major source of skin and soft tissue infections and involves strains with a diverse set of resistance genes. In this study, we report the efficient transduction of penicillinase and tetracycline resistance plasmids by bacteriophages ϕ 80 ϕ and ϕ JB between clinical isolates belonging to the USA300 clone. High transduction frequencies (10^{-5} to 10^{-6} CFU/PFU) were observed using phages propagated on donor strains as well as prophages induced from donors by ultraviolet light. Quantitative real-time PCR was employed to detect penicillinase plasmids in transducing phage particles and to determine the ratio of transducing particles in phage lysates to infectious phage particles (determined as approximately 1:1700). The successful transfer of plasmids between strains in USA300 clone proves transduction is an effective mechanism for spreading plasmids within the clone. Such events contribute to its evolution and to emergence of new multiple drug-resistant strains of this successful clone.

[13] Hana Madrova

Development of a prognostic kit for chronic lymphocytic leukemia patients

Patients with chronic lymphocytic leukemia could be divided into two groups with different prognosis. An easy way of distinguishing between these groups would improve the patients' therapeutic strategy.

The initial phase of a qRT-PCR kit development for the detection of LAG3, LPL and ZAP70 expression in CLL patients was performed. These genes are differentially expressed between patients with indolent and progressive diseases. Housekeeping genes for relative expression quantification (B2M, HPRT, GUSB) were selected based on a statistical analysis. The amount of passive fluorophore ROX in [the?] master mix was optimized (500nM). Gene expression detected by different probes and different cyclers were then compared, when the correlation ability of LAG3, LPL and ZAP70 expression for distinguishing of prognostic important groups was confirmed with both probes series. Further, the T-cells contamination impact on the prognostic genes expression was evaluated. The level was found to have changed mainly in patients with low ZAP70 or high LPL expression.

The kit will be modified according to these findings. It will be necessary to confirm the T-cells impact on a larger patient's cohort; to evaluate the stability of the selected genes expression during the disease course and design an algorithm for the classification of patients into two prognostic groups. At last, the final kit will be validated with a larger cohort of patients. Development of the kit should result into a fast and reliable method for prognostication of CLL patients.