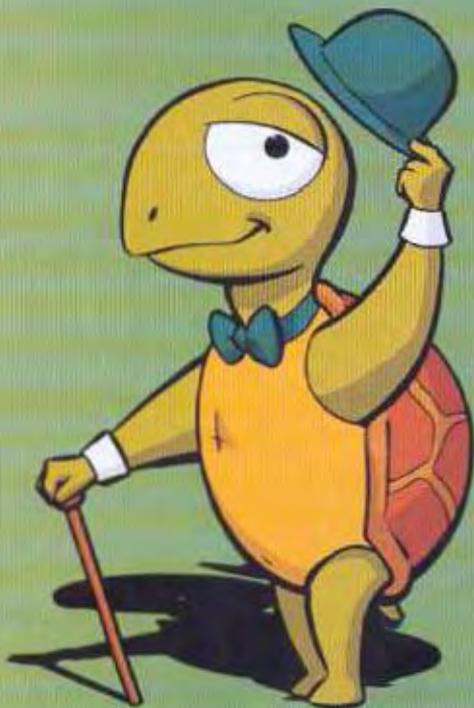


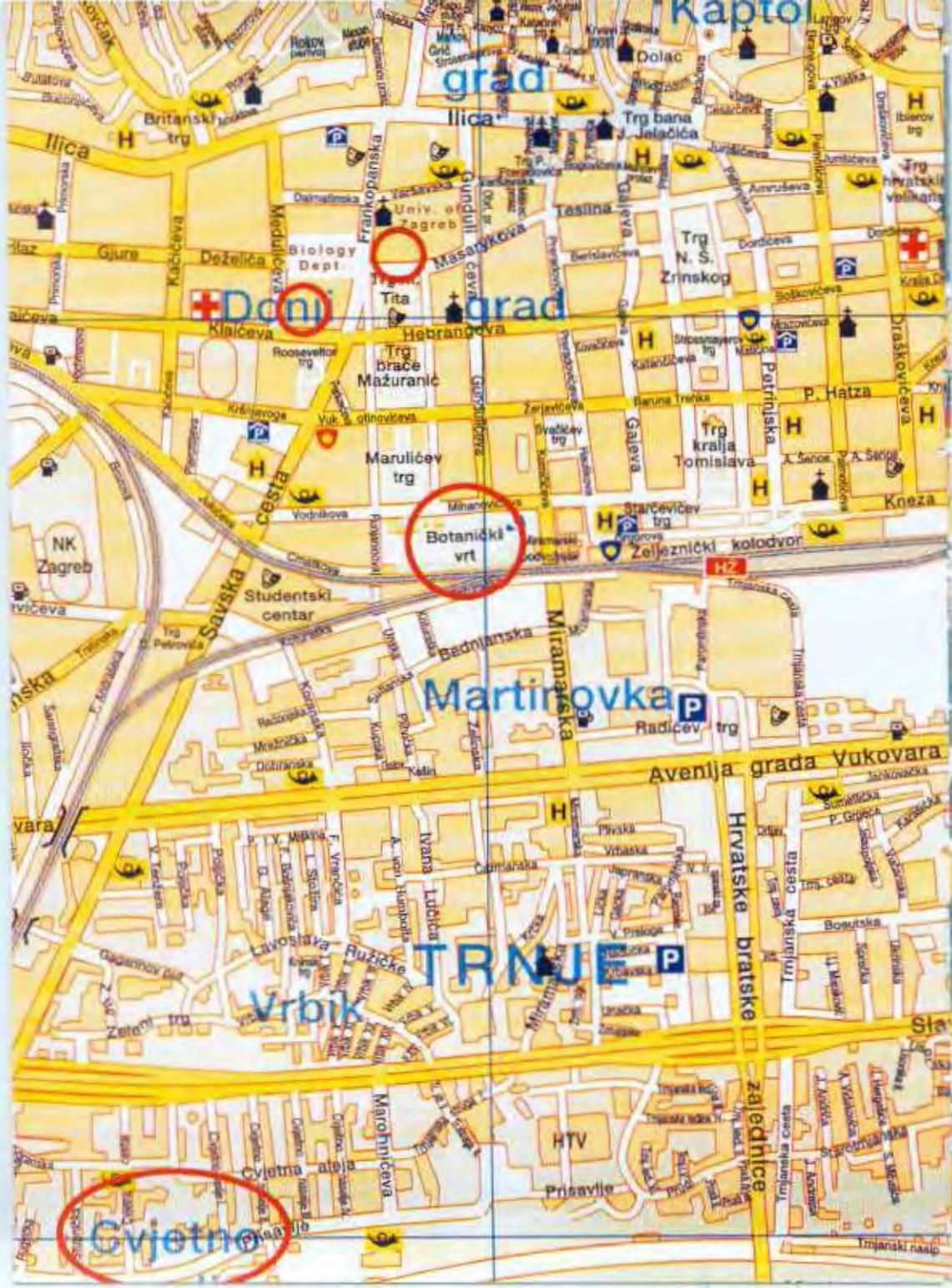


**CROATIA 2004**

**1st - 10th August**



**ZAGREB ZADAR**



grad

Donji grad

Botanički vrt

Martinovka

Trnje

Gvjetno



**Dear participant,**

## **Welcome to SymbioSE 2004!**

We have worked hard for the past two years to make this event possible and hope it will meet your expectations. We would like to offer you a warm welcome to our country and invite you to enjoy its natural and cultural beauties. Croatian SymbioSE team will be known as your Little helpers for the duration of the symposium. Feel free to ask us anything!

Preparing this symposium was not an easy task at all. Most of the invited lecturers are on vacation right now and were not able to join us. We thank all those who agreed to come and give a presentation or in any kind helped us to create the programme.

But after all, this is a student symposium and our first goal is to make friendships and contacts that can prove to be very valuable in our future life and professional careers.

The spirit of the SymbioSE is all about making friends and discussing current biology and student matters "our way" and thus creating a better future for ourselves. We encourage you to continue discussions in the evening and share your ideas and opinions with fellow symbionts.

We wish you a rich and pleasant symposium with lots of dear memories of people and places you will take back home with you.

Our team will do our best to help you make the most out of SymbioSE Croatia 2004!

*The Croatian Symbionts*

# **About SymbioSE**

SymbioSE was founded in 1996 by the German student association. The basic idea was to connect all European biology students, allowing for the exchange of ideas, perspectives and experiences about student concerns.

This led to the first meeting in Berlin in 1997.

After a successful start with 12 European nations it was continued as an annual event to be held in the different participating countries. Since then, every host country has built upon the initial framework and upgraded it with aspects of their own cultural background. Thusfar, this has resulted every time in a unique and enriching symposium.

Today, SymbioSE meetings have three major goals: to broaden the horizons of the participating students by excursions and lectures, to connect the people by discussions and cultural exchange and to inform everybody about current university matters.

The biological topics presented always rely upon the trends in research that complement both local institutions and their resources. Lectures are usually held at a local university, so the students gain a detailed insight into other university systems.

During round tables and national meetings representatives of the participating countries discuss the following issues: new developments within their parent universities, newly created or planned biological study programs, and the various ways of student collaboration.

Social events in the evenings further enhance contacts between the participants. This will allow everyone to create a personal network throughout Europe, thereby facilitating student exchanges and international work experience. All of this will promote a mutual understanding between countries through academic and cultural exchange while developing a different perspective on their own educational systems.

In general, SymbioSE is not a rigid organization with a hierarchical structure. SymbioSE is a symposium that takes place once a year and aims to connect European biology students through the year by personal contact. Therefore, it is open for every student and not limited to student representatives.

# PROGRAMME



*The programme will be updated every day. Possible changes within the programme will be printed out and put on the notice board so everybody can see it. Please pay attention to the notice board as some of the information will be very important.*

## ***Arrival and registration:***

*You will get symposium material on the registration desk. Please keep your nametag on so other participants can read your name.*

## Monday August 2

Opening ceremony will be held in the building of University of Zagreb.

9:30 Official opening by Croatian Symbiose team

10:30 Coffee break and welcome drink

13:00 lunch

14:00 free time/registration/informal National assembly session

16:00 Treasure hunt - tour of Zagreb historical and cultural sights

19:00 dinner

20:00 Official opening of the Symbiotic games

21:00 Party in the open/close to the dorm building

## Tuesday August 3

10:00 Visit to the Ruđer Bošković Institute/Visit to the Zagreb ZOO  
You must be in front of the dorm building at 9:00. Depending on your interest, choose between these two options.

13:00 lunch

15:00 **Citrus exocortis viroid variants M and S - another case of Dr. Jekyll and Mr. Hyde?**

Dr. Dijana Škorić, Biology Department, Faculty of Science, University of Zagreb

16:00 coffee break

16:15 **Loggerhead turtles in the Adriatic Sea: present knowledge and conservation perspectives**

mr. sc. Bojan Lazar, Natural History Museum, Zagreb

17:15 ***Caulerpa* - silent killer of the Adriatic biodiversity**  
**symbiont Vedran Nikolić**

Insight in the invasion of tropical green algae *Caulerpa taxifolia* and *Caulerpa racemosa*. Present state in the Adriatic Sea and overview of research in the past decade.

19:00 dinner

20:00 Symbiotic games

21:00 Country presentations

21:00 Party in the open

## Wednesday August 4

9:30 **Towards the 3-dimensional structure of human low density lipoproteins**

Dr. Marina Ilakovac-Kveder,

**11:00 Transcription factors regulate lymphocyte development from stem cells**

Dr. Mariastefania Antica

9:30 - 12:00 If the subjects presented do not match your interest, you can visit the Botanical garden guided by Croatian symbionts. Meeting in front of biology building at 9:30 or in front of the Botanical garden at 9:40

13:00 lunch

15:00 Faculty presentations

**16:45 Workshop: Student exchanges and SymbioSE in symbiosis**

**Symbionts Marcel Otten and Vedran Nikolić**

At the last years' symposium in Oslo we came up with the idea of establishing a network (BioNet) with the goal of connecting student organisations or students interested in short exchange projects between two universities. We came up with the pilot exchange project. Listen to what we have done so far and discuss our ideas for the future development of the BioNet.

**16:45 Workshop: Science and Society**

**Symbiont Jens Ådne Rekkedal Haga**

I will describe certain features of

science itself, indicate its current institutional structure, its relation to society at large and point out areas where biological sciences, and scientists, at present are pulled between different attractors. In this situation we need analytical models that makes us better understand concrete dilemmas as well as our own theoretical foundation. I will present a conceptual model that can serve this purpose. The model has the shape of a downward pointing cone. In the bottom of the model is our most fundamental value(s) and on top is our concrete world. The model is an empty framework and is thereby democratic - it must be filled in by the user who will not be given any directives; only aided in structuring her own thinking. We will use the model in the proceeding workshop an explore its properties as a heuristic, analytical tool.

**Workshop: Science and the demands of society**

Lennart Kiil, MSc, science journalist and director of Zensci.com

Thomas Hesselberg, MSc, PhD-Stud. Centre for Biomimetic and Natural Technologies. University of Bath.

In a time when funding for basic science gets more and more scarce, it becomes increasingly important for the scientist to step down from the ivory tower and relate his science to the surrounding society.

In this workshop we will discuss what the biologist can do, to ensure public awareness and understanding of his research. For the biologist working in medical related fields this is quite easily done, but for other biologist and especially for the classical naturalists it is not as simple. However, in this workshop we will explore two different possibilities:

– *To actively promote the interesting part of your research to the media.*

– *To join the growing field of biomimetics that looks at concepts and functions in nature to give inspiration to innovative new technologies and design.*

The first strategy is a general one, which aim to establish the inherent value of the knowledge research provides us with. The second strategy is based on providing justification through utility; that is, pointing to practical uses of the knowledge obtained through research. The strategies are not mutually exclusive; on the con-

trary, both should be pursued simultaneously for the best result. This is mainly true because the first aims primarily at the general public, whereas the second aims primarily at the industry. In both cases the press will do well as the main mediator, at least for now. The two organisers will provide a short introduction and give some illustrative examples, but the general idea is to discuss ways in which your own fields of expertise can meet the demands of society and make use of the presented strategies.

#### **IMPORTANT NOTE:**

Tomorrow we will be traveling to Zadar for the second part of the symposium. The excursion to National park Plitvice lakes will last for 4 hours and we will not have lunch. August 5th is also our national holiday and all the stores will be closed. This means you will have to buy all the necessary things TODAY as none of the stores will be open in Zadar too.

20:30 Symbiotic games

21:00 Country presentations

## **Thursday August 5**

8:30 departure for Zadar

11:00 Excursion to National park Plitvice lakes. You will receive handouts with some information. Additional information will be provided in the guided tour and by the Croatian symbionts. Please respect the rules of behaviour in the protected area of the national park.

18:00 arriving to Zadar/free time until dinner

21:00 Symbiotic games

## **Friday August 6**

9:30 Opening of the second part of SymbioSE 2005

prof.dr.sc. Esad Prohić,  
Science and Education Affairs  
Advisor to the President of Republic of Croatia

**10:15 Analytical approach for integrating natural and social sciences in the sustainable coastal management**

dr. Anamarija Frankić, Virginia  
Institute for Marine Science

The health and sustainable use of coastal and sea resources are of critical importance given their role in food production, economic activity, genetic biodiversity and recreation. In addressing integrated coastal management it is

essential to balance the need for economic development and the need for natural resources conservation within the same management plan. Therefore, integrated coastal management and sustainable development should include careful consideration of a multiplicity of parameters and their interactions. Planning for sustainable uses is a process that comprehensively and holistically analyses natural resources conditions, human uses and socio-economic aspects. Through effective research, monitoring and incentive programs that maintain ecosystem integrity and balance human values, economic development can be attained in an environmentally and socially sustainable manner. The proposed approach for sustainable use of coastal, marine and island resources is that 'the environment sets the limits for sustainable management and development'.

**11:15 Bivalves in Mali Ston Bay - what do we know about them?**

Peharda Melita & Ivona  
Mladineo  
Institute of Oceanography and Fisheries, Šetalište I. Meštrovića 63  
Despite thousand year old oyster aquaculture tradition in the Mali Ston Bay (Adriatic Sea), very little

was known about bivalves living in this unique habitat. During past few years, intensive research efforts were devoted to it in order to estimate bivalve diversity and analyze spatial distribution of bivalves in this marine protected area. Further on, studies on the ecology of selected bivalve species were initiated including studies of their age and growth and their reproduction. Presentation will provide overview of the research projects taking place and present the results of some of them.

13:00 lunch

15:00 **Importance of Being a Snake**

**Doc. dr. sc. Zoran Tadić,  
Biology department, Faculty of  
Science, University of Zagreb**

From time immemorial, snakes elicit various feelings in humans. To some they are symbols of evil, to some symbols of fertility, procreation and messengers from God. Being such legendary taxon, no wonder they are also subject of many scientific enquiries. Evolution has shaped snake body in peculiar way and, together with specific anatomy, they have evolved specific behaviour, physiology and ecology. In this presentation, we will see what exactly are the snakes and what do they do to

survive in this world. And, of course, what do people do to prevent (and help!) them to survive.

**17:00 National assembly - main session**

SymBioSE is improved and enriched with every following symposium. National assemblies are very important because only through discussions we can make sure that all every step is taken care of to assure that SymBioSE will continue its mission.

Each country will have to delegate one or more people that will take part in the discussion and decision making. The conclusions will be made using the double majority voting system.

We have prepared few propositions regarding various SymBioSE matters.. Some of the topics will include possible introduction of different registration fees for diferent countries, fund raising etc. Today we will also have to choose the host country for SymBioSE 2006!

**Saturday August 7**

8:00 Excursion to Nature park  
Vransko lake

10:00 National assembly

11:00 Student presentations  
15:00 **Writing a scientific article**

Prof. Ana Marušić, Faculty of Medicine, Zagreb; editor of Croatian Medical Journal

16:00 **Science in the mass media**

Ana Vadjjić, HRT reporter

17:00 **WORKSHOP: Open access in scientific publishing**

symbiont Dubravka Pezić

Pharmacy and Biochemistry, University of Zagreb

11:45 **WORKSHOP: Who is who? (linked to the lecture)**

14:00 lunch

16:00 **The Adriatic Dolphin Project and the proposed Lošinj Dolphin Reserve - Can habitat protection and economic development be compatible?**

P. Mackelworth<sup>1,2</sup>, D. Holcer<sup>1,3</sup>, C. M. Fortuna<sup>1,4</sup>

## **Sunday August 8**

Whole day excursion to National park Kornati. Please do not forget to bring sun block, hat and other accessories. The sun can be very dangerous to unprotected skin! We will take a boat to the islands and have lunch on board.

## **Monday August 9**

9:30 Excursion to National park Paklenica

9:30 **Bioinformatics**

dr. sc. Kristijan Vlahoviček, ICGEB, Trieste

10:45 **Identifying war victims using DNA analysis**

dr. Gordan Lauc, Faculty of

(1) Blue World Institute of Marine Research and Conservation, Kaštel 24, 51551 Veli Lošinj, Croatia, [www.blue-world.org](http://www.blue-world.org), [adp@blue-world.org](mailto:adp@blue-world.org) (2) Department of Geography, University College London, London. (3) Department of Zoology, Croatian Natural History Museum, Zagreb, Croatia. (4) Sea Mammal Research Unit, University of St. Andrews, St. Andrews, Scotland.

The Adriatic Dolphin Project (ADP) is the longest ongoing study on bottlenose dolphins in the Mediterranean. Application of data collected over the past 17 years, identifying critical habitats for dolphins, has resulted in the proposed Lošinj dolphin reserve

(LDR). This proposal is unique in the fact that it will be both the first dedicated dolphin reserve within Europe, but outside the European Union, and the first dolphin reserve in the Adriatic sea. The Lošinj-Cres archipelago is also important for tourism in the context of Croatia as a whole. In 1987 this area accounted for 4.2% of Croatia's total tourist population. Since the end of hostilities in the region this figure has significantly increased, hence the main threats to the dolphin population are fishing competition and disturbance by tourist boats. Public awareness activities have been aimed at the reduction of these two main stresses and the conservation of the marine habitat; therefore the establishment of the LDR is the next logical step in this process.

Although the primary focus of the proposal is dolphin conservation, the societal needs of the local people are regarded as an important aspect to be incorporated into the designation and management of the reserve. Support and cooperation from the local community can help limit conflict in areas of conservation, following the new paradigm of protected areas as promoted in Durban 2003. Raising the profile of cetaceans and their

socio-economic worth in this area has shown that protection and the sustainable development of the economy can work when all groups are involved. As research in other areas of the Adriatic identifies critical habitats for other populations of flagship species, the designation and management techniques developed and tested in the LDR can be used as a best practise model for the creation of similar reserves throughout the region.

17:15 Presenting declaration of SymbioSE 2004

17:45 Presenting SymbioSE 2005

18:00 Closing ceremony

19:00 dinner

21:00 Closing of the Symbiotic games

Party on the beach

## **Tuesday August 10**

Departure for Zagreb...

Thank you for participating SymbioSE 2004, we hope you enjoyed yourselves and we will see you again next year!

Until then, spread the word about SymbioSE, stay active and in contact!

# ABSTRACTS FROM LECTURES & STUDENT PRESENTATIONS



## **Towards the 3-dimensional structure of human low density lipoproteins**

*Marina Kveder, Ruđer Bošković  
Institute, Bijenička 54, Zagreb; e-mail:  
kveder@irb.hr*

Low density lipoproteins (LDLs) are the main cholesterol carriers in human plasma believed to be directly involved in the development of atherosclerosis. They exhibit structural complexity with the surface monolayer organization of mainly phospholipid molecules surrounding the hydrophobic core composed of apolar lipids. The LDL structure containing more than 3000 lipid molecules is stabilized by the amphiphatic apolipoprotein B100 (apoB), one of the largest monomeric proteins known, consisting of 4536 amino acid residues. Various experimental approaches have been employed to elucidate the structure of the LDL particle which is of central importance in the under-

standing of its function but still the LDL structure at the atomic resolution has not been elucidated. In this presentation different biophysical methods will be presented in studying such a complex macromolecular assembly.

*Cristescu Bogdan  
cristescub@yahoo.com*

*Here is the abstract of my work on pitfall trapping done in autumn 2003 in English deciduous woodlands.*

*The work was included in my dissertation for Bsc. Conservation and Land Management.*

### **Abstract**

The most widespread method of sampling surface-active arthropods, particularly Carabidae is pitfall trapping with single traps. However, this technique has a large number of biases and alternatives are needed for more accurate sampling and for studies of population density. Three sampling techniques, two involving traditional single traps simple and single traps with crossing and one involving an innovative design of enclosure with pitfalls traps inside are presented and assessed. The main

advantages of the enclosure are that it is active for a longer period of time than single, dry traps and is influenced very little by sudden changes in weather. It also proved more efficient at catching a larger number of Coleoptera families, Carabidae species and individuals than the two methods involving single traps. However, a small number of species were caught exclusively with single traps, therefore a combination of methods is recommended for sampling a site for both short and long-term studies. For short-term studies, capture-mark-recapture is not an efficient method for estimating density of Carabidae.

**Interaction of C1q with CRP and natural antibodies - a possible factor in the clearance of apoptotic cells**

*NELLY OLOVA, LUBKA  
ROUMENINA, MICHAELA GADJEVA,  
ALEXANDRA ZLATAROVA, IVANKA  
TSACHEVA, MICHAELA  
KOJOUHAROVA  
Sofia`University, Faculty of Biology,  
Department of Biochemistry*

Programmed cell death is a mechanism successfully controlling life duration of cells in different tissues, but also is the basis for elimination of potentially harmful and virus-infected cells. It is well accepted that the process includes participation of a variety of proteins, responsible for the phagocytosis of the dying cell by another cell. Such a role has already been described for C1q, CRP and natural antibodies (which are mostly IgM and rarely IgG) where the last two can act either independently or with the help of C1q. C1q is the first subcomponent of the classical complement system. It is a versatile recognition protein that binds to a great variety of immune and non-immune ligands. The participation of C1q ensures efficient phagocytosis of the apoptotic bodies without complement activation and thus sustains an anti-inflammatory immune response. Without participation of C1q in the phagocytosis pro-inflammatory TNF- $\alpha$  is secreted and engulfed self-antigens can be presented to T-cells, leading to autoimmune response. Therefore, studies related to the role of C1q and the nature of interactions with its ligands are topical and could bring more understanding on the process of waste material clear-

ance from the organism and hence the generation or, hopefully, the treatment of autoimmune diseases.

In the present study we investigated the interaction of C1q with CRP, immunoglobulins from classes G and M and apoptotic cells. As a model system for the globular domain of C1q we used recombinant globular fragments of its A, B and C chains.

Our results highlight the importance of charged amino acid residues in IgG/IgM and CRP binding. We determined the role of the B chain globular fragment for the CRP, IgG and IgM recognition. The binding site of CRP is most likely different from the IgG binding site. The IgM binding sites on C1q involve all three chains and differ from the binding site for IgG, although overlapping is probable. Hydrophobic interactions are also involved in ghB - IgG, ghB - IgM and ghB - CRP binding. Our results also indicate that C1q interacts with apoptotic cells through the globular parts of its three chains.

The obtained results strongly support our hypothesis that the C-terminal regions of all three C1q polypeptide chains form structurally independent modules and they participate in the formation of several ligand-binding sites. These findings could contribute to further

understanding of the role of C1q in the process of clearance of apoptotic cells from the organism.

### **Citrus exocortis viroid variants M and S - another case of Dr. Jekyll and Mr. Hyde?**

*Dr. Dijana Škorić, Biology Department, Faculty of Science, University of Zagreb*

Viroids are noncoding, circular, single-stranded RNAs of 246-401 nucleotides able to replicate autonomously only in some plant species. These minimal RNA genomes, despite their limited size, can induce serious plant diseases. Although the information concerning the viroid physical and chemical properties is detailed and extensive, the molecular mechanisms of viroid-plant interactions have only recently been dealt with.

Citrus exocortis viroid (CEVd) is the oldest known and the most severe viroid of citrus. It is the only one of six citrus viroids that also infects *Gynura aurantiaca* herbaceous host that often serves as a reservoir plant for CEVd in the greenhouse conditions. An unusual shoot displaying extremely mild symptoms was detected on a CEVd-infected *Gynura* plant exhib-

iting the usual severe CEVd-symptoms. The variants CEVd-S and CEVd-M were isolated from tissue displaying severe and mild symptoms, respectively. They differed only in five nucleotides within the viroid pathogenic domain. The variants remained stable when propagated by rooted cuttings or from successive plants inoculated with tissue extracts or transcripts from cDNA clones. CEVd-S consistently induced very severe reaction in *Gynura* throughout a range of environmental conditions. CEVd-M-induced symptoms varied greatly, from asymptomatic to the severe *Gynura* reaction when grown at 40°C. This “Dr. Jekyll and Mr. Hyde” host response was confined only to *Gynura aurantiaca*. The differential response could not be correlated with any changes in sequence or the conformation of the CEVd-M viroid variant, as predicted by molecular modelling. The variable symptom expression induced by the CEVd-M variant seemed to be associated with a specific temperature-sensitive response of *Gynura aurantiaca*. Other possible mechanisms of differential response for this pathogen-host interaction will also be discussed.

## **EVALUATION OF THE GENOTOXIC ACTIVITY OF ANTITUMORAL DRUGS BY THE ALKALINE SINGLE CELL GEL ELECTROPHORESIS TECHNIQUE (COMET ASSAY) IN TUMORAL CELLS**

Roxana Ola<sup>1</sup>, Ioana Brie<sup>2</sup>, Eva Fischer<sup>3</sup>, Iulia Diaconu<sup>3</sup>, Olga Soricu<sup>3</sup>, Octavian Popescu<sup>1</sup>

<sup>1</sup> Babes-Bolyai University Cluj-Napoca, Romania

<sup>2</sup> University of Medicine and Pharmacology „Iuliu Hatieganu”, Cluj-Napoca, Romania

<sup>3</sup> Oncological Institute „I. Chiricuta”, Cluj-Napoca, Romania

**Purpose:** This study aimed to investigate DNA damage induced by chemotherapeutic drugs, by comet assay in primary cell cultures from tumor biopsies. The performance and sensitivity of manual microscopic analysis versus computerized image analysis were compared.

**Methods:** Eight primary cell cultures were initiated from breast and ovarian malignant tumors treated with anti-tumor drugs: doxorubicin, taxoter, gemzar, 5-

fluorouracil (for mammary carcinoma) and taxol, carboplatin, doxorubicin, topotecan (for ovarian carcinoma).

The response of primary tumoral cells in the form of heterogeneous cells population was compared with two cell lines (HeLa - human cervical carcinoma, MLS - human ovarian carcinoma).

**Results and conclusions:** A high inter-individual variability of DNA damages in the response to chemotherapeutic agents, but no

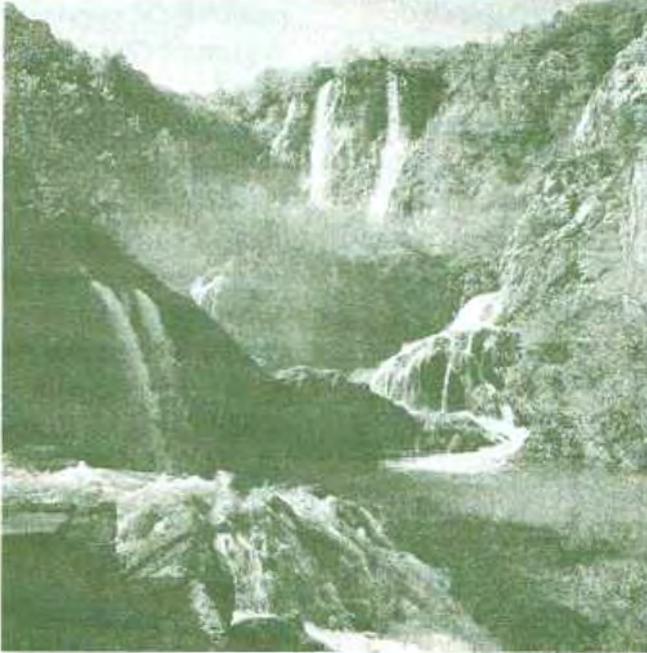
correlation with clinical stage, pathological parameters and cell degree of differentiation were found.

A putative activation of cell state in two multi drug resistant tumors conferred them protection against drugs-induced DNA damage. In determining necrotic and apoptotic cells more sensitive and less time consuming was the manual microscopic analysis comparative with computerized analysis.

*dr. Gordan Lauc, Faculty of Pharmacy and Biochemistry, University of Zagreb*

### **Identifying war victims using DNA analysis**

The development of biochemistry and molecular biology, and progress in new methods of DNA analysis has lead to its more practical usage. Besides its growing significance as a modern diagnostic method, DNA analysis has become a method for establishing identity in forensic medicine and criminology. In contrast with traditional investigation methods, which are subject to many mistakes, DNA analysis is very reliable and can establish the origin of a certain biological sample (blood, hair, semen) with great accuracy. In the process of identification of Croatia war victims, 3.429 bodies have been exhumated by April 2004., of which 2.871 have been positively identified. Somewhat 20 % of all identifications have been based upon DNA analysis, and that percentage is increasing every day.



## **National park Plitvice Lakes**

The natural attributes of the Plitvice Lakes National Park, uniqueness and sensibility of that phenomenon, deserve a full attention of the visitors. Recreational aspect of stay and the amazement up, separated by travertine barriers for which the period of the last ten thousand years was crucial, and which were ruled by ecological relations similar to those of today - suitable for travertine depositing and for the origin of the lakes - are the basic phenomenon of the National Park.

Travertine forming plants, algae and mosses have been and still are playing an important role in their creation, thus making a very sensitive biodynamic system.

Transitive type of climate between coastal and continental with microclimatic diversities makes summer pleasant and sunny, while on the other side winter is relatively long, harsh and snowrich. There are large forestry complexes in the Park area, of which some sections are protected as a special

reserve of forestry vegetation due to its primeval characteristics (Corkova uvala virgin forest). Diversity of places and living conditions makes possible for numerous species of plants and animals in watery and terrestrial areas of the Park to develop with no disturbancy.

It should be stressed that all fundamental things that do determine the Park, make a very fragile structural and functional complex, sensitive to natural changes and to incautious human actions. UNESCO has declared it with all rights as the World's natural inheritance.

## **NATURE CREATES WATERFALLS**

In the Plitvice Lakes National Park, barriers between the lakes over which are falling magnificent waterfalls and the small falls, have been created in a special, natural way. Under certain physical / chemical and biological conditions, calcium carbonate ( $\text{CaCO}_3$ ) is being extracted from the water, and then is being deposited on the bottom of the lake, and on the submerged items. It also creates underwater thresholds and barriers which are elevating above the water growing constantly in height and width. The barriers are chalky creations, which are hard, porous and fragile limestone, full of remains of microscopic mosses and petrified water mosses that are growing up at the falls. That kind of creation is called sedra, travertine, tufa, bigar, vapneni macak.

Travertine which is formed and created by plants, is called plant - formed travertine. The famous explorer of travertine creating process at the Plitvice Lakes, I. Pevalsek, wrote in 1926: "The essence of the Plitvice Lakes is in travertine and in travertine - forming plants, namely algae and mosses. Immense number of waterfalls, various barriers between the lakes and the unique caves have all been created by travertine - forming plants."

Permanent and continuous creation of plant - formed travertine at the Plitvice Lakes is the fundamental phenomenon of the National Park and condition for their existence.

## **HOW IS TRAVERTINE BEING CREATED?**

AT Plitvice Lakes due to the special qualities of karst base (limestone, dolomite), the water of the Plitvice Lakes is rich of dissolved calcium carbonate which is present in form of calcium bicarbonate  $\text{Ca}(\text{HCO}_3)_2$ . To explain the chemistry - water of the Plitvice Lakes is "super - saturated" with this chemical compound. It comes to that when rainwater, while going through superficial

soil - stratum, absorbs carbon dioxide (CO<sub>2</sub>), thus creating carbonic acid (H<sub>2</sub>CO<sub>3</sub>) which dissolves limestone and dolomite - thereby the water becomes significantly mineralized, super - saturated with calcium and magnesium - bicarbonate. When it breaks through on the surface, at the rapids and specially at the travertine barriers, the water splashes and thereby the chemical balance is being disturbed, calcium carbonate is being secreted in the form of microcrystals that are being deposited.

$\text{Ca}(\text{HCO}_3)_2$  splashing  $\rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{CaCO}_3$  (travertine)

The super saturation of water by calcium salts is the basic condition for travertine creation. Besides, the water has to be clean, must not contain increased concentration of organic substances which are the serious obstacle for the unique process of travertine creation at the Plitvice Lakes, (proved by SRDOC and associates in 1958). Down the Korana river from the Korana bridge, travertine creation ends quite quickly, inspite the supersaturation with calcium bicarbonate, because of the increasement of concentration of the organic substance in the water.

The presence of water - algae and some mosses is also a condition for travertine creation at the Plitvice Lakes, particularly as a factor that forms chalky secretions. Those water plants are giving form to the created travertine, and the Plitvice Lakes waterfalls can thank mosses for their feature, and depending on various species, we could also differ various biological types of travertine. Let's have a look at mosses on the travertine barriers over which water is falling down. Young shoots of mosses are green and soft, they are mostly without travertine, the ones from the last year are already forming travertine while the old shoots are of yellow color, completely covered and petrified, thus being the famous sight of the Plitvice Lakes - the plant - formed travertine. Recent researches have proved that millions of algae and bacteria living on the mosses shoots, are secreting mucus that is adhered to by the first microcrystals of calcite. Very quick, the other microcrystals are going to be deposited on that, thus creating the travertine. This process goes far back in geological past, but only under the conditions of warm and humid climate, similar to those of today. 2000 years ago, during the last cooling which effected Europe, travertine was not created at the Plitvice Lakes. Yet today travertine is being created much faster during the summer, than in the winter.

# LIVING WORLD OF THE LAKES AND AROUND THEM

## FISHES AND CRUSTACEANS

There are only few fish species living in the Plitvice Lake's water. It is still unexplained issue as to whether they have been living in this space from ancient time, or were they inhabited there in the last hundreds of years.



The major number of researches on ichthyofauna of the Plitvice Lakes was conducted in the thirties and fifties (Rossler 1929; Taler 1958).

The Plitvice Lakes and their tributaries have all the main characteristics of typical trout mountain water. Therefore, today in those waters, trout are finding the optimal living

conditions. Brown trout (*Salmo trutta*) is one of the aboriginal inhabitants of these lakes, and it comes in two forms: *Salmo trutta fario* L. and *Salmo trutta lacustris* L. Local people can recognize which trout is from which lake and which from tributaries, based on colour composition and the body shape. An interesting fact is that trout from Kozjak differ from trout from the Upper Lakes in anatomic characteristics too, for example in number of gastric and gill prolongation, side line, and in number of gills. Samples of *Salmo trutta fario* L. from the Plitvice Lakes have large, exclusively red spots that are particularly visible during the spawning period. Lake trout, *Salmo trutta lacustris* L. is covered by black spots, and can gain more than 10 kg of weight. The living conditions are not the same in all the lakes for trout.

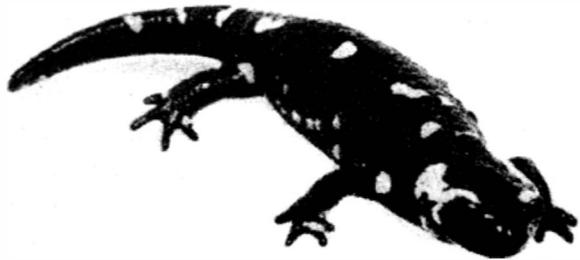
Already in 1929. Rossler established, that Proscansko lake had a lot of plankton species of crustaceans, which are food for trout. Small basins, connecting channels and small streams, are as well giving various possibilities for this fish species. Trout fry is better in certain lakes because some trout can go from there into tributaries, while there is no such possibilities from the other lakes. Therefore, they are forced to spawn at the places where lakes overflow, above the falls and on the similar spots where water more or less runs. The whole area of the Plitvice Lakes is an exceptional example of trout differentiation caused by isolation and various living conditions in the lakes. Except the brown trout, a species of pike (*Phoxinus phoxinus*) is present in a

large number. The male of this fish gets a beautiful red abdomen in spring. This fish is the most loved food of big trout. Man, intending to enrich this area, has brought into the water of Plitvice, species of jezerska zlatoovcica (*Salvelinus alpinus*) - fish of prey from North America, as well as Californian trout (*Oncorhynchus mykiss*) which have been raised in the Park for years, and nowadays is increasing in number in a natural way. A carp species have been recently noticed in the lake, such as klen (*Leuciscus cephalus*) and crvenperka (*Scardinius erythrophthalmus*). These species are, by the way characteristic of low - land watercourses, so that their presence is a consequence of both climatic changes and man's influence on these areas.

The river crab (*Astacus astacus*) was once exported to the choosy west European market. Diseases, exaggerated catch and the other factors have decreased the number of this species in the lakes. It is still today a common inhabitant of certain waters.

## **AMPHIBIA**

Amphibia is quite numerous group of vertebrates present in the Plitvice Lakes National Park with twelve species. Fire salamander (*Salamandra salamandra*) is the most frequent rype of salamanders that can be seen in springtime on the



walkways and roads. Water newts are present in pools and swamps which do not contain fishes. Very frequent is a mountain newt (*Triturus alpestris*), and ordinary newt (*Triturus vulgaris*). You can see two types of frogs: meadow type (*Rana temporaris*) and forestry species (*Rana dalmatina*), when only walking through a dewy grass.

Should the weather be nice, croaking of tree toad (*Hyla arborea*) could be heard. Taking into consideration the ability of adjustment to environment, this species is difficult to be noticed. The biggest frog of this area is European toad (*Bufo bufo*), which is easy to find in the forests and in damp park sections where it hides during the day, in small rodent holes. Zuti mukac (*Bombina variegata*) can be found in large number in swamps and pools along the paths. It cries nasally.

## REPTILES

Reptiles are represented in relatively small number of species in the Plitvice Lakes National Park. Long winters and thick snow cover are decreasing the number of this group of vertebrates. Lizard (*Lacerta vivipara*) is the only



reptile that lives on the top of the mountains and far, in the north of Europe, but it can be seen in the Park. The Plitvice Lakes area is the southern edge of their living space. In certain living areas exposed to sun, it is easy to see obicni zelembac (*Lacerta viridis*), which is the biggest lizard of our country. Beside almost all the Park waters, a common one

is snake species "ribarica" (*Natrix tessellata*) which is exclusively fed by fishes catching them by diving in or from the shore. It often provokes people's fear, due to external similarities with a poisonous snake (*Vipera berus*).

Some of the ringed snakes (*Natrix natrix*) could be found in some overgrown sections. Common adder is rather rare kind in these areas. Quite frequent species is horned viper (*Vipera ammodytes*) which can be seen particularly in spring, at the places exposed to sun. In the lake, beside reeds and thick water vegetation, some of the turtles (*Emys orbicularis*) could be found as well.

## BIRDS

There are about 140 bird species found in the Plitvice Lakes area, and more than seventy of them are building their nests there. Should you come into the heart of the Park and walk along the Black and White river, you would certainly see quite frequent mountain wagtail (*Motacilla cinerea*). It is also easy to notice a blackbird (*Cinclus cinclus*) just next to the water. By its piercing voice it usually calls a female, or kicks out intruders of the same species that entered its territory. While blackbird disappears under the water, or when like some experienced diver walks on the bottom of the river bed, the only thing you can notice is a white spot on its chest. Due to disappearance of clean mountain water streams, this bird species has become exceptionally rare. The Plitvice Lakes area is probably the only place in Croatia which contains 50 to 60 pairs of these birds.



Should you go deeper, into hundreds of years old beech forest, you will hear knocking produced by beaks of various woodpeckers. Almost all kinds of woodpeckers are residing in this National Park. Ornithologists have established that biological value of forest could be estimated based on the number of woodpeckers that have lived there. As particularly important and rare, we should mention mountain woodpecker (*Picoides leucotos*) and black woodpecker (*Dryocopus martius*). In the silence of the Park, you can often hear a wood grouse (*Tetrao urogalus*). This bird is mostly staying in hidden spots. In the past times, wood grouse used to live

in almost all European forests, while today it is pushed into certain well preserved areas. An interesting fact is that black stork (*Ciconia nigra*) builds its nest in quiet forestry areas of the Park, but as a rule it is done in lowland forests. These species have found the necessary living space in the Plitvice Lakes Park.

Variety of titmice (*Parus*) is absolutely miraculous. Except the usual species that can easily be found in our gardens, along the rivers and in the Park forests there are living marsh titmouse (*Palus palustris*) and mountain titmouse (*Parus montanus*). In the Park space, we can also find kratkokljuni puzavac (*Certhia familiaris*) and dugokljuni puzavac (*Certhia Bachydactyla*).

Every season of the year brings new species into the Park. In winter, when forestry ground is covered by thick snow, a flock of krstokljuni omorikas (*Loxia curvirostra*) looks for cone seeds. These wanderers are often guests of the Park, building their nests already in February.

Nocturnal birds of prey are owls. Out of rare species, in the Park there live mountain owl (*Strix uralensis*) and owl (*Bubo bubo*) - which is our biggest owl, while forestry owl (*Strix aluco*) and long eared owl (*Asio otus*) are frequent. All kinds of owls live in the Park. It may be interesting to stress that little owl (*Glaucidium passerinum*) known as the smallest European owl, lives here.

Although the water surfaces are considerable, water fowl are not the main attraction of this Park, but in winter during the migration period, many species from northern areas of Europe and from high mountain areas, take a break at these Lakes. Flocks of wild ducks (*Anas platyrhynchos*) are frequent. Occasionally, duck "glavata" (*Aythya ferina*) lands there, as well as some of lonely common heron (*Ardea cinerea*), black throated diver (*Gavia arctica*) or some other waterfowl, adorning the water mirror of the most beautiful European karst lakes. While wandering around or looking for food, a very rare species can be found here, such as grey eagle (*Aquila chrysaetos*), falcon (*Falco subbuteo*) and peregrine falcon (*Falco peregrinus*).

## **MAMMALS**

While birds arouse our interest every time when we visit the Park, various species of mammals are hard to be seen. At first light, or in twilight, there is a big possibility for you to see some of the big mammals. Bear (*Ursus arctos*), wolf (*Canis lupus*), fox (*Canis vulpes*), lynx (*Lynx lynx*), badger (*Meles meles*) and pine marten (*Martes martes*) are very frequent inhabitants of these forests. An otter (*Lutra lutra*), a jeopardized species used to come to the water of some creeks for years, but now it is not certain as to whether this species still lives there or not.

There are over 50 mammal species registered in this Park, some of which

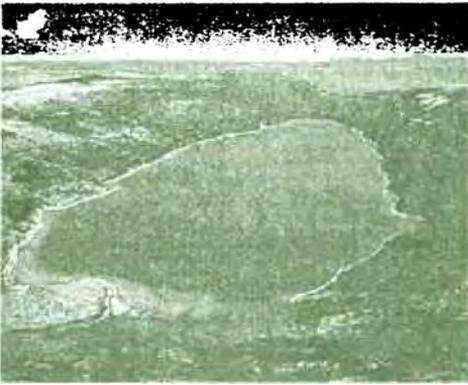


are only about ten centimetres long, while some of them are considered to be among the biggest mammals in Europe. The park is bristling with life at night. A dormouse (*Myoxus glis*) comes out from hidden places, eats beechmast, but also the food left over by some visitors who do not behave. Until recently this small animal was considered to be a specialty for local people in autumn season. Small dormouse (*Muscardinius avellanarius*) and mountain dormouse (*Dryomys nitedula*) which live here, are far too difficult to be noticed.

There is a lot of small animals staying at the spring of the Black river and on numerous places similar to that one. For example: mountain shrew (*Sorex alpinus*), marsh shrew (*Neomys anomalus*). Forest shrew (*Sorex araneus*) is frequent in deciduous forests. Out of a vole family in the deciduous forests, the largest number belongs to the type *rida voluharica* (*Clethrionomys glareolus*). Poljska voluharica (*Microtus arvalis*) resides in meadows. This small mammal is the main food for numerous birds of prey and predators too. They live in big colonies. This is a very numerous species in certain years, which is estimated by a number of corridors that are visible on wet ground during snow melting. Less known than poljska voluharica is subterranean vole (*Microtus subteraneus*) of more delicate skin and small eye.

Dinaric vole (*Dinaromys bogdanovi*) - endemic species of Dinaric karst, an example of the Tertiary period, lives at the mountain crests, on stony base in the larger Park area. This species has adjusted to life in rocky fissures. Their settlements are built in a karst caves and holes. A hedgehog (*Erinaceus concolor*) moves almost over all the places at night. Riches of bat species was known for a long time, but has not been completely researched. It is known that bats, which usually live in various living conditions (holes, cavities, under the tree bark...), are also staying there. In some less frequently visited caves, big colonies of these mammals are spending their hibernation period. About 15 species of these small, characteristically useful fliers which are the only one of mammal kinds that have conquered the air and have control over the space at night, which birds are controlling by day live there.





## **Nature park Vransko lake**

Lake Vrana near Pakostane/Biograd was proclaimed a Nature Park in 1999. This is a natural phenomenon in the Dalmatian karst and with its 30 square kilometres and 12.5 kilometres length is the largest natural lake in Croatia. The lake is in some parts is no less than 800 meters away from the sea. It is nothing else but gift of nature to

the traveller - this experience of sea and lake; greenish and azure colours, whilst driving down the Adriatic highway.

Apart from its obvious beauty, this lake is an interesting phenomenon, because of its geological and hydrological characteristics. The first thing that impresses you is its size. Usually in the Mediterranean carst (geological term) where water is scarce, there it is, large lake that is 5.5 kilometres long and 1.5 kilometres wide. Total of 5.75 square km. The water is drinkable and of the highest quality and it is used on the entire island, with little need for filtering or purification. Because of this, tough, access to the lake is strictly forbidden and scrupulously controlled. Lake is on average 72 m deep - 61 m under the sea level - and its height above sea level varies between 9 and 13 m depending on the time of the year. The most interesting thing, though, is that even with the increased consumption of water, due to tourism, the new waterway etc. the level of the lake has risen. The only explanation is that it is connected to the carst system somewhere on the continent and gets it's water supply from there. Divers have discovered an entrance to a tunnel, which may prove that theory, but only further scientific measurements and research are likely to be able to explain this phenomenon.

The surface temperature in summer is 25C deg. and 6C deg. at the bottom. In the winter temperatures on the surface and at the bottom are the same 4C deg.

The ornithological reserve in the northwestern part of the lake is a bird watcher's paradise. This swampy area is the nesting ground of the only heron colony on the Adriatic coast.



## National park Kornati

In the central part of Croatian Adriatic Sea, about 15 Nm to the west from Sibenik town, 7 Nm to the southwest from Murter, or 15 Nm to the south from Zadar town, there is amazing group of islands, islets and reefs (about 150 in total) named Kornati archipelago. Beauty and singularity of the archipelago moved authorities in 1980 to proclaim a bigger part of that area national park.

Since then certain modifications of its borders were made, so that nowadays Kornati National Park occupies the area of about 220 km<sup>2</sup> (54.000 acres). There are 89 islands, islets and reefs within the area of **Kornati National Park**, what makes it the most indented group of islands in the Mediterranean. The land part of Kornati National Park covers less than 1/4 of its total area, but the values of its landscapes, the “crowns” (cliffs) on the islands facing the open sea, and interesting relief structures, make this part of Kornati National Park unique. Besides, the Kornati submarine area, whose biocenosis are considered to be the richest in the Adriatic Sea, and also the magnificent geomorphology of the sea bed attracts divers from all over Europe to come and enjoy in unforgettable submarine adventures.

## National park Paklenica

The national park Paklenica spreads on the area of 96 km<sup>2</sup>, from the eastern coast of the Adriatic Sea to the highest peaks of the Velebit Mountains (Vaganski Vrh (1757 m) and Sveto Brdo (1753 m)), The treasure of Paklenica are the numerous natural wonders and phenomena. And that is about why the entire area was proclaimed a national park since 1949. This region is simple and unusual in its connection between the sea and the mountains; rich in beeches and black pine forests, with amazing deep canyons that cut vertically into the Velebit ridge, karst formations and numerous caves and pits.





## **ZADAR - FROM ANCIENT TIMES TO THE PRESENT**

**Zadar** was first mentioned in a Greek inscription speaking about the people of Zadar (the Jadasinei) as the leading enemies of the Greek colonists in the Adriatic. Taken over by the Romans, Zadar got the characters of a city. It became the Roman colony during the Second Triumvirate. It did not have a significant role among the Roman administration in Dalmatia, although the archaeological finds tell us about a significant growth of economy and culture. From the beginning of 7th century when Salona was destroyed till 1918 it was the capital of Dalmatia. In the early centuries of Croatian history Zadar acknowledged and was well linked with the Croatian sovereigns. The deeds of gift were given to its monasteries by the kings **Petar Kresimir IV** and **Zvonimir**. After the short termed Venetian administration at the end of 11th century Zadar acknowledged the sovereignty of Croatian - Hungarian king Koloman in 1105.

At the end of his life (26th June 1116) in spite of the citizen's resistance, the Venetians took it over. Their administration lasted throughout three unsuccessful citizen's uprising in 1159, 1164 and 1170 till 1181. The town was developing economically and culturally. The citizens of Zadar continued to recognize the sovereignty of Croatian - Hungarian kings up to 1202 when

the Venetians using French Knights on their way to the fourth Crusade took it over, destroyed the city and expelled the citizens. Soon the people came back and with the help of Domald the Duke of Omis expelled the Venetians, but owing to the political situation they had to sign the peace and accept the Venetian administration in 1205. Between 1242 and 1247 they were fighting against the Venetians again, but they had to surrender under the worst conditions. In 1311 they rebelled again and



with the help of Croatian **Ban Pavao Subic** they got better political conditions two years later. In 1343 there was a new uprising against Venice. The siege of the town lasted 16 months before the Venetians finally took it over. Their administration did not last long, as Zadar rebelled again in the autumn of 1357 and accepted Croatian-Hungarian king Ludovic's army. Although Zadar recognized the sovereignty of Croatian-Hungarian kings, it lived almost independently developing trade, seamanship, culture and art. Due to unsettled political situation in Croatia and Hungary, recognizing first the sovereignty of king Sigismund then of Ladislav of Naples, Venice succeeded in taking over the town buying it for 100,000 ducats from Ladislav. They had to build two fortresses inside the town - Kastel and Citadel.

In the course of time due to the general impoverishment and the growing Turkish danger, Venetian government became very strong. Bulwark and forts built in 16th century held the old Croatian town in which well known Croatian poets and writers - **P. Zoranic, B. Krnarutic, J. Barakovic** - lived and worked in 16th and 17th century. The town was changed. It was no longer an urban commune "townstate", but it was the centre of military and civilian administration of Venetian Republic, as well as later on under the French and Austrian administration. During the French administration (1806 -1812), the **first Croatian newspaper "King's Dalmatian"** was started, and between 1844 and 1849 the literary magazine "**Dalmatian Dawn**" was published. During 19th and the beginning of 20th C. Zadar was

a political and cultural centre of the Croats in Dalmatia, although the cultural image of the town itself was determined by the Italian civil servants serving French or Austrian administration and by Italianized aristocracy and Italy-oriented middle class.

Zadar has had strength and courage to withstand all the temptations through its past, and has faced the 20 th century with the identity that belongs to it, as a Croatian town. It was possible to keep that identity thanks to the Croatian people who never gave up their language and culture. Zadar had once again, like it had in the Middle Ages, to survive another siege in 1991 when it was brutally attacked by Serbian para-military forces helped by the Yugoslav army. The town was being attacked and destroyed until the summer of 1995 when the Croatian army finally liberated it. The people of Zadar, once again, have started to renew and rebuild their town. Today Zadar is a modern economic, political and cultural centre for the region, a town which during the last decade has developed its tourist, agricultural and fishing industries more and more.

## **CULTURAL HERITAGE**

Zadar dating from the ancient times is very rich and valuable. There are few towns with such a variety of monuments, architecture, art and literature. There are remains of the monumental antique architecture together with a few early Christian buildings and the most valuable Middle Ages monuments in Croatia. The high level of cultural creativity is witness to this, and confirmation are the Roman columns and portals, Romanesque churches, Renaissance and Baroque palaces, as well as treasure from archaeological findings, goldsmiths works, and pieces of art from Renaissance painters, magnificent valuable reliquaries, coffins (especially the silver coffin reliquary of Sv. Sime (Saint Simon) and crosses.

Zadars most famous monument, and wellknown monumental early Medieval building in Croatia, is the pre-Romanesque **Church of Sv. Donat (Saint Donat)** from the 9th century. This is followed by the **Church of Sv. Krsevan (Saint Chrysogonus)**, a wonderful Romanesque building, a three domed basilica with three apses. Saint Chrysogonus is one of the most important of the four patron saints, symbols of Medieval Zadar. Zadars Cathedral of **Sv. Stosija (Saint Anastasia)** was originally an old Christian

basilica on the remains of which a new Romanesque church was built in the 12th century. The **Church of Sv. Marija (Saint Mary)**, with its bell-tower, is a valuable national monument - its walls have separated the convent, and the lives of its Benedictine nuns, for over 900 years. The bell-tower of the cathedral is the most beautiful, and the original is a variation of a Romanesque bell-tower, the so-called "Lombard" type.

All these cultural monuments and many others, have kept the most valuable and artistic written documents from Medieval and Renaissance periods. Also in Zadar, the paintings of **Carpaccia, Palma Mladega, Lotha** and many other local and foreign painters can be found. Gold reliquaries, processional crosses, busts, coffins and stone and wooden sculptures are confirmation of the high level of artistic craft and are available today to any visitor who wishes to see them. "**The Permanent Exhibition of Church Art**", in a specially designed space, is a chronological window on these preserved treasures. There are also the **Archeological Museum, Folk Museum**, archives, libraries, all conserve an invaluable treasure, which are the best witnesses to this important cultural heritage. It was in Zadar that the **first law journal** on Balkans was published - "**Pravdonosa**" and Zadar is connected with the founding of the first Faculty of Medicine in Croatia. It has taken a lot of patriotism to preserve the true identity of the people from the numerous armies and conquerors attacking from the land and sea. (In 1177 the people of Zadar greeted Pope Alexander III with hymns in the Croatian language.) The town of Zadar, which has its own money and banks during Medieval times had also its own writers, artists, churches and palaces - it is a town of monumental heritage and international importance.

Zadar is an important cultural centre where many numerous and important cultural events take place, from the **Musical Evenings in the Church of Saint Donat**, world famous Renaissance music, to international exhibitions, photographic presentations on the theme "**Man and the Sea**" (**Covjek i more**). It is a town of music and song, the pop-group "**Riva**" were winners of the 1989 **Eurovision Song Contest**.



# **INSTITUT RUĐER BOŠKOVIĆ**

www.irb.hr

Rudjer Boskovic Institute (RBI) is the largest Croatian research centre in sciences and science applications. In the multi-disciplinary environment of the Institute more than 500 academic staff and graduate students work on problems in experimental and theoretical physics, chemistry and physics of materials, organic and physical chemistry, biochemistry, molecular biology and medicine, environmental and marine research and computer science and electronics. Within Croatia, RBI is a national institution dedicated to research, higher education and provision of support to the academic community, to state and local governments and to technology-based industry. Within the European Union, RBI forms a part of the European Research Area. Worldwide, RBI collaborates with many research institutions and universities upholding the same values and vision.

## **BOTANICAL GARDEN**

<http://hirc.botanic.hr/vrt/eng/garden.htm>

The Botanical Garden was founded in 1889 and Professor Heinz is considered its founder. The first works on the land started in 1891, and the first planting was done in 1892. The garden was designed and constructed in the landscape style, with free-standing



clumps of trees and winding paths, with only the flower beds having strictly symmetrical lines. As well as the glasshouses, the garden has the following buildings: the director's or administrative building, in Art Nouveau style, the one-time gardener's lodge; the building of the Botanical Institute (the one-time Physiological Laboratory); the old exhibition pavilion (a valuable and authentic item of pavilion architecture of 1891); a public lavatory (an example of a small municipal structure from the end of the 19<sup>th</sup> century); the old storeroom (also from the end of the 19<sup>th</sup> century); the Water Company boiler room building (built in the 1930s); the drinking water fountain; a porch for students; and a small gazebo, acquired as a gift to mark the first cente-

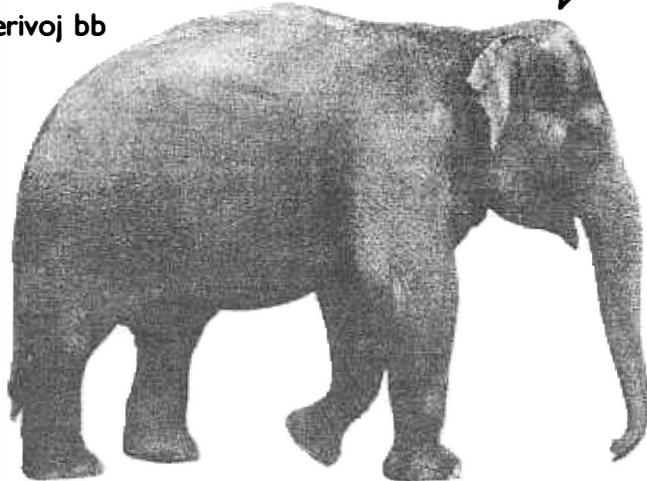
nary. Because of its great educational, cultural, historical and tourist values, as well as its overall importance for the city of Zagreb and the Republic of Croatia, the Botanical Garden of the Faculty of Science has been since 1971 statutorily protected as a monument of nature and culture (as monument of horticultural architecture).



## **ZOOLOŠKI VRT GRADA ZAGREBA (Zagreb Zoo)**

Maksimirski perivoj bb  
[www.zoo.hr](http://www.zoo.hr)

PLEASE  
DO NOT FEED THE  
ANIMALS! (EXCEPT  
PROBOSCIDEA)



### **Symbiotic games**

We will try to give the SymBioSE a flare of competition. Each country will choose a team that will have only one goal: to win and secure the eternal glory for their homeland! The country team will have a difficult task to earn points through 10 different crazy games. You will receive detailed instructions at the registration desk. Prepare for Rumble in the sea, Twin football, Drinking marathon, The snail race and other games!

### **Important telephone numbers:**

Police	92
Fire Department	93
Ambulance	94
International Operator	901
General Information	981
International Information	982
Public Emergency Centre	985
Road Assistance	987
Croatia Airlines	060 300 300
Weather Forecast & Road Conditions:	060 520 520

### **OC telephone numbers:**

Buga Berković	098 438 392
Vedran Nikolić	091 51772 11
Dubravka Pezić	098 91988 42
Andrea Obarčani	098 9701 484
Iva Kelava	098 579 926
Hrvoje Čizmek	098 9234 724
Tajana Uzelac	098 453 321
Marija Usenović	091 5072 083
Marija Buljan	091 7830 818
Jelena Baranović	091 5075 559
Tina Perica	091 7647 344

*You can call us any time you want. You can also send us an SMS message, these are all cell phone numbers.*

## **Money**

One **kuna** equals one hundred **lipa** (1 kn (HRK) = 100 lp). Foreign currencies can be exchanged almost on every corner: in banks, exchange offices (recommended), post offices and most tourist agencies and hotels. Banking hours are from 8 a. m. to 8 p. m. from Monday to Friday. On Saturdays banks are open until 1 p. m. Credit cards are used widely in Croatia (Eurocard/Mastercard, Visa, Diners, American Express...).

## **VAT - Tax return for foreign citizens**

Tourists making purchases in Croatia (apart from petroleum derivatives) which exceed 500 kuna per bill may reclaim VAT (PDV). When purchasing, ask the salesperson for form PDV - P, which they should fill and stamp. On leaving Croatia the receipt has to be verified by the Croatia Custom Service. A PDV refund in kuna can be obtained within six months either at the same shop where the goods were purchased (in this case the tax is refunded immediately), or by posting the verified receipt back to the shop together with the account number into which the refund should be paid. In this case the refund is dealt with within 15 days of receipt of the claim.

### Example prices

Coffee	5 - 10 kn (depending on the location and type of the coffee)
Beer	10+ (depending on the type and the size of the beer)
Soft drinks	10 - 12 kn
Pizza	25+ kn
Hamburgers	12 + kn
Bread	5 kn
Milk	5 kn
Pack of cigarettes	10+ kn
Newspaper	6 kn
Postcard	2+ kn
Disco	15+ kn

### Working hours

Shops and department stores are open from 8 a. m. to 8 p. m. and on Saturdays from 8 a. m. to 1 or 2 p. m. A small number of stores are closed between noon and 4 p. m. many stores are open on Sundays, too, and many stores, especially in the summer are open 24 hours. Public services and companies usually work from 8, 30 a. m. to 4, 30 p. m. from Monday to Friday.

**Warning!** 5<sup>th</sup> August is a public holiday - Homeland Gratitude Day and many shops and public services are closed, or the working hours are the same as on Sundays.

### Dictionary of some frequently used words and expressions

#### ENGLISH:

hi, hello, by  
good morning  
good afternoon  
good evening  
goodbye  
thank you  
please  
excuse me  
sorry

#### CROATIAN:

bok, bog, zdravo  
dobro jutro  
dobar dan  
dobra večer  
doviđenja  
hvala  
molim  
oprostite, ispričavam se  
oprosti, žao mi je

to help  
yes/no  
maybe  
How do you do?  
I am.../My name is...  
Do you have....?  
I need...  
Where is...?  
What's the time?  
How much is it?  
student dormitory  
post office  
bank  
exchange office  
bus/bus stop  
train  
tram  
airplane  
boat  
chemist's  
hospital  
doctor  
dentist  
telephone  
store, shop  
money  
change money  
embassy  
price  
sale  
bill  
to pay  
cash  
credit cards  
expensive/cheap  
to eat  
to drink

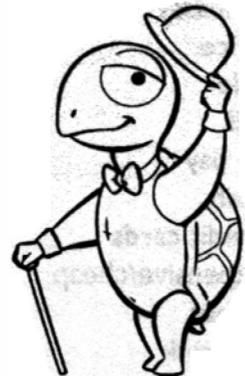
pomoći  
da/ne  
možda  
Drago mi je.  
Ja sam.../Moje ime je...  
Imate li...?  
Trebam...  
Gdje je...?  
Koliko je sati?  
Pošto je?, Koliko košta?  
studentski dom  
pošta  
banka  
mjenjačnica  
autobus/autobusna stanica  
vlak  
tramvaj  
avion  
brod  
ljekarna, apoteka  
bolnica, ambulanta  
doktor  
zubar  
telefon/telefonska govornica  
dućan  
novac  
promijeniti novac  
ambasada  
cijena  
rasprodaja  
račun  
platiti  
gotovina  
kreditne kartice  
skupo/jeftino  
jesti  
piti

red wine/white wine  
red wine + water  
red wine + cola  
beer  
water  
juice  
entrance/exit  
open/closed  
left/right  
forbidden  
caution  
sea  
shore  
island  
street  
square  
Good luck!  
Cheers!  
Pleasant journey!

crno vino/bijelo vino  
bevanda  
bambus  
pivo  
voda  
sok  
ulaz/izlaz  
otvoreno/zatvoreno  
lijevo/desno  
zabranjeno  
oprez, pazi  
more  
obala  
otok  
ulica  
trg  
Sretno!  
Živjeli! U zdravlje!  
Sretan put!

## Numbers

- |    |             |
|----|-------------|
| 1  | jedan       |
| 2  | dva         |
| 3  | tri         |
| 4  | četiri      |
| 5  | pet         |
| 6  | šest        |
| 7  | sedam       |
| 8  | osam        |
| 9  | devet       |
| 10 | deset       |
| 11 | jedanaest   |
| 12 | dvanaest... |
| 1. | prvi        |
| 2. | drugi       |
| 3. | treći...    |
| 4. | četvrti     |



## Pronunciation

Croatian: As in English:

a	arm		
c	t+s	lj	l+j
č, ć	cheese	nj	n+j
dž, đ	jump	o	walk
e	wet	s	smile
g	game	š	she
h	help	u	moon
i	see	z	zebra
j	you	ž	vision

### *SymBioSE Croatia organising team:*

Buga Berković -head of organising team  
and Big brain

Vedran Nikolić

Dubravka Pezić

Andrea Obarčanin

Iva Kelava

Hrvoje Čižmek

Tajana Uzelac

Marija Usenović

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Kristina Mišlov

Nikša Nazlić

SymBioSE 2004 is organised by Biology  
Students Association - BIUS  
([www.bius.hr](http://www.bius.hr)).

## Acknowledgement:

During the time of creating SymBioSE 2004 lots of people helped us and made our task easier. We thank all of them but we have to mention some in specific:

Rector Helena Jasna Mencer and prorector Vlasta Vizek Vidović and all the people from Rector's office for the help and support.

Head of the Biology department Ivan Habdija for the economic support and understanding our needs for .

Božo Pavićin from Ministry of Science, Education and Sports for the enthusiastic help and moral support when we needed it most.

We thank all the lecturers and people who helped making the programme.

notes, addresses, signatures, drawings, etc.



notes, addresses, signatures, drawings, etc.





# PARTNERS

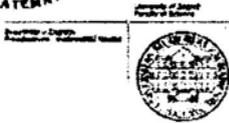
We thank all those who helped us to organise SymbioSE. You helped us a lot.



President of  
Republic of  
Croatia



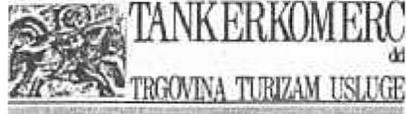
Mediteran kakav je nekad bio  
Croatian National Tourist Board



University of Zagreb, Faculty of  
Science, Biology department.



Ruđer  
Bošković  
Institute



Ministry of science  
education and sport

CROATIA AIRLINES

BADEL 1862



Grad Zadar



Grad Zagreb



Zagreb Tourist  
Board



Dizajn & prelozi: Seb

# Schedule

## Sunday, August 1<sup>st</sup>

Arrival - registration at student's home  
"Cvjetno naselje"  
19<sup>00</sup> - 21<sup>00</sup> - dinner

## Monday, August 2<sup>nd</sup>

7<sup>00</sup> - 9<sup>00</sup> - breakfast  
9<sup>00</sup> - 10<sup>30</sup> - official opening and  
introductions (University Recognition)  
10<sup>30</sup> - 11<sup>00</sup> - coffee break  
11<sup>00</sup> - 13<sup>00</sup> - lunch  
14<sup>00</sup> - 17<sup>00</sup> - free afternoon for sightseeing  
17<sup>30</sup> - 18<sup>00</sup> - dinner  
18<sup>00</sup> - 20<sup>45</sup> - treasure hunt (City Centre)  
20<sup>00</sup> - ... - party!!!

## Tuesday, August 3<sup>rd</sup>

7<sup>00</sup> - 9<sup>00</sup> - breakfast (Cvjetno naselje)  
9<sup>00</sup> - 13<sup>00</sup> - visit to Ruđer Bošković Institute  
OR visit to Zagreb ZOO  
13<sup>00</sup> - 14<sup>00</sup> - lunch  
14<sup>00</sup> - 19<sup>00</sup> - lectures  
(Department of Biology)  
19<sup>00</sup> - 20<sup>00</sup> - dinner  
20<sup>00</sup> - 22<sup>00</sup> - country presentation

## Wednesday, August 4<sup>th</sup>

7<sup>00</sup> - 9<sup>00</sup> - breakfast  
9<sup>00</sup> - 13<sup>00</sup> - lectures OR visit to Zagreb  
Botanical Garden  
13<sup>00</sup> - 14<sup>00</sup> - lunch  
14<sup>00</sup> - 17<sup>00</sup> - workshops  
17<sup>00</sup> - 19<sup>00</sup> - lectures/national assembly  
19<sup>00</sup> - ... - free time

## Thursday, August 5<sup>th</sup>

7<sup>00</sup> - 8<sup>00</sup> - breakfast  
9<sup>00</sup> - trip to Zadar + visit to National Park  
"Plivnice"  
18<sup>00</sup> - on the road to Zadar  
~20<sup>00</sup> - dinner, free time

## Friday, August 6<sup>th</sup>

7<sup>00</sup> - 9<sup>00</sup> - breakfast  
9<sup>00</sup> - 10<sup>45</sup> - opening of the second part  
10<sup>00</sup> - 13<sup>45</sup> - lectures + workshop  
13<sup>00</sup> - 14<sup>00</sup> - lunch  
14<sup>00</sup> - 19<sup>00</sup> - lecture/sightseeing  
19<sup>00</sup> - 20<sup>00</sup> - dinner  
20<sup>00</sup> - ... - fun in the city

## Saturday, August 7<sup>th</sup>

7<sup>00</sup> - 9<sup>00</sup> - breakfast  
9<sup>00</sup> - 13<sup>00</sup> - visit to Nature Park "Vrana"  
OR lectures  
13<sup>00</sup> - 14<sup>00</sup> - lunch  
14<sup>00</sup> - 19<sup>00</sup> - student presentations  
19<sup>00</sup> - 20<sup>00</sup> - dinner  
20<sup>00</sup> - ... - national assembly/party

## Sunday, August 8<sup>th</sup>

7<sup>00</sup> - 9<sup>00</sup> - breakfast  
9<sup>00</sup> - 19<sup>00</sup> - boat excursion to  
National Park "Kornati"  
19<sup>00</sup> - 20<sup>00</sup> - dinner  
20<sup>00</sup> - ... - night on the beach

## Monday, August 9<sup>th</sup>

7<sup>00</sup> - 9<sup>00</sup> - breakfast  
9<sup>00</sup> - 13<sup>00</sup> - visit to National Park  
"Faklenica" OR lectures  
13<sup>00</sup> - 14<sup>00</sup> - lunch  
14<sup>00</sup> - 17<sup>00</sup> - free time (beach)  
17<sup>00</sup> - 19<sup>00</sup> - summing SymbioSE 2004,  
presenting SymbioSE 2005  
Finkind. closing session  
19<sup>00</sup> - 20<sup>00</sup> - dinner  
20<sup>00</sup> - ... - farewell party

## Tuesday, August 10<sup>th</sup>

7<sup>00</sup> - 10<sup>00</sup> - breakfast, cleaning, packing  
10<sup>00</sup> - departure for Zagreb  
~14<sup>00</sup> - arrival to Zagreb