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SPEED TALKS

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* The Abstract number begins with the letters SpT and can be found atop each abstract's title in the PDF file.

oligomeric state differs from mono- to di-mer. All studied lectins recognize L-fucose and O-methylated disaccharide glucose(1–4) rhamnose, but the fine binding specificities vary. The biological assay shows inhibition of the immune system response in the presence of *P. luminescens* lectins. Our results indicate these lectins might be involved in *P. luminescens* pathogenicity towards insect larva.

SpT.02-11
Effects of N-(3 oxododecanoyl)-L homoserine lactone, a quorum sensing signal molecule belonging to *Pseudomonas aeruginosa*, over human pancreas cell (hTERT-HPNE)

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Pseudomonas aeruginosa causes infections with high morbidity and mortality in patients with suppressed immune system. The mortality of these infections is directly related to the deterioration of membrane integrity of epithelial cells and inflammation formation. N-(3 oxododecanoyl)-L homoserine lactone (3-oxo-C_{12}-HSL) signal molecule which the bacteria have, play an important role in the arrangement of bacterial virulence factors and the formation of inflammation. In this study, it was aimed to determine the effects of 3-oxo-C_{12}-HSL on human pancreas cell (hTERT-HPNE). First, the cytotoxic effect of 3-oxo-C_{12}-HSL on hTERT-HPNE cell lines was detected with MTT. Second, the expression of cyclooxygenase-2 (Cox-2), a proinflammatory indicator in hTERT-HPNE cell stimulated with 3-oxo-C_{12}-HSL, on RNA and protein level was researched using real-time PCR (RT-PCR) and Western Blotting method. In the consequence of the performed MTT, it was found that 3-oxo-C_{12}-HSL signal molecule was cytotoxic on hTERT-HPNE (IC_{50} 75 μM). According to the results of RT-PCR, the expression level of *Cox-2* was increased significantly ($P < 0.05$) in the cell treated with 12.5-50 μM of 3-oxo-C_{12}-HSL when compared with control cell (%0.1 DMSO). The highest elevation was found to be fivefold at 50 μM concentration of 3-oxo-C_{12}-HSL. According to the results of Western Blotting analysis, the expression level of Cox-2 protein was increased significantly ($P < 0.05$) in the cell treated with 12.5-50 μM of 3-oxo-C_{12}-HSL when compared with control cell (%0.1 DMSO). The highest elevation was found to be 1.5 fold at 12.5 μM concentration of 3-oxo-C_{12}-HSL. These results suggest that 3-oxo-C_{12}-HSL signal molecule plays an important role in the increase of bacterial virulence, and also inflammation level in eukaryotic cells. This study was supported by the Anadolu University Research Foundation (Project Code: 1403F090).

SpT.02-08
Peculiarities of heme and iron metabolism in ticks

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Blood digestion in ticks is a key physiological process providing essential nutrients for development and fecundity of the parasite that ultimately allows transmission of tick-borne pathogens. Host blood is a rich source of pro-oxidative heme and iron. Therefore ticks had to evolve specific mechanisms protecting them against the oxidative stress caused by the surplus of these compounds. These adaptations led to unique features of tick heme and iron metabolism that markedly differ from other organisms including insect blood-feeders. In the majority of eukaryotic organisms, heme and iron homeostasis is based on balancing the flux between heme biosynthesis and its degradation. During evolution of their parasitic life style, ticks lost the capability of heme biosynthesis and all the heme needed for assembly their endogenous hemoproteins is of the host origin. Ticks are also not capable to acquire iron via heme degradation as they lack the enzyme heme oxygenase (HO). Our experiments confirmed, that iron needed for tick metabolic demands does not originate from digested hemoglobin but most likely from the serum transferrin. The intracellular free iron is maintained at low levels by its storage in ferritin 1 (Fer1) that is closely related to the mammalian heavy-chain ferritins, including the typically conserved motifs for ferroxidase center. Proteosynthesis of Fer1 is controlled at translational level via binding of iron-regulatory protein (IRP) to the iron binding element at 5′ UTR region of Fer1 mRNA. In contrast to their vertebrate hosts, ticks possess a specific type of secreted ferritin 2 (Fer2) that serves as inter-tissue transporter of bio-available iron, which resembles the function of vertebrate transferrin. These major departures of tick heme and iron metabolism and transport from their canonical functioning in their hosts hold promises for the design of effective anti-tick strategies. Financing: Czech Science Foundation No. 18-018132S (PK).

SpT.02-09
β-lactoglobulin covalent modification by phycocyanobilin under physiological conditions: structural and functional effects

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Phycocyanobilin (PCB) is a blue tetrapyrrole chromophore covalently attached to cysteine residues of C-phycocyanin (PC), chromoprotein of cyanobacteria *Spirulina platensis* and a molecule with numerous health-promoting effects. β-lactoglobulin (BLG) is the major protein of milk whey, frequently used as an additive in food industry, due to its extraordinary techno-functional properties. In this study, we investigated covalent binding of PCB to BLG under physiological conditions, using spectroscopic and electrophoretic techniques. We showed that BLG stereo-selectively binds PCB, with the apparent binding constant of 4×10^5 M^{-1}. Binding of PCB to BLG exhibits slow kinetics with binding rate constant (k_a) of 0.065 min^{-1}, while unfolding of BLG in urea makes free thiol group more exposed to solvent, producing a higher yield of adduct formation and accelerating the reaction ($k_a = 0.101$ min^{-1}). Although binding occurs at broad pH range, adduct formation rises with increasing reaction pH. Moreover, we demonstrated that covalent adduct could also be formed in simulated gastrointestinal conditions. In comparison to native BLG, phycocyanobilin-modified BLG has slightly altered secondary and tertiary protein structure. Obtained BLG-PCB adduct has increased antioxidant potential and is less susceptible to oligomerization and amyloid formation. Furthermore, BLG-PCB covalent adduct possess higher resistance to pepsin and pancreatin digestion then unmodified protein. Taken together, our results indicate that covalent modification of BLG with PCB could improve protein's bioactive and techno-functional properties and possibly enable incorporation of phycocyanobilin-modified protein into various food products.