Generally, for both PS+ subpopulations the dependence of the bound factor quantity binding on the added FIXa concentration was linear without any saturation up to very high concentrations of FIXa (2000 nM, which is by several orders of magnitude higher than the physiological value). Confocal microscopy showed that FIXa localizes on the surface of the PS+ platelets to a some 'hat'-shaped formation. This localization could be important for additional acceleration of coagulation reactions.

Conclusions: Two PS+ subpopulations of platelets is better than the PS- in binding of FIXa by one order of magnitude, their dependence of binding on the concentration of free FIXa is linear and without saturation. This suggests their major role in binding of FIXa during the clotting. Non-uniform, localized distribution of the FIXa on the surface of PS+ platelets, it's 'hat'-shaped formation, suggests that such a colocalization with other factors could work for acceleration of coagulation reactions.

SW06.W30–15
New concepts about fibroblasts trophic function

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In pluricellular organism, intercellular communication is instrumental for the survival and the function of cells and to ensure the integrity of tissues. The exchange of information could occur through the transmission of electrical or chemical signals or through the transfer of portions of cell membrane, either after direct cell-cell contact (mechanisms of trogocytosis, nibbling and nanotubes) or by the secretion of small vesicles composed of a lipid bilayer containing transmembrane protein and enclosing soluble molecules [1].

By cytofluorimetry, confocal microscopy and radiolabelled protein experiments we found that primary human fibroblasts transfer both proteins and lipids to cancer cells and to non-transformed cells. On the contrary, various lines of cancer cells are not able to perform this kind of effect, so this phenomenon is mainly unidirectional. Time-lapse confocal microscopy studies and radiolabelled protein experiments showed, respectively, that the passage of lipids and proteins could be mediated by cell-cell contact and/or through the transfer of small vesicles.

These data in addition with proliferation tests, where we have shown that cancer cells increase their growth rate of 30–40% when co-cultured with primary human fibroblasts, suggest a novel role of stromal cells in the context of tumor microenvironment, that could represent a general property related to the trophic function of connective tissue. In fact, in the simplest hypothesis, the proteins and lipids transfer could not only promote cells survival but also enhances cells proliferation by increasing the rate of mass accumulation to the lower limit necessary for cell division.

Reference

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SW06.W30–16
Results of the long-term observation of the population of *Blumeria graminis* f.sp. *hordei* in Latvia and Lithuania

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Local populations of *Blumeria graminis* f.sp. *hordei*, causal agent of barley mildew, are very changeable due to migration, mutations, recombinations and direct selection, in result new dangerous pathotypes could spread rapidly. Therefore monitoring of racial composition of pathogen population is crucial to create effective plant protection systems, including resistant varieties. During last decade we analysed more than 2500 isolates of *B. graminis* f.sp. *hordei* collected in conidia and/or cleistothecia stages both in Latvia and Lithuania. For determination of virulence genes each single colony was tested on a set of differentials with different powdery mildew resistance genes, comprised 10 near-isogenic Pallas lines, barley line *SI1* and varieties 'Steffi', 'Goldie' and 'Meltan'. Significant differences between samples of the pathogen population were detected for frequencies of virulence genes *Va1, Va3* and *Va13*. During previous years a clear tendency to increase of mentioned virulences was observed in South-Eastern part of Latvia. At the moment, corresponding resistance genes are still effective in the Central and Eastern Asia, for example, in winter barley regions of China. Barley mildew resistance genes *Mla6, Mla7, Mla9, Mla12, Mlk* and *MlLa* can be recognised as unnecessary in Latvia and Lithuania conditions, because frequencies of corresponding virulence genes were high. Shannon- and Simpson index were calculated to describe variability in samples of the pathogen, as well genetic distance between populations was determined. Significant differences in diversity of virulence genotypes among regional sub-populations occurred; highest level of diversity was detected in the South-Eastern part of Latvia. Presented data could be used for elaborating the best strategy for resistance breeding under Latvian conditions.

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Interactions between nanoparticles and calli cultures of red clover and flax

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Until now the influence of nanoparticles (NPs) on organisms at the molecular level is questionable, especially their molecular regulation mechanisms. Calli culture is an important tool in plant biotechnology, which is used in various ways, such as organogenesis, somatic embryogenesis and generation of somaclonal variation. This study was aimed to analyse the effect of NPs on calli DNA methylation, somaclonal variation and cell ploidy. We examined the influence of variable concentrations of Ag, Au, Zn, Fe, Ni and C nanoparticles on calli tissue. In this work, embryos were grown on Murashige and Skoog medium with different concentrations of NPs suspension. Latvian origin flax accession 'Blue di Riga' and 'Lirina', red clover variety 'Skriveru agrais' was used for calli formation. Genes rich with CpG sites (26S ribosomal RNA gene, 26S-18S ribosomal RNA intergenic spacer, 18S ribosomal RNA gene, internal transcribed spacer 1, 5.8 S ribosomal RNA gene, and internal transcribed spacer 2) were analysed for determination of DNA methylation in calli cells using pyrosequencing method. Analysis of methylation level in the six CpG sites in calli revealed significant differences between control calli and calli grown on medium supplemented with NPs. Genetic diversity of calli cells is expressed mostly in different ploidy, i.e. calli cells have different number of chromosomes. Calli were analysed by flow cytometry techniques. The results revealed that there are differences in development of calli, ploidy changes in calli cells which are caused by different NPs on the cultivation medium. Cell ploidy variation in calli significantly depends on the dose of carbon NPs concentration in medium. nuDNA regions of pectin methylesterase (pme3) and Mlo-like