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decreases manifestation of locomotor impairments in animal models of Parkinson's disease. A wide range of biological activity of isatin is associated with interaction of this regulator with numerous isatin-binding proteins. The aim of this study was to investigate the profile of brain isatin-binding proteins in mice with MPTP-induced Parkinsonism (90 min and seven days after administration of this neurotoxin). A single dose administration of MPTP (30 mg/kg, ip.) was accompanied by locomotor impairments in the open field test 90 min after administration; seven days after MPTP administration locomotor activity of mice significantly improved but did not reach the control level. Five independent experiments on proteomic profiling of isatin-binding proteins resulted in confident identification of 96Â±12 proteins. Development of MPTP-induced locomotor impairments was accompanied by a significant decrease in the number of isatin-binding proteins (63Â±6; n=5; p<0.01). Seven days after MPTP administration the total number of identified proteins increased and reached the control level (132Â±34; n=4). The profiles of isatin-binding proteins were rather specific for each group of mice: in the control group these proteins (which were not found in both groups of MPTP-treated mice) represented more than 70% of total proteins. In the case of MPTP treated mice this parameter was 60% (90 min after MPTP administration) and >82% (seven days after MPTP administration). The major changes were found in the groups of isatin-binding proteins involved into cytoskeleton formation and exocytosis, regulation of gene expression, cell division and differentiation and also proteins involved in signal transduction.
DOI: 10.18097/PBMC20176304316

6. Surikova E.I., Goroshinskaya I.A., Frantsiyants E.M., Shalashnaja E.V., Nerodo G.A., Neskubina I.V., Kachesova P.S., Nemashkalova L.A., Chudilova A.V.

The activity of redox-regulatory systems in the primary and recurrence tumors in vulvar cancer.

The activities of superoxide dismutase (SOD), catalase, glutathione peroxidase (GPx), glutathione reductase (GR), glutathione transferase (GST), the content of reduced glutathione (GSH) and malondialdehyde (MDA) were investigated in the samples of the tumor, peritumoral zone and healthy tissue, taken at the line of resection, were obtained from 14 patients with primary squamous cell carcinoma of the vulva, and 13 patients with local recurrence appeared in the period from 3 months to 7 years. by conventional spectrophotometric methods. The content of GSH and the activity of SOD, GPx, GR, GST were significantly increased, while MDA was decreased in the tissue of the primary carcinoma of the vulva in compared with the healthy tissue. Differences in the functioning of the investigated system of enzymes in the peritumoral zone were also revealed in the primary and recurrent tumoral process. Similar but much less pronounced changes were also observed in the recurrent tumor. It is suggested that such dynamics of activity of the studied system with the progression of cancer process can be the result of adaptation to changes in the local biochemical status of healthy (nonmalignant) tissue of the organ carrying the tumor and reflect the metabolic features of the recurrent tumor.
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7. Krylova T.D., Tsygankova P.G., Itkis Yu.S., Sheremet N.L., Nevinitsyna T.A., Mikhaylova S.V., Zakharova E.Yu.

High resolution respirometry in diagnostic of mitochondrial disorders caused by mitochondrial complex I deficiency.

Complex I (CI) deficiency is one of the most common defects in the OXPHOS system; it represents more than 30% cases of mitochondrial diseases. The group is characterized by clinical and genetic heterogeneity and comprise several nosological forms. The most prevalent phenotypes for CI are LHON and Leigh syndrome. In this study we have analyzed skin fibroblasts from 11 patients with mutations in mtDNA, which cause LHON or Leigh-like phenotypes: m.11778 G>A (n=3), m.3460 A>G (n=2), m.3635 G>A (n=1), m.3308 T>G (n=2), m.3472 T>C (n=1) and 2 patients with earlier unknown substitutions m.3945 C>A and m.14441T>C. High-resolution respirometry (HRR) on the Oxygraph-2k instrument (â€œOroboros corp.â€•, Austria) was performed for complex analysis of the mitochondrial respiratory function in intact and permeabilized fibroblasts of patients and healthy controls. Flux control rations in intact cells R/E, (R-L)/E (p<0.05) were raised compared to the control. Rates of R, E, L normalized on the CS were statistically varied between patients and controls. In permeabilized fibroblasts we observed differences in CII/E, Rot/E, R/CII, CI/CII (p<0.05) between groups. These data highlight the dysfunction of the OXPHOS system and particularly CI. Increased citrate synthase level and decreased CI/CII ratio indicate compensatory metabolic response to respiratory chain dysfunction. Our results show applicability of HRR in revealing the biochemical abnormalities of complex I in fibroblasts of patients with LHON and Leigh-like syndrome. We also suggest HRR to be a useful method for inspection of other mutations causing complex I deficiency.
DOI: 10.18097/PBMC20176304327

8. Bespyatykh J.A., Manicheva O.A., Smolyakov A.V., Dogonadze M.Z., Zhuravlev V.Yu., Shitikov E.A., Ilina E.N.

Influence of cultivation conditions on the proteomic profile of Mycobacterium tuberculosis H37RV.

Comparative proteomic profiling of M. tuberculosis H37Rv strains cultured on two different nutrient media, Levenstein-Jensen and Middlebrook 7H11, was performed using a label-free LC-MS/MS approach. It was shown that results obtained from two media possessed high convergence. The only difference was observed in the representation of fumarate reductase FrdB, its abundance was higher in the mycobacterial cells cultured on Levenstein-Jensen medium. The correlation analysis of biological repeats revealed the high convergence of the results obtained from Middlebrook 7H11 medium. Thus, we can conclude that the use of the Middlebrook 7H11 medium is most appropriate in the scientific laboratory.
DOI: 10.18097/PBMC20176304334

9. Skvortsov V.S., Mikurova A.V., Rybina A.V.

Use of de novo sequencing for proteins identification.

Three de novo sequencing programs (Novor, PEAKS and PepNovo+) have been used for identification of 48 individual human proteins constituting the Universal Proteomics Standard Set 2 (UPS2) (â€œSigma-Aldrichâ€•, USA). Experimental data have been obtained by tandem mass spectrometry. The MS/MS was performed using pure UPS2 and UPS2 mixtures with E. coli extract and human plasma samples. Protein detection was based on identification of at least two peptides of 9 residues in length or one peptide containing at least 13 residues. Using these criteria 13 (Novor), 20 (PEAKS) and 11 (PepNovo+) proteins were detected in pure UPS2 sample. Protein identifications in mixed samples were comparable or worse. Better results (by ~20%) were obtained using prediction included high quality identified fragment (TAG) containing at least 7 residues and unidentified additional masses

at N- and C-termini (PepNovo+). The latter approach confidently recognized mass-spectrometric artefacts (and probably PTM). Atypical mass changes missed in UNIMOD DB were found (PepNovo+) to be statistically significant at the C-terminus (+23.02, +26.04 and +27.03). Using peptides containing these modifications and milder detection threshold 41 of 48 UPS2 proteins were identified.
DOI: 10.18097/PBMC20176304341

10. Mikhailova M.V., Belyaeva N.F., Kozlova N.I., Zolotarev K.V., Mikhailov A.N., Berman A.E., Archakov A.I.

Protective action of fish muscle extracts against cellular senescence induced by oxidative stress.

Muscle extracts of some fish species, i.e. pike (Esox lucius), sterlet (Acipenser ruthenus), pink salmon (Oncorhynchus gorbuscha) and, to a lesser extent, perch (Perca fluviatilis) and Russian sturgeon, (Acipenser gueldenstaedtii) prevent the development of premature senescence of the human embryonic fibroblasts induced by the sublethal concentration of H_2O_2. Muscle extracts of other fish species tested, i.e. coho salmon (Oncorhynchus kisutch) and zander (Sander lucioperca), have not demonstrated this feature. Cell proliferation increased after the action of the senescence-inhibiting muscle extracts. Possible mechanisms of the action of nature biologically active compounds that interfere with the development of stress-induced cell senescence are discussed.
DOI: 10.18097/PBMC20176304351

11. Belyakova N.V., Pantina R.A., Kovalev R.A., Filatov M.V., Naryzhny S.N.

Quaternary structures of human cytoplasmic and nuclear PCNA are the same.

Properties and mechanisms of PCNA (proliferating cell nuclear antigen) functions have been investigated for a long time and are studied in great detail. As follows from its name, most known PCNA functions (DNA replication, DNA repair, DNA recombination and others) are connected with cell proliferation and localization of this protein in nuclei. In addition, there is good reason to believe that PCNA also performs some functions in the cytoplasm. However, the possible role and mechanisms of PCNA action in the cytoplasm require careful study and clarification. Interestingly, such cells as neutrophils differ in that they are non-dividing on one hand and on the other hand contain a rather large amount of PCNA, which is localized only in the cytoplasm, that is, they are an ideal model for the study of cytoplasmic PCNA. Using cross-linkages with formaldehyde, we showed that this cytoplasmic PCNA is cross-linked in a similar way, that is, organized in the same way as the nuclear PCNA that is present in the proliferating cells. Previously, we showed that PCNA in such cells is organized into a dynamic complex of double trimer on the basis of the back-to-back principle (Naryzhny S.N. et al. (2005) J. Biol. Chem., 280, 13888). Apparently, such organization of this hub-protein allows it to better coordinate the processes taking place in the cytoplasm as well.
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