expression. Given that AR and PSA are involved in a prostatic role in prostate cancer cell viability, we measured the effect UA, UB and V had on apoptosis. Treatment with UA, UB and V induced an increase in apoptotic cells, which could be related to the decrease in AR and PSA expression.

Conclusion: Our results suggest that Urothilins A and B attenuate the function of the AR by repressing its expression. Down-regulation of AR and PSA mRNA and protein levels could provoke an interruption of PSA–AR interaction, which has a proven role in prostate cancer development and progression. Urothilins’ modulatory effect over the AR receptor also causes an apoptotic effect on LNCaP cells. The aforementioned results indicate a potential role of walnuts as a chemo-preventive and/or chemo-therapeutic agent for prostate cancer.

No conflict of interest.

High intensity of cytoplasmic peroxiredoxin VI predicts poor outcome in diffuse large B-cell lymphoma
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Introduction: Diffuse large B-cell lymphoma (DLBCL) is an aggressive lymphoma with often fatal outcome. Prediction of later relapse is based on clinical markers and therefore there is a need for good biomarkers to select patients for more aggressive first-line treatments in the primary stage of the disease. Peroxiredoxins (Prxs) are a group of antioxidant proteins which function in the intracellular redox system. The amount of Prxs in tissue samples have been suggested to be prognostic in several cancer types.

Material and Method: Altogether 110 diagnostic lymphoma biopsy samples were immunohistochemically stained for Prxs I, II, III, V and VI by commercial antibodies. The patient data was carefully collected from hospital records.

Results and Discussion: High cytoplasmatic intensity of peroxiredoxin VI (Pvx VI) predicted worse outcome. The 5-year disease specific survival 70.4% vs. 97.0% in group with low cytoplasmic intensity of Prx VI (p = 0.001). A similar trend was also found in the cytosplasmic expression of peroxiredoxin II (Ptx II).

Conclusion: It appears that high intensity of cytoplasmatic Ptx VI expression in diagnostic lymphoma biopsy samples predicts worse outcome in patients with DLBCL. Whether Ptx VI is responsible for the development of chemoresistance and therefore the dismal outcome in patients with DLBCL needs to be evaluated.

No conflict of interest.

Hair dyest in breast cancer risk
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Introduction: The use of hair dye products and its possible role in the etiology of breast cancer has been in the public eye from time to time. It has been presumed that certain chemicals, especially aromatic amines that are often present in commercial hair dyes and bleaches may increase the risk of breast cancer. In our study, we will investigate the association between personal use of hair dyes and breast cancers among monochromatous women.

Material and Method: We conducted a retrospective, population-based case-control study, where the research material consisted of a questionnaire data from 2523 Finnish breast cancer patients diagnosed in 2000–2007 and aged under 50 at the time of the diagnose, and 10,092 age-matched controls. We report univariate and multivariate odds ratios from the logistic regression model.

Results and Discussion: The risk of breast cancer was 1.3 times higher among those who used hair dyes compared to those who did not. We observed a significant increase in the risk of breast cancer with increasing cumulative use of hair dyes. These results remained when adjusted for other known risk factors. We estimated that the attributable fraction for using hair dyes was 17% (95% CI: 1.07–30.83).

Based on previous studies, the mechanism of the effect could be dermal absorption of carcinogenic substances. It has been shown that many of the current commercial hair dyes contain chemicals that are banned for their known carcinogenicity. This is possibly due to contamination of some commonly used hair dye compounds.

Conclusion: We conclude that use of hair dyes increases the risk of breast cancer in cases diagnosed before age 50. The findings suggest that exposure to the hair dye compounds should be avoided especially at young age.

No conflict of interest.

Highly sensitive pancreatic cancer diagnosis by serum exosome stem cell and miRNA markers
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Introduction: Late diagnosis contributes to pancreatic cancer (PaCa) dismal prognosis, urging for reliable, early non-invasive detection. Serum exosome (S-Exo) protein and/or miRNA markers might be suitable candidates.

Material and Methods: Serum was collected from 190 patients and 30 healthy donors. S-Exo were purified according to routine procedure. Prescreening included S-Exo miRNA profile evaluation by microarray analysis, protein expression profiles were evaluated by flow cytometry. S-Exo of patients with PaCa, benign pancreatic tumors, chronic pancreatitis, nonPaCa-malignancies and healthy donors were analyzed for protein markers by flow-cytometry and for miRNA by qRT-PCR.

Results and Discussion: Prescreenings showed high recovery of PaCa stem cell markers and a panel of 4 miRNA in S-Exo pools of PaCa patients, though not healthy donors. After defining cut off points in a training versus a validation set, a preclinical screening was performed with S-Exo from PaCa patients and healthy donors. PaCa stem cell markers CD44v6, Tspan8, EpCAM and CD104 were expressed in 96% of PaCa patients S-Exo, but not in control groups, except nonPaCa-malignancies. Recovery was tumor grading and staging independent including early stages. A panel of miR-1246, miR-4644, miR-3976 and miR-4308 was significantly upregulated in 83% of PaCa S-Exo, but rarely in all control groups. miRNA expression increased PaCa progression. Concomitant PaCIC and miRNA S-Exo marker evaluation significantly improved sensitivity (1.00) with a specificity of 0.80 for PaCa versus all others and of 0.92 excluding non-PaCa-malignancies.

By a most thoroughly performed selection of serum exosome protein and miRNA markers we could demonstrate that PaCa patients’ serum contains a significantly increased amount of exosomes expressing PaCa stem cell and distinct miRNA markers, which both were recovered with high fidelity. Being comparably cheap, non-invasive and requiring less than 2ml serum, concomitant S-Exo PaCa stem cell and miRNA marker expression deserves large scale clinical evaluation that likely brings a breakthrough in early PaCa diagnosis.

Conclusion: Combined PaCa stem cell and miRNA S-Exo marker evaluation provides a highly sensitive diagnostic tool offering a breakthrough in PaCa diagnosis and could allow for the first time identification of PaCa in people at risk. Moreover, searching for exosomal cancer stem cell and miRNA markers may well work for a wide range of malignancies.

No conflict of interest.

Quantification of donor/recipient chimerism in leukemia by digital PCR
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Background: During leukemia treatment mixed chimerism can occur in which both recipient and donor cells are present in the bone marrow or peripheral blood after transplantation. Chimerism analysis is performed to monitor peripheral blood or bone marrow in the recipient after allogenic stem cell transplantation to monitor for leukemia relapse. Observation of increasing mixed chimerism after transplantation is associated with a higher risk of relapse in acute leukemia. Previously, a quantitative PCR (qPCR) technique, using insertion/deletion polymorphisms, was found to predict relapse in 88.2% vs. 44.4% of individuals analyzed by variable number tandem repeat markers with a median anticipation period of 58 days and a sensitivity of 0.01% vs. 3%. Experiments were performed to determine if the digital PCR (dPCR) method used is able to predict relapse earlier and with greater accuracy than the qPCR method using retrospective leukemia samples.

Material and Methods: A set of qPCR (TaqMan®) assays were designed targeting insertion/deletion polymorphisms that were present in the donor and not present in the recipient samples. Digital PCR (QuantiStudio™ 3D Digital PCR System) was performed with donor and pre- and post-transplantation DNA samples isolated at different intervals using qPCR assays with the same nucleotide sequences as those used in qPCR experiments.

Results: The dPCR and qPCR methods yielded similar percent recipient chimerism values when recipient DNA was present at greater than 1%. Furthermore, the dPCR method was found to be more sensitive than the qPCR method based on the ability to detect recipient DNA in a relapsed individual earlier where the percent recipient chimerism was 0.2% or less. The false positive rate was close to the complete chimerism value of 0.01% for peripheral blood samples.