in high demand for successful diagnosis, treatment and improvement of survival rates. Micro and nano-fabricated electrochemical sensors are widely used as sensing devices due to their low-cost, high selectivity and sensitivity, and the possibility to be integrated into smart systems enabling sampling and fluidic handling. This work is aimed at developing a microelectrode sensor functionalized with anti-hCG antibody that enables rapid, selective and sensitive recognition of hCG biomarker. 

**Material and methods** Screen printed carbon macroelectrode (400 µm diameter) was modified with a layer of 1- pyrenebutyric acid-N-hydroxysuccinimide ester (PANHS) to enhance the sensing performance of the fabricated sensor. Anti-hCG antibodies were immobilised onto the modified surface and then bovine serum albumin was dropped to minimise unspecific adsorption on the electrode surface. Functionality of the developed sensor was examined by measuring cyclic voltammetry (CV) and square wave voltammetry (SWV) after addition of hCG proteins at different concentrations.

**Results and discussions** In immunesensors, generation of an electrochemical signals is based on formation of a stable complex between an analyte and antibody that recognise the analyte specifically. When hCG protein was added at different concentrations to the developed sensor, SWV electrochemical signals were changed. The peak current reduced with higher hCG concentrations which is attributed to formation of an antigen-antibody complex onto the fabricated sensor. The limit of detection was approximately 1 pg/ml.

**Conclusion** In this work, an electrode with a micropatterning was used to enhance the sensitivity of the sensor since the surface area directly affects the sensing mechanism. The fabricated microelectrode exhibited a good detection limit. In the future, the proposed sensor will be modified using nanomaterials such as graphene and carbon nanotubes to enhance the sensitivity which can be further exploited in the diagnostic applications for early detection of different disease biomarkers.
Results and discussions Preliminary results indicate that the DNA methylation biomarkers have high accuracy for identifying CCA, particularly among patients with PSC. Interestingly, the markers were able to detect 5/8 PSC patients that later developed CCA, and that were not detected by standard diagnostic tools.

Conclusion By using highly sensitive ddPCR based technology and a robust DNA methylation biomarker panel, CCA can be accurately detected in small volumes of bile from patients with PSC.

**PO-092 SENSITIVITY AND SPECIFICITY ACCURATE OF SNiffING DOGS TO DETECT LUNG CANCER**

O Horváth*, 1D Hegyi, 1E Balogh, 1P Mátrai, 1I Kiss, 1Z Gyöngyi. 1University of Pécs Medical School, Department of Public Health Medicine, Pécs, Hungary; 2University of Pécs Medical School, Institute of Bioanalytics, Pécs, Hungary

Introduction Lung tumours are in the leading causes of cancer death. On the basis of last years’ literature, trained dogs are able to detect lung cancer by sniffing human biological samples.

Material and methods In our experiment, we conducted a systematic search to define sensitivity and specificity of lung cancer detection from exhaled breath applying dogs. Embase, Web of Science, Cochrane and PubMed databases were reviewed according to PRISMA Guidelines. We identified all articles which covered canine scent detection and lung cancer diagnosis. Values of sensitivity and specificity with 95% confidence intervals were calculated. ROC curves were created to display the results.

Results and discussions Seven studies met all the eligibility criteria, but in two of them the cut-off was different from the others. In all and selected five studies, sensitivities were 0.81 (0.71–0.88) and 0.77 (0.67–0.83) while specificities were 0.73 (0.47–0.89) and 0.59 (0.34–0.80). In contrary of the particular training methods of dogs and other variable factors (collecting method of samples, probability chance etc.), results predict the application of well-trained dogs as a diagnostic tool or alternative solution besides the current diagnostic tools.

Conclusion Based on the statistical analysis, sniffing dogs were able detect even the early stage lung cancer with good sensitivity and specificity.

**PO-093 A HEP-2 CELL MODEL AS TOOL FOR ANALYSING DNA DOUBLE STRAND BREAKS IN CANCER PATIENTS**

$^{1}$M Ruhe*, $^{1}$L Sauer, $^{1}$P Schierack, $^{2}$W Dammermann, $^{2}$M Deckert, $^{1}$C Schröder, $^{1}$D Roggenbuck, $^{1}$S Rödiger. $^{1}$Brandenburg University of Technology Cottbus-Senftenberg, Institute of Biotechnology, Senftenberg, Germany; $^{2}$Brandenburg Medical School Theodor Fontane- Germany, Internal Medicine II, Brandenburg an der Havel, Germany

Introduction DNA double strand breaks (DSB) are one of the most severe DNA damages and as thus can lead to genomic instability favouring cancer. The number of phosphorylated histone variant H2AX ($\gamma$H2AX) correlates with the number of DSB and can be quantitatively detected by immunofluorescence imaging. In particular, we are interested on the individual response and adverse effects of DSB-inducing chemotherapeutic drugs such as etoposide in the context of the chemoresistance–inducing and tumour-associated antigen dense fine speckled protein of 70 kDa (DFS–70).

Material and methods HEP-2 wild type and CRISRP/Cas9-generated DFS-70 knock-out (DFS-70 KO) cells were treated with the topoisomerase inhibitor etoposide (0–10 μM) to induce DSB. The AKLIDES NUK system (Medipan GmbH, Dahlewitz, Germany), a fully automated and standardised immunofluorescence imaging and data processing platform, was used to measure the number of $\gamma$H2AX foci and nucleus size. Additionally, immunoblotting was performed to analyse $\gamma$H2AX.

Results and discussions Both the protein analysis by Western blotting and Immunofluorescence analysis by AKLIDES NUK system showed an elevated formation of $\gamma$H2AX with increased etoposide concentration. HEP-2 wild type cells indicated a significant induction (p<0.01) of DSB up to 13 foci per cell after 16 hours of etoposide treatment. Adverse effects could be observed on nucleus size that increased significantly upon treatment in all cell lines. No difference in the basal level of $\gamma$H2AX foci were detectable comparing wild type and DFS-70 KO cells. In contrast, two out of five DFS-70 KO clones exhibited an increased foci number in comparison to the wild type control after 16 hours of etoposide treatment. This finding might indicate that DFS-70 KO sublines are more sensitive to topoisomerase inhibition than HEP-2 wild type cells.

Conclusion The automated multiparameter imaging platform AKLIDES allows an individual and differential detection of $\gamma$H2AX foci formation and nuclei size in human laryngeal carcinoma cells, HEP-2 and sublines. Therefore, this system can be useful to identify cancer progression e.g. analysing peripheral blood mononuclear cells of patients with malignant lymphoma. Moreover, additional biomarkers defining cancer progression can be integrated into the analysis.

**PO-094 A NOVEL PROGNOSTIC SIGNIFICANCE OF COMBINATION OF PREOPERATIVE SYSTEMIC IMMUNE-INFLAMMATION INDEX AND MONOCYTE-LYMPHOCYTE RATIO IN UPPER TRACT UROTHELIAL CARCINOMA**

HC Jar*, WH Yang, CH Ou. National Cheng-Kung University hospital, Urology, Tainan, Taiwan

Introduction Upper tract urothelial carcinoma (UTUC) is a rare malignancy in urinary system. In order to improve preoperative treatment choice and management of postoperative surveillance, identification of prognostic factors is necessarily required. To our knowledge, the elevation of systemic inflammatory markers may imply the development of an inflammation-associated microenvironment in tumours. The aim of this study is to identify a novel prognosticator, systemic immune-inflammation index (SII, neutrophil x platelet/lymphocyte) and monocyte-lymphocyte ratio (MLR), in patients with UTUC undergoing radical nephroureterectomy (RNU).

Material and methods The records of 424 patients who underwent RNU at National Cheng-Kung University Hospital,