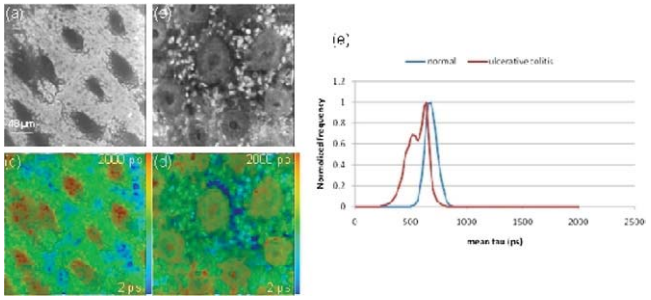
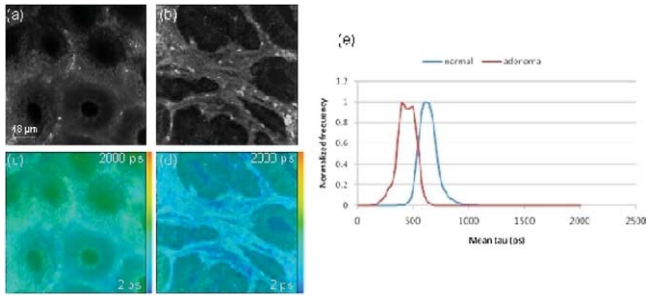
adenomatous polyps, colon cancer, inflammatory bowel disease (IBD) and Barrett's esophagus (BE). The confocal FLIM data was analyzed using ROC curve analysis and the Wilcoxon signed rank test. Results: Our preliminary FLIM data reveals that the fluorescence lifetime of dysplastic or neoplastic samples may be either shorter or longer than that of normal tissue. Increased lifetime values have been observed in colon cancer and BE and the fluorescence lifetime difference ($\Delta\tau$) was -126 ps and -5 ps respectively. Adenomas and IBD have shown a decrease in lifetime and the $\Delta\tau$ was 99 ps and 112 ps respectively. FLS of adenomas revealed $\Delta\tau$ values of -422 ps (UV) and -162 ps (blue). We have attributed this contrast primarily to contributions from flavins, collagen and elastin, which are supported by histopathology. Conclusion: Our data demonstrates that FLIM is able to contrast between normal and diseased tissue. The ability to generate this contrast may allow potential clinical applications for FLIM including the in vivo detection and characterization of dysplasia and early GI cancers. Ethics approval for the first in vivo use of our clinically-deployable systems has just been granted and we are preparing the first pilot study using FLS in patients undergoing GI endoscopy.



Matched intensity (a, b) and FLIM (c, d) images of fresh colon biopsy samples of normal mucosa (a, c) and ulcerative colitis (b, d). (e) Lifetime distribution histograms calculated from the FLIM data.



Matched intensity (a, b) and FLIM (c, d) images of fresh colon biopsy samples of normal mucosa (a, b) and adenoma (b, d). (e) Lifetime distribution histograms calculated from the FLIM data.

Sa1610

Clinical Impact of Background Coloration (BC) Between IPCLs in Differentiating Esophageal Squamous Cell Carcinoma. What Makes the Color Change?

Hitomi Minami*[1], Hajime Isomoto[1], Naoyuki Yamaguchi[1], Kayoko Matsushima[1], Yuko Akazawa[1], Ken Ohnita[1], Fuminao Takeshima[1], Toshiyuki Nakayama[2], Kazuhiko Nakao[1]
[1]Department of Gastroenterology and Hepatology, Nagasaki University Hospital, Nagasaki, Japan; [2]Department of Pathology, Nagasaki University Hospital, Nagasaki, Japan

Background: It has been reported that alteration of intra-papillary capillary loop (IPCL) is important in detecting early esophageal squamous cell carcinoma (SCC). Also, brownish color change in the epithelia between each IPCL that we call "background coloration (BC)" has recently reported as an additional finding to differentiate SCC from non-neoplastic lesion. However, the cause of this phenomenon has not been identified. We applied anti-human Hemoglobin(Hb) antibody immuno-staining for both SCC and non-neoplastic lesions in order to illuminate the reason why cancer lesion can be positive for NBI, which is a specific wave length of Hb. Patients and Methods: From September 2007 and September 2010, 159 patients with 173 lesions were recorded. Of all the cases, 127 patients with 145 lesions which underwent endoscopic observation in comparison with pathological findings were enrolled in this study. Using magnifying endoscopy with NBI, IPCL findings including irregular dilation and caliber change, and also whether BC was seen or not were evaluated. And then, we applied Anti-human Hb antibody immuno-staining to both 26 lesions that were positive for BC and 11 that were negative in order to illuminate the relation between BC and component of Hb in the cancer area. The anti-Hb immunostaining intensity were classified into the following category. (++); intense similar to intravascular red blood cells; (-); identical to surrounding non-neoplastic epithelium. ,(+); staining intensity in between (-) and (++). Results: Diagnostic accuracy of IPCL pattern classification was acceptable with type III and V. However, the accuracy of type IV was about 50%, which is insufficient to differentiate the lesions requiring treatment. Diagnostic ability of IPCL type IV has improved from 50% to 71.4% when it is combined with BC as an additional finding. Furthermore, all the lesions that were classified as BC positive were revealed to be positive for anti-Hb immunostaining. And 8 lesions out of 11 lesions that were negative for BC categorized into (-) and (+) group and only 3 lesions were categorized into (++) group ($p<0.0005$). 97% (24/26) of BC positive group were revealed to be (++). On the contrary, only 27% (3/11) was classified as (++) among BC negative group ($p<0.0001$). Conclusion: Background coloration is a useful additional finding to discriminate neoplastic lesion in the pharyngo-esophageal region. Component of extravascular Hb can be considered as one of the causes that make the color change. Still there is large room for further investigation to clarify this finding.

Sa1611

Computer-Assisted Diagnosis of Confocal Laser Endomicroscopy (CLE) by a Novel Image Analysis and Semantic Annotation Method

Ruben Tous[2], Rafael Ballester-Ripoll[2], Jaime Delgado[2], Ralf Kiesslich[1], Martin Goetz*[1]
[1]I. Med. Clinic, University of Mainz, Mainz, Germany; [2]Distributed Multimedia Applications Group (DMAG), Universitat Politecnica de Catalunya (UPC-BARCELONA TECH), Barcelona, Spain

Introduction: CLE has revolutionized GI endoscopy by providing microscopic visualization on a cellular basis in vivo. However, most gastroenterologists are not trained to interpret mucosal pathology, and histopathologists are usually not available in the endoscopy suite. Aim of the current approach was to build a set of computer-aided diagnosis tools that assist endoscopists in the interpretation of optical biopsies obtained through CLE. These tools include real-time functionalities for supporting diagnosis in vivo and for cataloguing and searching CLE databases.Material and Methods: The system applies a combination of image analysis and pattern recognition techniques which results in a novel algorithm for automatic feature extraction in CLE images, showing promising results on inferring semantic metadata from low-level features. The image analysis algorithm allows identifying the different crypts and also featuring their contours with high accuracy. This information is computed to characterize the geometry of the crypts and to overprint visual markers aiming to facilitate diagnosis (Fig 1). The extracted low-level visual features are then combined to obtain a feature vector which represents the particularities of the geometry of one CLE image. This vector is analyzed to translate the low-level details into high-level semantic information about the images, notably a suggested diagnosis. Besides supporting the diagnosis of a single image during an ongoing session, the described method also allows annotating a complete database of CLE images with semantic information, thus providing a search engine with advanced functionalities such as semantic retrieval or query by image. Results: In a first step, the system's database was standardized using image sets based on the Mainz confocal classification for colonic optical biopsies. This step was used to provide an optical biopsy search engine based on extracting simplified features of crypt and mucosal patterns. The second step aims at providing an interrogation platform to provide on-site assistance during CLE, mainly by automated detection of crypt geometry. First evaluation of this ongoing (Nov 2011) phase shows that automated differentiation between normal and abnormal mucosa and between different pathologies is possible with high accuracy. Discussion: On-site image analysis and semantic interpretation are able to provide a standardized diagnosis of CLE images in real time. This has the potential to facilitate, standardize and shorten endoscopists' training for CLE. In addition, we provide a powerful tool to explore databases of images for retrospective analyses. This system's geometry is not limited to CLE, but can be extended to multiple imaging modalities.

Sa1612

Safety and Preliminary Results of the Pose (Primary Obesity Surgery Endolumenal) in the Treatment of Obesity

Jorge C. Espinos, Román Turró*, Alfredo Mata, Mariel Da Costa, Marta Cruz, Jesús Turró
Unidad de Endoscopia, Centro Médico Teknon, Barcelona, Spain

The POSE procedure (Primary Obesity Surgery, Endolumenal) creates gastric transmural plications in the fundus and in the distal gastric body to trigger earlier