centres of the conventional glass slide Morphology scheme to submit a named individual as a CPD registrant for the DM scheme. In April 2006 the number of registrants was increased from 221 to 412 individuals from 14 countries (85% are UK based). For each exercise two Web-based morphology cases were released (four releases per year, fourteen cases to date). Each case consisted of multiple digital images from smears previously released as glass slide morphology assessment surveys. Revised coded comment report sheets and reflective feedback forms were placed on the Web (www.ukneqas-haem.org.uk) One CPD point was awarded per completed case. *Results.* On average 51% of registrants completed the exercises (range 43%-69%). The majority of participants (72%) spent <30 minutes reviewing each case but additional time on background reading. The cases included Haemoglobinopathies, Disseminated Intravascular Coagulation and both chronic and acute leukaemias. Of those who gave additional feedback >70% stated the exercises had improved their awareness of the haematological conditions whereas <20% said their knowledge had not changed (variation in improvement depended upon clinical diagnosis). General comments from 28% were used to develop the scheme format; optical magnifications now appear with the images and presentation of clinical data has been streamlined. With reference to education aspects participant feedback was positive, many commented that their overall knowledge of a condition improved, as cases were presented with relevant additional data (cell markers, cytogenetics, immunochemistry) and expert opinion highlighting the significance of specific morphological features e.g. appearance of granulation or nuclear structure. Participants stressed the usefulness of images for teaching and education purposes, particularly for rare haematological cases seen less frequently in some smaller laboratories and for bone marrows. *Development.* Additionally the collaboration has blended (or stitched) sequential high power (x60 objective) quality images to create larger composite images (virtual slides) which were viewed using appropriate software. This allows the user to move across images creating the feel of a microscope whilst maintaining high resolution. Stitched images ensure all users see exactly the same cells and enable the scheme to present rare cases that have insufficient material for the conventional glass slide survey. *Summary.* Future development by UK NECAS (H) and the collaboration, include the introduction of electronic reporting for participants and improved access to viewing software allowing larger composite images. The Digital Morphology scheme is currently aimed at educating individuals. With the key theme of personal professional development to promote improvement to the quality of haematological morphology the scheme has the potential for further expansion across the UK and internationally. Further information can also be found at www.manlab.co.uk

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NEUTROPHIL ACTIVATION MARKERS IN CHRONIC RENAL FAILURE PATIENTS UNDER HAEMODIALYSIS AND RECOMBINANT HUMAN ERYTHROPOIETIN

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The interaction of blood with nonbiological materials of the extracorporeal circuit during hemodialysis, leads to the activation of several non-cellular and cellular systems, including polymorphonuclear leukocytes (PMN). PMN activation leads to degranulation and release of proteases and of oxygen free radicals, and may be associated with resistance to recombinant human erythropoietin (rhEPO) therapy. The aim of this work was to evaluate the neutrophil activation state in chronic renal failure (CRF) patients under haemodialysis, and its linkage with resistance to rhEPO therapy, by measuring circulating levels of elastase and lactoferrin. These two substances are contained in primary and secondary neutrophil granules, respectively, and are frequently used as indirect markers of neutrophil activation *in vivo*. We studied 50 CRF patients (32 males, 18 females; mean age 64.5±15.4), 25 responders and 25 non-responders to rhEPO therapy. CRF patients were dialysed three times per week for 3 to 5 h, for a median period of time of 36 months. All patients used the high-flux polysulfone FX-class dialysers of Fresenius, 25 with FX60, 23 with FX80 and 2 with Fx100 dialyser type. Twenty-five individuals were included in a control group, age and gender-matched with CRF patients. Total leukocyte count was measured using an automatic counter (Sysmex K1000, Hamburg, Germany) and leukocyte differential counts were evaluated in Wright-stained blood films. Plasma levels of elastase and lactoferrin were evaluated by enzyme immunoassays (human PMN Elastase ELISA, Bender MedSystems; Lactoferrin ELISA Kit, Calbiochem, respectively). Compared with controls, CRF patients presented with significantly higher neutrophil counts and elastase levels ($p<0.05$). No significant differences were observed for lactoferrin and for total leukocyte count. Elastase per neutrophil and lactoferrin per neutrophil presented similar values for controls and CRF patients. No statistically significant differences were found between responders and non responders to rhEPO therapy concerning total and differential leukocyte counts, as well as elastase and lactoferrin plasma levels. The higher neutrophil counts and elastase plasma levels in CRF patients seem to reflect the undergoing inflammatory process. The rise in those values may result from the mobilization of the marginal pool of neutrophils or of an increased neutrophil production to face the chronic inflammatory process associated with the disease and/or with the regular haemodialysis process. Actually, no differences were observed between responders and non-responders to rhEPO therapy.

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NON-INVASIVE COLOR VISUALIZATION OF BLOOD CELLS

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Background. Our understanding of biological organization of a live matter and its cellular process we can mainly get from microscopy. But visualization of a biological structures is based on interaction of electrons and photons with sample what leads to destruction of a sample. In some cases to get color contrast image of separate elements of biological sample need to use a variety of dyes and fluorescent substances but it leads to artificial staining of sample, destructive modification and loss very important structural information its native structure. For instance to get color image of morphological structure of blood smears are usually using staining of living blood smears by dyes. But this method leads to disruption of sample caused by the specimen preparation and viewing conditions.[1] Other ways of generating color image contrast is based on visualization of phase gradients within unstaining specimens, as realized by phase contrast[2] and differential interference contrast.[3] Usually in medical practice conventional bright-field microscopy let us see black and white image of separate morphological elements of blood smears only (Figure 1).

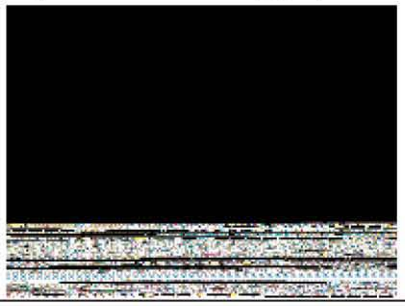

Figure 1. Red blood cells in native color under optical microscopy.

Aims. In present paper we would like to offer the new nondestructive method of optical microscopy capable of examining the structures of living cells in their natural colors without staining them, using a specially designed substrate for deposition of biological sample and observing native structure in reflected light. *Methods.* Offered approach based on physical phenomena of white light interference reflected from sample surface and special supporter on which this sample is deposited. As distinct from phase contrast[2] or differential interference contrast[3] microscopy there we have interference picture not for passed through sample and transparence object-plate two light rays but for two reflected light rays on the sample surface and substrate respectively. It allows to occur at the image plane converting previously invisible gradients of refractive index within the specimen in to intensity gradients in the image. Color interference contrast image is achieved due to special condition of experiment is connected with chose of angle of incidental light,