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# 1. A Mental Health Needs Assessment of Children Attending the Manchester Federation of Schools for Emotional, Behavioural and Social Difficulties

**Charlotte Boobyer**

**Objective:** To enhance the understanding of the mental health needs of children and adolescents in the Federation of schools for educational, behavioural and social difficulties and to ascertain whether their needs are being adequately met.

**Method:** Three questionnaires were used; the standardised Strengths and Difficulties Questionnaire, and Conner's Questionnaire and the Additional Information Questionnaires, designed by the researchers. Pupils were allocated an anonymous identification number before the questionnaire packs were distributed to parents, pupils and teachers, allowing them to be combined upon completion. A total of 134 subjects across the four Federation schools were recruited on this study.

**Results:** Information was returned regarding 76 subjects. Parent only information was returned regarding 12 subjects, pupil only for 6 subjects and teacher only for 23 subjects. Teacher and pupil information combined was returned regarding 29 subjects, parent and teacher combined for 3 subjects and parent, teacher and pupil combined information for 3 subjects. Findings suggest that most pupils are at a medium or high risk of a psychiatric diagnosis particularly behavioural or hyperactivity disorders. There is a strong similarity between the amount of professional help required by parents and teachers, both suggest that more is required in the form of teachers, behaviour support and child and adolescent psychiatrists, although the results suggest that the pupils disagree with this. About half of the pupils are misusing at least one substance.

**Conclusion:** There was a low response rate for this research, particularly amongst parents. However, these results could be representative on a national level.

# 2. What happens to elderly patients following discharge from a Geriatric Day Hospital?

**Anne Parfitt-Rogers**

**Introduction:** This study aims to determine what happens to patients in the 6 months following discharge from a geriatric day hospital, and investigate factors which may predict a higher risk of hospital readmission in 6 months.

**Methods:** Retrospective audit of 95 patients discharged from the Older People's Rehabilitation and Assessment unit. Patient notes were retrieved from medical records, with hospital admissions and mortality data collected from the NHS Trak computer system and NHS Lothian Health Intelligence Department. 17 factors were investigated as possible predictors.

**Results:** At 6 months, 8.4% of patients had died. Of those still alive, 32.1% had been admitted to hospital. Female gender, increasing age, hypoalbuminaemia, low Barthel Index score, high deprivation quintile, informal support, formal support, depression and hospital admissions in the past 12 months were associated with increased hospital admission risk.

**Discussion:** Although the small sample size and broad confidence intervals make conclusions difficult to draw, further investigation is warranted into the 3 factors with the greatest effect (hypoalbuminaemia, informal support and formal support). These may be useful markers for predicting admission risk. It would be worth repeating this as a prospective study with a larger sample, using multivariate analysis to separate confounding factors.

# 3. Impact of Severe Maternal Obesity and Specialist Antenatal Care on Pregnancy Complications

**Lydia Samy, Fiona Denison**

**Background:** The risks of obesity in pregnancy are well-researched, but the effects of severe obesity and the impact of specialist antenatal care have been less thoroughly investigated.

**Objective:** To compare rates of major antenatal complications and pre-existing morbidities in women of BMI>40kg/m2 attending a metabolic clinic with non-attenders and with normal-weight controls, and to compare rates of minor complications in severely obese clinic attenders to the controls.

**Setting:** Tommy's Metabolic Antenatal Clinic, Simpson Centre for Reproductive Health, Edinburgh Royal Infirmary.

**Population:** 194 obese attenders, 150 obese non-attenders and 67 normal-weight controls.

**Methods:** Retrospective analysis of patient electronic TRAK records for major complications, co-morbidities and demographics, self-report questionnaires for minor complications.

**Results:** Compared to normal-weight controls, obese attenders had a significantly higher prevalence of depressive disorders (25.4% versus 7.5%), incidence of the major complications pregnancy-induced hypertension (0% versus 11.4%) and gestational diabetes (3.8% versus 13.7%), and the minor complications symphysis-pubis dysfunction (25.7% versus 15.4%) and sciatica (19.7% versus 9.2%), with trends towards increased chest infections (15.1% versus 6.1%) and headaches (75% versus 61.5%). Pre-eclampsia rates were similar for all groups. All rates were adjusted for age, ethnicity and DEPCAT. Blood pressures of obese attenders at all gestations were significantly higher than normal-weight controls, but lower than obese non-attenders.

**Conclusions:** Severe obesity in pregnancy increases risk of certain minor and major antenatal complications, and is associated with depressive disorders in women. Unavailability of large sphygmomanometer cuffs in the community setting may lead to overestimation of blood pressures in obese pregnant women.

# 4. The Effect of Cross Over to Biosimilar Growth Hormone, on Insulin Like Growth Factor 1 Concentrations in Patients with Adult Growth Hormone Deficiency on Recombinant Human Growth Hormone Replacement Therapy

**Rathy Ramanathan, Sobia Akhtar, Karen Perkins, Frank Joseph**

**Introduction:** Biosimilars are a novel cost effective generation of biopharmaceuticals. The fundamental differences of synthetic biosimilars are their large size, their use of biotechnology derived proteins as the active substances and that they are not identical to their initial product. The effectiveness and potential adverse effects of biosimilars are unknown and more research is needed. We looked at the effect of transferring patients with adult growth hormone deficiency (AGHD) from recombinant human growth hormone (GH) preparations to a biosimilar GH preparation.

**Methods:** An audit was conducted of 12 patients on GH replacement therapy for severe AGHD from the Countess of Chester Hospital, UK. All patients had been transferred over dose for dose from recombinant human GH preparation to the biosimilar GH preparation, Omnitrope® over an 18 month period. Electronic records and patient case-notes were used to obtain results.

**Results:** 12 patients (7 women) with an average age of 50±9.4 years(SD) were transferred over to Omnitrope®. Prior to transferring GH, all patients were previously on genotropin minicquick. 7 patients had surgery for either a pituitary macroadenoma or craniopharyngioma; the remaining primary pathologies included: pituitary macroadenoma, transethmoidal encephalocoele, histiocytosis and pituitary irradiation. The average daily Omnitrope® dose was 0.44mg, administered in a 3.3mg/ml liquid solution for injection formulation. The average Insulin like growth factor 1(IGF1) before commencing Omnitrope® was 23.5±6.3 nmol/L(SD) and after Omnitrope® treatment was 24.2 nmol/L±4.2(SD).

**Conclutions:** We found that dose for dose, the biosimilar GH, Omnitrope® maintained IGF-1concentrations at a level similar to that achieved by recombinant human GH.

# 5. Pioglitazone acts on L-type calcium channels causing vasodilatation in porcine coronary arteries.

**Laura Aiken**

**Introduction:** Pioglitazone, a thiazolidinedione is a hypoglycemic agent used to lower blood glucose in type II diabetics. Pioglitazone activates PPAR$\gamma$, a nuclear hormone receptor involved in DNA transcription regulation, enabling recovery of insulin sensitivity, particularly in adipose tissue. Moreover, thiazolidinediones cause vasodilatation which is desirable in diabetics due to their increased risk of atherosclerosis. This investigation looks into the mechanism of pioglitazone-mediated vasodilatation in porcine coronary arteries.

**Methods:** Coronary artery segments were contracted using U46619 and subsequently exposed to pioglitazone. Vasodilatation was measured as a percentage of the U46619-induced contraction. To determine the mechanism behind the pioglitazone-mediated vasodilatation, pathways suspected of being involved were blocked to establish whether this inhibited relaxation. We inhibited PPAR$\boldsymbol{\gamma}$, potassium channels, NO synthase, AMP kinase, L-type calcium channels, Rho kinase, removed endothelium and removed extracellular calcium.

**Results:** Inhibition of PPAR$\boldsymbol{\gamma}$, potassium channels, NO synthase, AMP kinase, Rho kinase and removal of endothelium failed to significantly inhibit the vasodilatation, indicating that relaxation was independent of these pathways. A two-way ANOVA showed that depletion of extracellular calcium significantly inhibited vasodilatation by 36% when compared to a control ($p<0.001$). Moreover, exposure to 0.1$\mu$M nifedipine, an L-type calcium channel blocker significantly inhibited vasodilatation by 34% ($p<0.0001$).

**Discussion:** Pioglitazone causes vasodilatation by blocking the influx of extracellular calcium through L-type calcium channels. 34% of vasodilatation was inhibited indicating that pioglitazone must also act through other pathways. In addition to reducing the risk of atherosclerosis, "off-target" calcium channel blockade makes pioglitazone beneficial to hypertensive diabetic patients since it lowers blood pressure.

# 6. Reproductive Health and Contraceptive Use in Rural Kenya: A Community-Based Study of Beliefs and Behavior

**Shannon N Wood, Lisa Baker, Habil Ogolla, Nelly Ogunde, Eva Doyle, Troy Abell**

Kenya is a densely populated country of 41 million people. The total fertility rate is 4.9, which is double that of Asia (WHO). Unintended pregnancies account for at least 30% of all births in Sub-Saharan Africa (Carr 2004). Unplanned pregnancies create hazardous health and psychosocial ramifications for children, mothers, and society. Reducing unintended pregnancies would directly improve gender equity, poverty reduction, and economic growth (Guttmacher Institute 2009). This study examined unplanned pregnancies in rural western Kenya. One hundred and fifty-five women in eight villages on the Nyakach Plateau were interviewed about their knowledge, behavior, and attitudes concerning reproductive health and contraception. The results showed that only 8% of the sample had accurate knowledge of reproductive health, and although knowledge was associated with use of contraception, neither of these factors was associated with fewer unplanned pregnancies. The most striking finding was that >60% of women in every age group and marital status admitted to having been forced to have sex. These findings highlight the complexity of implementing change in sexual and reproductive behavior among men and women in traditional communities with few health and social service resources. Follow-up to these findings has been the creation of a reproductive health curriculum, the training of key village leaders, and the instituting of bi-monthly women's and men's educational groups. Further research is being done to document the context and consequences of rape in this society and to explore interventions which are culturally meaningful and likely to succeed.

# 7. Audit of practice of oesophageal endoscopy: How accurate is our diagnosis and should oesophagitis be biopsied?

**Lauren S Coupe, P Kaye, J Mannath**

Gastroesophageal reflux disease can lead to Barrett's oesophagus (BO). These patients are at higher risk of developing high grade dysplasia (HGD) and oesophageal adenocarcinoma (OAC). In some cases, BO and OAC are diagnosed by biopsying oesophagitis (OS). The Royal College of Pathologists (RCPath) guidelines advise against biopsying OS.

Patients were identified from electronic histopathology and Barrett's databases. Clinical data was collected from NotIS and WebHISS covering the period 2003-2009.

Among 42 patients diagnosed with HGD or T1 OAC, 4 (9.5%) were diagnosed due to biopsying OS and 15 (35.7%) by biopsying BO. The remainder being diagnosed based on normal biopsies or biopsies of suspected lesions. A total of 140 patients had a new diagnosis of BO. 6/140 (4.2%) were diagnosed based on biopsies for OS with no endoscopic features of BO.

Among 58 patients with OAC who did not receive a previous endoscopy, 36 (62%) had stage≥3 OAC, while 8/58 (14%) had stage 1 OAC. Of 20 patients who had previous endoscopies within 5 years, 11/20 (55%) had stage≥3 OAC and 8 (40%) had stage 1. All but one Barrett's surveillance patient had a stage 1 OAC. Out of 245 endoscopies performed in November 2009, 12/26 patients with OS had biopsies taken.

Biopsying of OS within the NUH trust is not in agreement with current RCPath guidelines. However, a significant proportion of patients with OAC and BO were diagnosed based on this practice. The cost-effectiveness of routine biopsies needs to be weighed against clinical judgement.

# 8. The relationship between disorganized thought in psychotic disorders and abnormal brain structure, assessed using magnetic resonance imaging

**James D Pumphrey**

**Introduction:** Disorganised thought is a cardinal feature of schizophrenia, but has continually proven problematic to assess and this has precluded past attempts to find an anatomical basis for the phenomenon. Recently, alteration in insular structure has been a recurring finding in schizophrenia and, on the basis of this; we tested whether insular surface area is correlated with severity of formal thought disorder in schizophrenia.

**Methods:** 28 patients in the stable-phase of schizophrenia were recruited, and using an adaptation of the Thought and Language Index, we assessed their free-flowing speech as they described three pictorial stimuli. The sensitivity and reliability of this method was analysed. Participants also underwent an MRI scan, processed using Freesurfer, allowing us to calculate the surface area of cortical structures.

**Results:** Inter-rater reliability for total TLI score was shown to be excellent (ICC r=0.828). There was significant first-order negative relationship (r=-0.393, p = 0.039) between right insular area and severity of thought disorder. Covariate analysis indicated this was accounted for by whole brain cortical surface area variations. There was positive correlation between disorganisation and left-sided hemispherical insular asymmetry (r=0.431, p=0.022).

**Discussion:** Our results provide validation of the TLI as a suitable measure of disorganised thought. Increased disorganisation severity was associated with absolute reduction in right insular area (as opposed to relative reduction), perhaps due to a failure to loss of integration of language components which take account of the needs of the listener. This is consistent with a recently proposed insular dysfunction model of schizophrenia.

# 9. Levodopa-induced dyskinesias in Parkinson's disease: pathophysiology and potential pharmacological treatment

**Maria Ghaus**

**Introduction:** Levodopa is the most effective treatment option for controlling motor symptoms of Parkinson's Disease. However, a major limitation of chronic levodopa therapy is development of involuntary hyperkinetic movements termed levodopa-induced dyskinesia (LID). Pathophysiology of LID is incompletely understood. The aims of this dissertation were to review the literature in order to determine the pathophysiological mechanisms which contribute to LID and consider potential future therapies stemming from increasing understanding pathophysiology of LID.

**Methods:** The databases ISI Web of Knowledge and Pubmed were searched using the terms 'pathophysiology', 'pathology', and 'treatment' of 'levodopa-induced dyskinesia'. Preference was given to literature from 2005 onwards.

**Results:** Several factors may contribute to development and maintenance of LID. A key factor is pulsatile stimulation of postsynaptic dopamine receptors, causing altered sensitivity of postsynaptic dopamine receptors, alterations in downstream genes and proteins, and maladaptive changes in striatal plasticity. The main neurotransmitters implicated are dopamine and glutamate. Other neurotransmitter systems within the basal ganglia, including serotonergic, adenosinergic, adrenergic, opioid and cannabinoid systems, are also thought to be involved in LID. Potential pharmacological therapies include continuous release levodopa therapies, glutamate antagonists, and drugs which target various other neurotransmitter systems involved in LID.

**Discussion:** Unfortunately, many therapies which have been successful in reducing LID in animal models have failed to show similar success in larger clinical trials. Limitations of animal models, incomplete understanding of the pathophysiology of LID, and oversimplified basal ganglia models may all contribute to this discrepancy in results.

# 10. Investigation into HIV-1 GAG modification strategies and the correlation with immunogenicity

**Rajan Nimalanathan, Linda Klavinskis, Ernest Pablo, Catherine Cocican, Katherine Hervouet**

For the development of an efficacious HIV-1 vaccine, the breadth and potency of the responding CD8+ T-cells may prove to be critical in-order to confer protection from the enormous diversity of viral isolates in the population, and to limit viral escape from dominant epitope-specific T-lymphocytes. HIV-1 Gag has proven to be the archetypal immunogen to include in vaccine design due to its association with low viral load and its highly conserved nature.

Here we have investigated the impact of HIV-1 CN54 Gag modification strategies in a vaccine setting using the in vivo mouse model system.

CD8+ T-cell responses to the native Gag protein expressed in a rAd5 vector were first evaluated and a highly focused immunodominant 10mer CD8+ T-cell epitope identified (GL10). In order to overcome the phenomenon of immunodominance we employed two strategies: i) removal of the myristylation site to compare the potency of a strictly cytoplasmic immunogen with one that traffics to the cell membrane for release, ii) direct targeting of HIV-1 CN54 Gag by in-frame fusion of Ubiquitin (Ub).

We demonstrated that mice immunised with the HIV-1 CN54 Gag lacking the myristylation site (GagMysΔ), generated enhanced immune responses to a range of peptide pools spanning the length of HIV-1 CN54 Gag. Contrastingly, direct targeting of CN54 Gag to the proteasome by in-frame Ubiquitin (Ub) fusion modifications markedly impaired the immune response.

This may have important implications for the further refinement of HIV-1 Gag immunogen design in HIV-1 vaccine candidates.

# 11. Oxygen saturation distribution in extremely preterm infants targeted to the saturation range 90-95%.

**Leila Platt, B Stenson**

**Introduction:** Optimal oxygen saturation (SpO2) for very preterm infants is unclear. Hyperoxia increases retinopathy of prematurity and hypoxia increases mortality. Preliminary findings of the BOOST II trial show higher survival in babies born <28 weeks randomised to SpO2 of 91-95% compared with 85-89%. This new Edinburgh study compares SpO2 distribution of infants born <28 weeks targeted to 90-95% with distributions associated with survival advantage in the BOOST II UK trial.

**Patients and Methods:** All infants born <28 weeks between 1st January and 31st July 2011 were studied. Values for SpO2 and heart rate (derived from ECG and oximeter) were recorded electronically every second. The percentage of readings between 70-100% SpO2 was calculated for each infant. Cumulative percentages for all infants were plotted for comparison with the BOOST II UK data.

**Results:** 18 infants (mean gestational age and birth weights of 25.6 weeks and 834 grams) were studied. >18million SpO2 data points were analysed, showing 53.10% readings of 90-95% SpO2 compared with 45.04% for BOOST II higher survival group.

**Discussion:** Using SpO2 alarm limits of 90-95%, infants replicated the SpO2 distribution associated with survival advantage in the BOOST II UK trial. The study needs extending to 36 weeks to ensure results remain comparable.

# 12. Investigating the direct and indirect effects of VEGF-188 on pericyte differentiation

**Tejas H Ingle, Sheila Harris, Gill Tozer, Chryso Kanthou**

**Introduction:** Pericytes provide stability to developing vasculature and are linked with resistance to vascular disrupting treatments in targeting tumours. Our group has found that mouse fibrosarcoma cells expressing only a single isoform of VEGF-A i.e. matrix-bound VEGF-188, are associated with pericyte-rich blood vessels, when grown in vivo. Here, we hypothesise that VEGF-188/9 impacts on pericyte differentiation directly, or indirectly via endothelial cell stimulation.

**Method:** Using the mesenchymal cell line C3H/10T1/2 (10T1/2) to model pericyte precursors, cells were co-cultured with mouse fibrosarcoma cell lines expressing VEGF-188 or VEGF-164 isoforms, or alternatively with human umbilical endothelial vein cells (HUVECs). Pericyte markers of differentiation including PDGFR-β, NG2 and α-SMA were investigated in the 10T1/2 cell line using western blotting and immunocytochemistry, with transforming growth factor- β1 (TGF-β1) used as a positive control for pericyte differentiation.

**Results:** TGF-β treated cells displayed an upregulation of PDGFR-β and NG2 proteins through western blotting. Additionally, a clear increase in the expression of NG2 in TGF-β treated 10T1/2 cells was found through immunofluorescence staining. Furthermore, immunofluorescent staining of cells detected clear changes in distribution of α-SMA after TGF-β treatment. VEGFR-2 expression was also found to be markedly upregulated by TGF-β.

**Discussion:** Upregulation of VEGFR-2 in this cell line is a novel find and thus can potentially be used as an additional positive marker of pericyte differentiation in future investigations. However, no similar changes in marker expression were detected in 10T1/2 cells co-cultured with fibrosarcomas or HUVECs, suggesting that VEGF-188 does not directly stimulate pericyte differentiation.

# 13. Cardio-Pulmonary Exercise Testing Predicts Post-Operative Outcome for Hepatic Patients

**Rohan Pinto, Declan Dunne, Stephen Fenwick**

**Background:** Cardio-pulmonary exercise testing (CPET) has been shown to be an effective pre-operative assessment tool to measure patients' fitness for surgery. The aim of our study was to investigate how well CPET was able to predict post-operative and intensive treatment unit (ITU) length of stay (LOS), mortality and post-operative morbidity in patients undergoing hepatic resection.

**Methods:** Consecutive patients undergoing CPET prior to hepatic resection starting from the 1st November 2009 were identified. Information including CPET scores, demographic data, mortality and post-operative and ITU LOS were recorded. Patients were divided into two groups depending on whether their lactic threshold (LT) was higher or lower than 11mM. This enabled identification of a "fit" and an "unfit" group.

**Results:** In this study there were 51 participants of which 34 were fit (group 1) and 17 were unfit (group 2). Mean post-operative LOS was 9.3 and 13.4 days in group 1 and group 2 respectively. ITU LOS was reduced in group 1 by approximately 1 day. 5.9% mortality was found in group 2 compared to 0% in group 1. On the fifth post-operative day, 7 patients from group 1 experienced a post-operative complication compared to 9 patients in group 2.

**Conclusion:** CPET was successful in predicting post-operative LOS, ITU LOS and post-operative morbidity and mortality. These results need to be confirmed using a larger study with a larger sample size.

# 14. Use of Online Formative Assessments

**Lorna E Berry**

**Introduction:** Research into assessment has the potential to inform the creation of future assessments, but as yet the research surrounding formative assessment and its use in medical education is sparse and conflicting.

This study aimed to explore the use of online formative assessment in medical education, and more specifically to determine the effect of these assessments on summative exam marks, the effect of question type variation between formative and summative exams, and medical students' opinions about formative assessment.

**Methods:** Access log data for formative assessments from a cohort of medical students was analysed alongside summative exam marks. Individual modules were studied and compared, as well as entire years of study, against average summative mark. A survey assessed the qualitative response of students to formative assessments.

**Results:** A significant positive correlation was found between online formative assessment use and summative exam mark in two of four modules studied, and one year of study. T-tests established a significant difference between formative assessment access time between first and second years of study, but no difference in average summative exam marks. Students considered formative assessment an important study resource, though not enjoyable to complete.

**Discussion:** Students believed strongly that formative assessments improve their learning experience and summative exam mark, and that question styles should be standardised between formative and summative assessments. No significant correlation was established overall between time spent on formative assessment and summative exam mark; no association was found between similarity of question type and influence of formative assessment on summative mark.

# 15. Harnessing undergraduate skills can lead to service improvement and achieve academic goals

**Gurprit Singh Mudhar, Greg Dyson, Robert McGowan, Mohammed Ali, Max Troxler**

**Introduction:** The NHS continues to progress towards consultant-led care. This improves patient outcome but limits time that can be dedicated to other important areas such as student education and service development. The aim of this project was to produce an electronic resource for patients and students, achieving university-set academic goals, without onerous clinician input.

**Methods:** Four third year medical students volunteered for a 5 week module entitled "Create a web site for the Leeds Vascular Institute". The students designed the appearance and structure of the site (Dreamweaver CS5 and Photoshop CS5). The content was written by the students and edited by the supervising consultant surgeon (2 hours/week). The Flesch Reading Ease Score (FRES) was utilized to optimize content clarity / accessibility (target >60%). The University of Michigan Consumer Health Website Checklist (MST) was used to assess site structure and functionality (target >80%). Academic success was assessed by web site quality, review article and reflective diary.

**Results:** Within the 5 week project a serviceable website was produced and available on line. The FRES was measured at 64.2%, equivalent of reading level of 12-14 years. The MST was scored at 76%. All students successfully completed a reflective diary, a review article and presented their achievements.

**Discussion:** Within just 5 weeks, a functional website suitable for both patient and student use was designed and populated with appropriate content. Consultants are aspiration rich and time poor. Harnessing the creative skills of enthusiastic medical students can result in service improvements and still meet academic goals.

# 16. Expression of mammalian target of rapamycin (mTOR) pathway components in myometrium, placenta and fetal membranes from women before and during labour

**Hannah B Walton, Nanette Hibbert, Eleanor Golightly, Simon C Riley**

**Introduction:** The mTOR Ser/Thr protein kinase pathway responds environmental signals including growth factors, cytokines, nutrients and cellular metabolic balance, in order to mediate cellular functions including growth, proliferation and survival. mTOR can act as the catalytic core of two complexes, TORC1 and 2, with differing functions. Expression of mTOR has been reported to be down regulated in the placenta in association with IUGR. However, regulation of mTOR and its associated proteins Raptor, Rictor and Deptor, at the placenta-fetal membrane/uterine interface during the initiation of labour in women is unknown.

**Materials and methods:** Samples of myometrium, placenta, amnion and chorion-decidua were collected, with appropriate consents, from women at term caesarean section either before or during labour (n=11/group). The relative expression of mTOR, raptor, rictor and deptor were determined by qRT-PCR. Immunohistochemistry was used to identify the cellular sites of mTOR protein expression.

**Results:** Expression of mTOR significantly increased ($p=0.049$) in myometrium of women in active labour compared to before labour. There were no changes in raptor, rictor or deptor expression in any of the tissues. However, the relative expression of raptor was higher than rictor, suggesting that TORC1 may play a more important role than TORC2. The expression of mTOR protein was localised by immunohistochemistry in syncytiotrophoblast in placenta, in decidua, endothelial cells and neutrophils.

**Discussion:** This study suggests that the increase in myometrial mTOR expression may play a role in the regulation of labour, likely by an TORC1-mediated mechanism. Whether mTOR mediates myometrial cell hypertrophy and/or nutrient exchange in the placenta is being examined further.

# 17. An audit of peripheral intravenous cannulation technique in the Emergency Department: recommendations for clinical practice

**Fiona Frame, S George, J Hong, DR Maggs, L Osborne, SA Simpson, A Seager, JA Akajioyi, L Dyall, SR Knight, AJ Hanson, EL Maile, TJ Coats**

**Introduction:** Peripheral intravenous cannulation is one of the most common procedures performed in the Emergency Department (ED), facilitating investigation and treatment by providing direct access for blood sampling, drug and fluid administration or transfusion(1).

The aim of this audit was to raise awareness of peripheral intravenous cannulation technique in the ED of Leicester Royal Infirmary, whilst examining current clinical practice and highlighting areas for improvement.

**Methods:** UHL guidelines were utilised to formulate audit criteria and standards(2). A proforma was developed for use in the observation of 100 adult patients requiring peripheral intravenous cannulation in the majors area of the ED.

All data were coded and entered into a spreadsheet for analysis. An initial recommendation for change was made and a further 100 patients were observed in the re-audit.

**Results:** The first audit cycle highlighted deficits in the overall performance of the procedure including: inadequate drying time after skin cleaning (43%); re-palpation of the insertion site (41%); failure to cannulate on the first attempt (16%).

The use of the infra-red vein illuminator AccuVein AV300(3) was chosen as a novel approach to improve these deficits and was subsequently evaluated in the second audit cycle. There was a significant reduction in the rate of re-palpation (down from 41% to 24%). All other criteria remained similar.

**Discussion:** This audit has raised awareness of peripheral intravenous cannulation technique in the ED and highlighted areas for improvement. Further recommendations for change include a tailored educational approach, integrated with the clinically appropriate use of the AccuVein AV300.

# 18. 3D reconstruction and 2D morphometry demonstrate distal oesophageal vascular anatomy

**Amy S Izon, D Treanor, N Roberts, L Ward, H Grabsch**

**Introduction:** The longitudinal palisade vessels (LPV) are distal oesophageal veins which cross from gastric submucosa to oesophageal mucosa at the gastro-oesophageal junction (GOJ). In Japan, the distal end of the LPV is used to identify the GOJ on endoscopy; their distribution may also be important in relation to distal oesophageal disease. We aimed to create 3D images and perform morphometric examination of distal oesophageal vasculature.

**Materials and methods:** Paraffin blocks originating from the distal oesophagus, cut into serial sections, underwent immunohistochemistry using CD31 vascular endothelial marker. Slides were scanned and annotated, generating 3D images. The morphometry of five whole sections and 21 lamina muscularis mucosae (MM) sections, divided into quadrants, was investigated.

**Results:** The 3D images demonstrate the LPV distribution. The number of vessels ($p < 0.001$), vessel perimeter ($p = 0.004$) and vessel area ($p < 0.001$) were significantly different between quadrants and between upper, middle and lower distal oesophagus (all $p < 0.001$). Whilst the number of vessels was highest in the posterior right quadrant, the mean vessel perimeter and area were lowest in this quadrant. All parameters were highest in the lower distal oesophagus.

**Discussion:** This is the first study to investigate distal oesophageal vasculature by 3D reconstruction and morphometry. The 3D images have provided evidence of the LPV, confirming the vascular arrangement seen endoscopically. Vessel morphometry demonstrated variation in regional microanatomy, providing a unique insight into vessel characteristics. This study also poses new questions about distal oesophageal vasculature in relation to disease, which warrant further investigation.

# 19. Comparison of Four HSPC1 Inhibitors in Colorectal Cancer Cells

**Sheah Lin Lee, Nina C Dempsey-Hibbert, John HH Williams**

**Introduction:** Colorectal cancer is the third most common cancer in the UK accounting for approximately one million new cases of cancer worldwide. Heat Shock Proteins (HSPs) are a family of ubiquitous proteins that function as molecular chaperones. HSPC1, one of the most studied HSPs, is elevated in colorectal cancer cells compared to corresponding normal cells, and chaperones key proteins such as HER-2 that are involved in cancer cell proliferation and survival. HSPC1 is therefore an attractive therapeutic target in the development of anti-cancer therapies.

**Materials and Methods:** HT29 colorectal cancer cells were treated with the HSPC1 inhibitors 17-AAG, 17-DMAG, AUY922 and HSP990 for 48 hours. Apoptosis and necrosis were detected using caspase-3 and propidium iodide assays. HER-2 was analysed following treatment. HT29 cells were treated with a combination of 5-Fluorouracil (5-FU) and HSPC1 inhibitor to determine if inhibition of HSPC1 can sensitize cells to chemotherapeutic treatment. Data were analysed using the un-paired t-test.

**Results:** Apoptosis and necrosis was induced by all four HSPC1 inhibitors. 17-AAG and 17-DMAG were significantly more effective than AUY922 and HSP990. 17-AAG and 17-DMAG, and to a lesser extent HSP990 down-regulated HER-2, while AUY922 did not affect HER-2 expression. HSPC1 inhibition sensitized the cells to 5-FU.

**Discussion:** HSPC1 inhibitors are effective at inducing colorectal cancer cell death via apoptosis and necrosis. 17-AAG and 17-DMAG are more effective than AUY922 and HSP990 at induction of cell death and degradation of HER-2. Furthermore, HSPC1 inhibitors can sensitise colorectal cancer cells to treatment with 5-FU.

# 20. Pre-examination Anxiety: Exploring Students' Experiences and Support within an Undergraduate Programme

**Richard Dixon**

**Introduction:** Excessive anxiety can paralyse rational thought and therefore have a detrimental effect on performance in examinations (Jarvis 2006). The GMC states in Tomorrow's Doctors (2009) that students must be adequately supported and the QABME report from 2009 of Dundee University medical school reported that suitable guidance is in place for student support. However, there is still a lack of literature on how support should be delivered (Sayer et al 2002) and more specifically on pre-examination anxiety.

This study will explore students' experiences of pre-examination anxieties, how they manage their anxiety and the support available.

**Methods:** This is a qualitative study using an exploratory case study. Semi-structured interviews were carried out to record the experiences and views of medical students in years 1-5.

**Results:** Findings suggest that the main factor causing stress and anxiety in students around examinations is an unclear understanding of what is expected of them. The symptoms of stress and anxiety are usually experienced beforehand and students tend to rely on informal support – usually talking to peers - to manage this rather than utilise University Support. The reasons for this have been described and the most recommended way to alleviate students' anxieties beforehand is to give them practise with examinations.

**Discussion:** The principle recommendations based on these findings would be to have past papers available before summative examinations, to publicise current Student Support more clearly when students begin their Undergraduate studies and explore current options for introducing a formal peer-led support programme.

# 21. Cortisol levels in the body following stroke: a systematic review

**Paul Gray, Gillian Mead**

**Background:** Although cortisol is necessary to respond to physiological stress, chronic elevation of cortisol may have negative effects on the body's ability to recover. This systematic review aims to determine the level of cortisol in the body following stroke and any associations this might have with stroke severity or outcome.

**Methods:** An electronic search of MEDLINE and EMBASE was performed using a pre-determined search strategy in order to identify all observational studies that reported cortisol levels after stroke.

**Results:** 37 studies were included, of which 24 were cross-sectional cohort studies and 13 were longitudinal cohort studies. They all measured cortisol levels in the first year following stroke. Several studies reported hypercortisolaemia and in addition to this, a number of studies found higher levels of cortisol correlated significantly with stroke severity as well as stroke outcome.

**Conclusion:** The results suggest that cortisol levels can be affected after suffering a stroke and this may have an effect on the disease severity and outcome. The mechanism for this is not completely understood, but research suggests it is related to the physiological stress response. Further research must be conducted to validate the results of the included studies.

# 22. Optimising the Chain of Survival: Improving Cardiopulmonary Resuscitation by Edinburgh's Ambulance Crews

**Gavin Baillie, Gareth Clegg**

**Background:** Effective cardiopulmonary resuscitation (CPR) is an important step in the 'chain of survival' for the management of cardiac arrest and is known to be an independent predictor of survival. Despite this knowledge, it has been shown that CPR quality is poor in the pre-hospital environment. This study aims to assess if CPR quality improves when additional crew members are at the scene of a cardiac arrest or if paramedic with additional training in cardiac arrest management is in attendance.

**Methods:** All Edinburgh city ambulance crews were issued with and instructed in the use of Q-CPR pucks to collect objective measures of CPR quality. Data from 48 resuscitation attempts in patients aged over 18 were submited for analysis.

**Results:** Off chest time was found to be significantly better in cardiac arrests where 3 or 4 crew members attended compared to those with 2 crew members on scene (37% v 18% v 14%, p=<0.05). There was a higher proportion of compressions of adequate depth when a paramedic with additional training was on scene compared with standard crews (66% v 58%, p=<0.001).

**Discussion:** Pre-hospital CPR is significantly better both when additional crew members are on scene and when a paramedic with additional training is on scene. This provides justification for enhanced paramedic training and a change in the policy of dispatching crews to cardiac arrests.

# 23. Correlation of diagnostic findings between Coronary Computed Tomographic Angiography and Conventional Angiography in Coronary Arterial Diseases – A Single Centre Study.

**Simiao Liu**

**Introduction:** Computed tomography angiography (CTA) is an increasingly popular technology in assessing coronary arterial diseases. In addition to providing non-invasive imaging of lumen stenosis and obstruction, CTA is capable of yielding further information on the characteristics and composition of atherosclerotic plaques in comparison with the current gold standard, conventional angiography. The current study aims to retrospectively compare CTA with conventional angiography for diagnosing coronary stenoses and obstructions.

**Methods:** Fifty patients who had both conventional and CT angiography performed between 2007 and 2011 at a district general hospital were retrospectively studied. Radiological reports of CTA and reports of conventional angiography were compared. In specific, descriptions of four coronary arteries: Left main stem, Left anterior descending, Left circumflex and Right coronary artery were compared.

**Results:** There is an 100% correlation for any completely occluded vessel. Correlation of severity in stenoses are 94% (LMS) 90% (LAD) 94% (LCX) and 92% (RCA) respectively. There arethree cases where conventional angiography had suggested heavier stenoses than indicated by CTA. In all other cases where discrepancy occurred, CTA had suggested more severe calcification and stenoses. There is also an 100% correlation for graft patency where applicable.

**Discussion:** Findings of CTA significantly correlate with that of conventional angiography in the assessment of coronary artery diseases. Furthermore, CTA provides additional value in cases of complex cardiac / coronary anatomy and in cases where cannulation is difficult. CTA also offers quantitative information on calcium scoring that is valuable in risk stratification in patients with coronary heart diseases.