osteoogenic lineage and the effects of a selective Rho-kinase inhibitor, Y-27632, on cell viability and pluripotency.

**Methods:** Following 2-dimensional culture on a feeder layer, hESCs were treated with Y-27632. Live/dead assays and stage-specific embryonic antigen-1 expression were used to assess viability and pluripotency, respectively. The hESCs were encapsulated and transferred to a 3-dimensional perfusion bioreactor with osteogenic growth media to stimulate differentiation. On day 21, the cells were analysed for differentiation using Alizarin red S-staining and osteonectin immunocytochemistry.

**Results:** Y-27632 maintained hESC survival and pluripotency. Following 3-dimensional culture, Y-27632-treated hESCs showed increased osteogenic differentiation.

**Conclusion:** The use of Y-27632 may represent a novel method of enhancing bone yield whilst maintaining hESC survival and pluripotency in-vitro.

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**THE ASSOCIATION OF CANCER STEM CELLS AND CHEMO-RESISTANCE IN BREAST, COLON AND PROSTATE CANCER CELLS**

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**Background:** The Cancer Stem Cell (CSC) theory suggests that tumours consist of a small proportion of highly tumourigenic cells termed CSCs, involved in the proliferation, metastasis and chemoresistance. CSCs express cell surface markers i.e. CD44 and CD24 in breast cancer, CD133 in colon cancer and CD44 in prostate cancer. Purpose: To demonstrate that CSC markers are over-expressed in human cancer cell lines, associated with chemoresistance and metastasis.

**Materials & Methods:** A tetrazolium based colorimetric cell viability assay was performed to access the chemoresistance of MCF-7 breast and C170HM2 colon CSCs, while resistant cells were subjected to immunofluorescence for the expression of CSC markers. Breast (MCF-7 and MDA-MB-231), colon (C170HM2 and APSLV) and prostate (PC3M) xenograft mouse models were subjected to immunohistochemical staining for the expression of CSC markers.

**Results:** Chemo-resistant MCF-7 adriamycin and paclitaxel breast cancer cell lines expressed high levels of CD44 in vivo and in vitro. CD133 expression was elevated in colon cancer lung metastasis site (AP5LV) but not the primary tumour site. CD133 and CD44 expression was elevated in the poorly vascularised subcutaneous sites suggesting they may be up-regulated in response to stress.

**Conclusion:** CD44 was found to be a robust marker for chemoresistance in breast cancer.

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**COGNITIVE DISTRACTION WORSENS ENDOVASCULAR PERFORMANCE: EFFECTS RELATED TO EXPERIENCE**

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**Background:** Endovascular interventionalists often perform complex procedures under unsuitable environmental conditions including noise, time constraints and interruptions. The effect of these distractions on performance may be negated by technical automation.

**Aims:** To evaluate the effect of adverse environmental conditions on endovascular performance in recruits with varying levels of experience.

**Methods:** All participants performed an identical renal artery angioplasty procedure on a virtual reality simulator under distracted (pre-recorded interruptions) and undistracted conditions. Three groups were recruited; highly experienced (>500 interventional procedures) interventional radiologists (n = 11), pre-trained proficient residents (n = 12) and medical students (n = 10). Performance was assessed by simulator recorded metrics and by post-hoc video ratings of the fluoroscopy screen and hand movements using procedure specific (min– max score) and global rating scales (min–max score).

**Results:** Distraction significantly affected the performance of pre-trained novices in terms of total procedure time (574 vs 534 sec, p = 0.04), procedure specific (19 versus 23, p = 0.014) and global rating scoring (25 vs 27, p = 0.29). Procedure specific performance of experts deteriorated in the presence of distraction (19 vs 22, p = 0.029).

**Conclusions:** Cognitive distraction negatively influences endovascular performance most notably in subjects with less clinical experience. Experienced interventionalists appear to block out distraction maintaining dexterity but qualitative performance is impeded.

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**IMPROVING QUALITY OF COLON CANCER SURGERY THROUGH SURGICAL EDUCATION**

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The importance of the plane of rectal cancer surgery is well established, however, evidence for a similar effect in colon cancer is limited. We have previously reported better outcomes with mesocolic plane surgery and shown that complete mesocolic excision with central vascular ligation (CME & CVL) produces an oncologically superior specimen. We received specimen photographs and pathology data from 280 primary colon cancer resections; 99 from surgeons trained in CME & CVL and 181 from surgeons prior to training. The plane of dissection was assessed and tissue morphometry performed. CME & CVL surgeons more frequently operated in the mesocolic plane (74% vs. 37%, p < 0.0001) and removed more lymph nodes per specimen (median 27 vs. 19, p < 0.0001). They also removed a greater length of bowel (median 316 vs. 266mm, p < 0.0001), and more mesentery between the tumour and vascular tie (median 104 vs. 89mm, p = 0.033). We have shown that CME & CVL surgeons are more likely to operate in the mesocolic plane, remove more tissue both centrally and longitudinally, and achieve a greater lymph node yield. This provides further evidence for the oncological superiority of CME & CVL and shows that surgical education can directly influence the quality of the specimen produced.

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**A STUDY ON PATIENT ELIGIBILITY FOR, AND ECONOMIC IMPACT OF BARIATRIC SURGERY**

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Bariatric surgery produces significant weight reduction in addition to proven healthcare cost savings. This study aims to assess the suitability of patients referred for bariatric surgery and the subsequent economic impact of receiving surgery. A retrospective analysis was performed of NHS