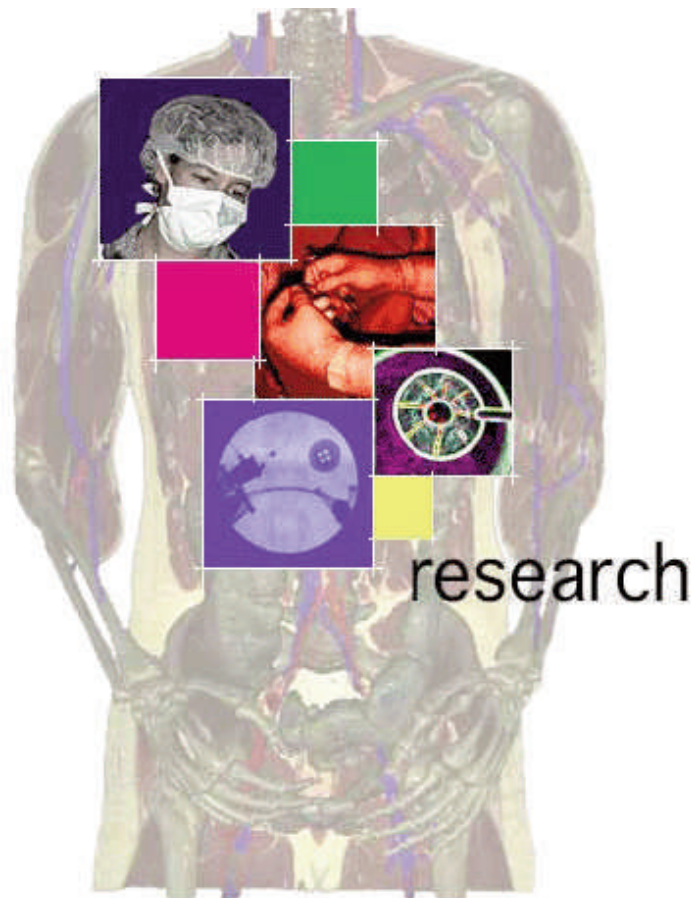


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Investigation of positional and orientational contributions to visual shape integration in amblyopic patients

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Background information: Our ability to discriminate the shape of objects is very well developed and something we take for granted, yet little is known about the nature of the underlying neural mechanisms responsible. For instance, in amblyopia, a disorder characterized by an impaired processing in the visual areas of the brain in an otherwise normal eye, patients have difficulties judging the shape of highly visible objects, and traditional treatment consists of patching the fellow eye to let the amblyopic eye develop. Moreover, it is known that in order to process the shape of an object, the information relating both to the position and the orientation of the object is used. Furthering scientific understanding on the basis for the shape processing disorder in amblyopia may lead to a more comprehensive approach to therapy as well as refining our current knowledge on normal vision. **Purpose of the study:** By measuring the discrimination of contour shape in amblyopic patients, our aim is to find the relative contributions of positional versus orientational coding of visual information to the amblyopic deficit for shape discrimination. **Methods:** Amblyopic patients and controls are tested on their ability to discriminate between a circle and a slightly deformed one, using images that allow us to distinguish between orientational and positional information in the stimulus. Data is collected using a psychophysics threshold derived from a two-alternatives forced choice type experiment. **Results:** It was found that amblyopic subjects as well as normal subjects are better at tasks using pure orientational information than positional information. Moreover, when deriving the circular contour frequency from the stimuli parameters (CCF: number of radial modulations per unit of visual angle), amblyopes as well as controls do better at the task as CCF increases (as the stimulus distance rises). **Conclusion:** It was concluded that both orientation and position pooling mechanisms are affected in amblyopes. While position and orientation seem to be varying similarly as CCF increases within the range tested, preliminary evidence show some discrepancy at higher CCFs. Further investigations at even higher circular contour frequency will probably lead to additional results and conclusions regarding shape integration in amblyopic vision.

Keywords: shape integration, amblyopia, circular contour frequency

Nrf2 and Cul3 are potential biomarkers for the evaluation of chemoresistant breast cancer

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Background information: Cancer cells can induce the expression of detoxifying enzymes, which can nullify the activity of chemotherapeutic agents and prevent successful treatment. Recently, the transcription factor Nuclear Factor Erythroid-Like 2 (Nrf2) was implicated in a potential chemoresistance pathway in breast cancer. Nrf2 can induce the expression of phase II detoxifying enzymes which can lead to chemoresistance to doxorubicin and paclitaxel. Nrf2 expression is negatively regulated by the E3 ubiquitin ligase Cullin 3 (Cul3) by targeting it for proteasomal degradation. It has been shown that silencing of Cul3 using small interfering RNA leads to increased Nrf2 activity and dramatic chemoresistance. In a pilot study, breast cancer biopsies (8/10) showed high levels of Cul3 and low levels of Nrf2 and phase II detoxifying enzymes, but expression was not correlated with the chemoresistance status of the patients. **Purpose of the study:** We hypothesize that a higher ratio of Nrf2 versus Cul3 expression is a useful biomarker to determine the chemoresistant status of breast cancer. **Methods:** A tissue micro-array (TMA) set used was composed of 1622 core biopsies of breast tissue samples from 219 patients for prognosis and an additional 40 patients with follow-up biopsies. For the TMA, small 0.6mm and 1.0mm wide cylindrical core biopsies were punched from paraffin-embedded fixed tissue blocks. The cylindrical cores were then arranged in a new paraffin block in a precise array. Serial sections from the TMA set were stained using avidin-biotin based immunohistochemistry (IHC) techniques using human specific antibodies for Nrf2 and Cul3. **Results:** Positive staining was mostly seen in epithelial cells and epitheloid cancer cells. Nrf2 demonstrated mostly granular cytoplasmic staining while Cul3 demonstrated both cytoplasmic and nuclear staining. Quantification of staining intensity and percent staining of the epithelial cells was performed for the entire TMA set. In readable cores with epithelial cells, Nrf2 showed variable expression (44% no staining, 13% low intensity, 22% moderate intensity and 21% high intensity) while most cores showed high Cul3 staining intensity (2% no staining, 13% low intensity, 41%

moderate intensity and 45% high intensity). Variability, suggests patient differences, possibly due to the chemoresistance status of the patients. This cannot be determined yet as the IHC data at present still needs to be evaluated with respect to basic clinical-pathologic data such as tumor type, grade, therapy, relapse and disease-specific survival. At the same time, staining of Nrf2 versus Cul3 is being correlated with the different clinical parameters by a biostatistician.

Conclusions: Once statistically significant relationships are determined, more definite conclusions can be drawn with respect to Nrf2 and Cul3 expression profiles and their use as markers for chemoresistance.

Keywords: breast cancer, chemoresistance, Nuclear Factor Erythroid-Like 2, E3 ubiquitin ligase Cullin 3, tissue microarray

Dealing with unscheduled patients in an outpatient clinic: a simulation modeling approach

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Background information: As the oncology outpatient clinic at Montreal General Hospital is looking for ways to improve efficiency and reduce patients' waiting times, the following question has been raised: at a given daily arrival rate of unscheduled patients, what is the best way to serve this clientele as to minimize their impact on the daily clinic's operations and the waiting times for all scheduled patients. **Purpose of the study:** In this study, a simulation modeling approach is used to answer the question previously raised. **Methods:** The data was collected through interviews and direct observation of the clinic. Additional information, such as the number of visits per day, type of procedures performed, and the number of physicians working was obtained from MedVisit database of the clinic. Process mapping was done to understand the patients' flow through the system. Simul8 V9 software package was used to build a simulation model to depict the oncology clinic at work. Modifications were then introduced to the basic model and the performance of these modified scenarios was compared to the performance of the original unmodified scenario. The sensitivity of performance was examined under four realistic environmental factors: no show, variance of consultation time, walk-in arrival rates and scheduled patients' arrival patterns. **Results:** While the patients' average waiting time was the measure of interest, the model also allowed evaluating other parameters including average and maximum queueing sizes, idle and working times of resources. While there was no single scenario that did well on all performance measures, the results showed that when it comes to reducing average waiting time for patients, adding an extra chair or reserving one chair for walk-in patients promised to give the best results. **Conclusion:** Time constraint, quality of data, and limited programming power represented three major constraints of the study. Despite these limitations, the model seems to predict fairly well the relative values of performance measures.

Keywords: operations management, simulation, oncology clinic

The role for th17 cells in the progression of the cutaneous t cell lymphoma (ctcl) and in maintenance of the normal skin homeostasis

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Cutaneous T cell lymphomas (CTCL) are the most common lymphomas afflicting the skin. Currently the etiology of the disease is not known, however a number of recent reports indicate a possible involvement of the novel T helper (TH) 17 cell subtype in the disease progression. To acquire better understanding of the TH17 biology in CTCL and in normal skin homeostasis, Fluorescence Activated Cell Sorting (FACS) analyses were carried out on T cells isolated from the normal and the CTCL-lesioned skin for the presence of the four TH subtypes (i.e., TH1, TH2, TH17 and T reg). Similar analysis was carried out on Peripheral Blood Mononuclear Cells (PBMC) from the normal and CTCL patient blood. Furthermore, CTCL lesions were further analyzed by the Real Time PCR (RT-PCR) to detect the expression of the TH17 signaling cascade proteins. Our results indicate that the TH17 cells are present in normal and CTCL skin. These cells can be expanded by treating the skin explant cultures with IL-15 alone or in combination

with IL-21, IL-23 and IL-2. Interestingly, in normal skin all of the combination treatments expanded TH17 and the novel merged TH1/TH17 T cells, while in CTCL skin we observed only the expansion of TH17 cells with IL15/IL-21 treatment and the TH1/TH17 cells with IL-15/IL-23 treatment. Furthermore we document that the subset of CTCL patients, but not normal individuals, exhibit the presence of the TH17 cells in their PBMC population. RT-PCR data confirms the FACS results and documents that a large subset of the CTCL patients expresses the critical components of the TH17 signaling cascade and thus are able to elaborate a TH17 immune response. Current work refocuses our attention on the presence of the TH17 and TH1/TH17 pathogenic cells in PBMC samples and skin of the CTCL afflicted individuals and opens the avenue for further studies of the IL-17 signaling in this disease.

Acknowledgements: This work was supported by the NIH R01AI041707 grant to Dr. Kupper and the Summer Research Bursary from the Leukemia and Lymphoma Society of Canada to Dr. Litvinov

Keywords: Cutaneous T Cell Lymphoma (CTCL), IL-15, IL-21, IL-23, TH-17

The role of the subventricular zone in neurogenesis in Parkinson's Disease

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Background information: Parkinson's disease is a neurodegenerative disease of unknown etiology characterized by a progressive degeneration of dopaminergic neurons in the pars compacta of the substantia nigra. Patients are typically diagnosed with symptoms of motor dysfunction, rigidity, mood disturbances, etc – most of which appear after more than 70% of the striatal dopamine is already depleted. Current treatments are mainly neuroprotective for a limited number of years, consisting of a dopamine replacement strategy using levodopa. Since dopamine modulates ontogenetic neurogenesis and contributes to morphogenesis by governing the proliferation of neural stem cells, it is hypothesized that its depletion may affect neural precursors in the subventricular zone (SVZ) of the adult brain.

Purpose of the study: The goal of this study was to analyze neurogenesis in the subventricular zone and the effect of dopaminergic neuronal loss on proliferation in the subventricular zone. **Methods:** Three wild type mice and three aphakia mice, aged 7 weeks, received injections of bromo-2-deoxyuridine (BrdU) intraperitoneally at 3 hour intervals. Then, the animals were perfused transcardially with saline and heparin, and then buffered paraformaldehyde. Brains were removed and cut at 40 μ m-thickness on a freezing microtome in the coronal plane. Every 6th serial section was collected in phosphate-buffered solution and immunohistochemically stained with mouse anti-BrdU antibody; then exposed with biotinylated goat anti-mouse IgG and finally nickel DAB chromogen (in Tris buffer). Sections were rinsed and mounted on slides, air dried, Nissl stained, and coverslipped. Optical Fractionator, an unbiased stereology technique, was applied to estimate the total number of BrdU positive neurons in the SVZ through the Stereo Investigator software and a light microscope. **Results:** The average Nissl count for wild type mice was $110,097 \pm 6675$, slightly higher than the average aphakia cell count $105,314 \pm 11,850$ cells ($p > 0.05$). BrdU profiles in the adult subventricular zone of wild type and aphakia mice were $20,650 \pm 1323$ and 22400 ± 3491 , respectively. While the average BrdU profile was marginally higher in aphakias, statistical analysis did not show statistical significance ($p > 0.05$). This result was consistent within all delineated zones in aphakia and control mice. Further, the ratio of BrdU to Nissl cells was evaluated – 0.211 for aphakia and 0.187 for wild type; while the average proportion was higher in aphakia, the results were also insignificant ($p > 0.05$). With regards to total volume sampled, the wild type mice volume of 0.139 ± 0.00888 mm³, compared with 0.124 ± 0.0186 mm³ in aphakia animals, showed no statistical significance ($p > 0.05$). **Conclusion:** Analysis of the SVZ suggested that there is no significant difference in cell proliferation and neurogenesis between aphakia and wild-type control mice. To further validate the conclusions of this study, it may be necessary to increase the number of animals tested.

Keywords: Neurogenesis, Aphakia, BrdU, Parkinson's Disease, Subventricular Zone

Establishment of non-invasive direct pulmonary infection technique for murine study of cystic fibrosis nutritional therapy

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Background information: Cystic Fibrosis is a chronic inflammatory disease, characterized by progressive lung damage and failure, leading to premature death. CF patients are prone to bacterial infection; the exaggerated inflammatory response and the resulting oxidative stress cause the characteristic impairment in pulmonary function. Among the infective agents that cause damage in cystic fibrosis patients' lungs, *Pseudomonas aeruginosa* is one of the most common and most destructive. Animal models have been developed throughout the years with the goal of gaining a more complete understanding of *P. aeruginosa* infection and pathogenesis, and by extension, of cystic fibrosis as a whole. Recently, a novel method was developed in which bacteria-impregnated agar beads are administered orally into the trachea, through the vocal cords. This technique allows for the bilateral infection of the lungs without the need for surgical intervention, eliminating the potentially confounding inflammatory effects resulting from this injury and the healing thereafter. **Purpose of the study:** It was our intention to establish this less invasive model in our lab, for later use in a series of studies to determine the effects of a novel nutritional supplementation on the pathological course of chronic infection and inflammation in CF. **Methods:** Two time courses were studied, each with two groups of animals (infected and control). The mice were instilled with either bacteria-impregnated beads (5×10^5 CFU) or sterile beads, and then evaluated and weighed for 3 or 7 days. Bronchoalveolar lavage was performed at the end of the time course in order to recover inflammatory cells from the lungs. These cells were then counted to determine the total leukocyte number per mL as well as the proportions of specific cell types (macrophages, polymorphonuclear cells, lymphocytes). **Results:** Our results showed few significant differences between the groups in terms of weight change over time and total and differential leukocyte numbers. It was suspected that several of the animals were not successfully infected, and there was difficulty as well in recovering adequate numbers of leukocytes for analysis. These difficulties may be due in part to the technician's expertise with the model, but also to its inherent challenges. Possible solutions include the use of novel infection-monitoring techniques, such as PET or bioluminescence, in order to confirm and quantify infection, as well as the use of certain biomarkers to serve as proxy indicators of specific cell infiltration. **Conclusion:** The above additions warrant investigation as they could prove pivotal in the consistent success of this model, and consequently in its use in the development of effective therapies for Cystic Fibrosis patients.

Keywords: Cystic, Fibrosis, Murine, Infection, Nutrition

Optimum stimulus characteristics for speech perception interventions

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Similarities exist between adults learning a second language and children with speech sound disorders. Specifically, both groups have inaccurate phonological representations of the speech sounds they are attempting to learn, leading to incorrect production of these new sounds. Speech perception training has been shown to be effective in improving phonological representations in both adult second language learners and children with speech sound disorders. However, there have been no studies as of yet describing a systematic procedure for creating a speech perception training program. Such a systematic procedure is necessary in order to determine the stimulus characteristics, such as variability in voices and speaking rate that are optimally related to an effective speech perception training program. This study examined the role of multiple voices versus one voice with prototypical stimuli in training individuals to perceive a vowel contrast used in French, but not used in the native language of the participants. Participants were nine monolingual English speakers, aged 16 to 52 years. Participants first completed a pre-test to obtain a baseline of their ability to perceive the difference between two French vowels. They were then randomly assigned to a control condition or one of two training conditions involving a two-alternative forced-choice word identification task. Participants received immediate feedback during these training sessions. The training sessions were followed by a post-test identical to the pre-test, and results were compared to the baseline measure. It was hypothesized that those in the multiple voice condition would show greater effects of training than those in the single voice and control conditions. Preliminary results provided support for this hypothesis, as those in the multiple voice condition performed better on the perception task following training than those in the single voice and control conditions.

Although the results revealed a trend in favour of speech perception training with multiple talkers rather than with a single talker, further data must be collected to confirm this conclusion.

Keywords: speech perception training, speech sound disorders, second language, learning, adults

The role of the subventricular zone in Huntington's Disease

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Background Information: Huntington's Disease is a genetically inherited neurodegenerative condition characterized by a progressive loss of neurons in the striatum and the cerebral cortex. It is caused by a trinucleotide repeat expansion in the Huntington gene (Htt) which produces an altered form of the Huntington protein (mHtt) resulting in neuronal death. The most common presenting symptoms in adults are chorea (jerky, rapid, uncontrollable movement), memory deficits, and additional manifestations of motor dysfunction such as parkinsonism and dystonia. Striatal neuronal loss results in progressive worsening of the movement disorder, difficulty swallowing, mood disturbance and eventual death. Current treatments are mainly neuroprotective since there is no effective method of replacing lost neurons. **Purpose of the Study:** The goal of this study was to determine whether new neurons are produced in the subventricular zone, which under normal circumstances produces neurons for the olfactory bulb and to some extent for the striatum, in response to neuronal loss in the Huntington brain. **Methods:** Fourteen month old YAC128 and control animals were injected with BrdU 4 times over a 48 hour period and were perfused 12 hours after the final injection. Immunohistochemistry staining was done by incubating sections in mouse anti-BrdU antibody overnight at 4 °C and then leaving the sections in goat anti-mouse IgG antibody for 1 hour at room temperature. Sections were then mounted onto slides, air dried, Nissl stained with cresyl violet and coverslipped. The subventricular zones of the two groups of mice were analyzed using unbiased stereology to obtain an accurate estimation of the total number of proliferating cells. **Results:** The estimated total averages of Nissl cells, an indicator of total cell number since all cells are Nissl positive, were 53013 ± 2593 and 56671 ± 3661 for the wild type and YAC128 animals respectively. This was not statistically significant ($p=0.3829$). The estimated total average of proliferating cells, i.e., those cells stained with BrdU, in the wildtype and YAC128 animals was $17,100 \pm 2951$ and $14,745 \pm 1105$ respectively. Although cell proliferation appeared slightly decreased in the YAC128 animals analysis showed that this difference in BrdU labeled cells was not statistically significant ($p=0.4215$). Average total volumes in the two groups were $84641575 \pm 3008666 \text{ mm}^3$ and $91377825 \pm 6166240 \text{ mm}^3$ respectively, however this too was not statistically significant ($p=0.3002$). **Conclusion:** The results showed no significant difference in cell proliferation and brain volume between the two groups of mice. Further experimentation with younger animals and increased mice in each group may be necessary to obtain conclusive results.

Keywords: Huntington's Disease, Subventricular Zone, Neurogenesis, YAC128 Mouse

Significance of extreme high d-dimer levels in patients with clinically suspected venous thromboembolism

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Introduction: Positive d-dimer values are considered to be non-specific for the diagnosis of venous thromboembolism (VTE). However, the potential relevance of extreme high positive d-dimer values is unknown.

Purpose of study: The objective of our study was to investigate the significance of extreme high d-dimer levels ($>2500 \text{ ng/ml}$) among patients presenting to the emergency department (ED) with clinically suspected VTE.

Methods: We performed a retrospective chart review of patients who met all of the following inclusion criteria: 1) outpatient who presented to our hospital's ED from 2002-2007; 2) patient identified by an attending physician as having clinically suspected pulmonary embolism (PE) or deep vein thrombosis (DVT); 3) patient had a d-dimer blood test during the ED visit with result $>2500 \text{ ng/ml}$; 4) patient underwent imaging tests to objectively rule in or rule out PE and/or DVT. Data were collected on demographic information, history of VTE and thrombophilia, comorbid conditions and VTE risk factors (including recent surgery, trauma, cardiac disease, pregnancy/post-partum, use of oral contraceptives, smoking, cancer), results of imaging tests for VTE, final diagnosis and outcomes after the ED visit including hospitalization and death. **Results:** Of 164 patients identified to have d-dimer $>2500 \text{ ng/ml}$, 123 met all eligibility criteria and were included in the study. The mean age was 67 years and 51% were female. D-dimer

levels in the participants ranged from 2500 to 4000 ng/ml, with a mean of 3648 ng/ml. Older patients, male patients and those with active cancer tended to have higher d-dimer levels. Overall, 54% of patients were diagnosed with VTE. The prevalence of VTE increased as the d-dimer level increased, such that between 3500-4000 ng/ml, 58% percent of patients had VTE. In patients with DVTs, proximal clots (84%) were more frequent than distal clots (16%). Patients diagnosed with active cancer had a higher d-dimer level, and of those, 67% were diagnosed with VTE. Patients diagnosed with VTE had poorer outcomes than those without VTE. 61% of patients with VTE were hospitalized versus 42% of patients without VTE, and 27% of patients with VTE died compared to 19% without VTE. Among patients in whom VTE was ruled out, the three most common alternate diagnoses were pleural effusion, cancer, and congestive heart failure. **Conclusion:** More than 50% of patients with clinically suspected DVT and extreme high d-dimer levels have VTE, which is much higher than the 10-20% prevalence of VTE among unselected patients with clinically suspected VTE reported in the literature. Within our population, the prevalence of VTE increased with increasing d-dimer levels, even in patients with multiple co-morbidities. Further analysis will determine which patient characteristics are associated with greatest risk for VTE among patients with extreme high d-dimer levels. Our findings challenge the assertion that positive d-dimer levels are not useful in the diagnostic process for VTE.

Keywords: venous thromboembolism, pulmonary embolism, deep vein thrombosis, high d-dimer, diagnosis.

Attitudes of health care professionals towards integration of complementary and alternative medicine into professional education and clinical practice

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Background: Complementary and alternative medicine (CAM) is defined by the National Center for Complementary and Alternative Medicine (NCCAM) as “a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine.” According to the 2003 Canadian Community Health Survey, 20% of Canadians over the age of 12 used some type of CAM in the preceding year. However, health care professionals (HCPs) often do not have sufficient knowledge to discuss CAM use with their patients. Thus, formal education on CAM may be warranted. Further, up to 98% of nurses support the use of CAM, and up to 83% of physicians perceive CAM as useful. Integrating CAM into the hospital centers might therefore be desirable. **Purpose of the study:** This pilot study aimed to describe and compare attitudes of HCPs toward integrating CAM into their professional curricula, their institution, and their own clinical practice. **Methods:** Staff physicians, nurses and medical residents working at St. Mary’s Hospital Center in Montreal were surveyed (June to August, 2007) using an anonymous self-administered questionnaire. Five CAM categories were defined according to NCCAM definitions. These categories were: whole medical systems, mind-body interventions, manipulative methods, biologically-based medicine, and energy therapies. The following was assessed for each category of CAM: the desire to see CAM taught as four different modalities, the desire to see CAM available at the HCPs’ institution, and the desire to practice CAM oneself. Descriptive statistics were used to characterize the study sample; non-parametric tests were used to compare attitudes according to profession. **Results:** 126 HCPs completed the survey, including 39 (31%) staff physicians, 58 (46%) nurses and 29 (23%) residents. Interest to include CAM courses in the medical and nursing curricula was high. Interest levels for the 5 CAM categories ranged from 67% to 91% for staff physicians, 73% to 95% for nurses, and 71% to 90% for medical residents. 93% and 86% of HCPs wanted CAM taught as electives and continuing medical education, respectively; 52% wanted CAM taught as core courses and 37% as clinical rotations. More nurses (64%) and medical residents (50%) wanted to integrate CAM into their own clinical practices compared to staff physicians (16%) ($p < 0.0001$). Of the HCPs who wanted a clinical rotation in CAM, 70% reported a desire to practice CAM themselves, whereas of those who did not want a clinical rotation in CAM, only 39% reported a desire to practice CAM themselves ($p = 0.005$). More nurses (93%) than residents (79%) and staff physicians (68%) reported a desire to see CAM available at their institution ($p = 0.004$). **Conclusion:** A majority of HCPs reported interest for including CAM courses in the medical and nursing curricula, and seeing CAM available at their institution. Nurses and medical residents displayed more interest in performing CAM therapies as part of their clinical practice compared to staff physicians.

Keywords: Physician, nurse, attitude, complementary, alternative.

Shape processing in human vision: binocular properties of shape-frequency and shape-amplitude after-effects

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Background information: Recently, Dr. Kingdom's lab in the Department of Ophthalmology at the Royal-Victoria Hospital has started to use a new tool for studying contour shape coding in human vision, known as the 'shape-frequency and shape-amplitude after-effect'. The SFAE and SAAE refer respectively to the perceived shifts in the shape-frequency and shape-amplitude of a sinusoidal test contour following adaptation to a contour with a different frequency or amplitude. The shift is always in a direction away from that of the adapting stimulus and is believed to reflect underlying changes in the distribution of neural responses to curvature. By manipulating the properties of the adapting and test contours, and by measuring the affect on the size of the after-effect, we can learn more about how visual neurons code curvature. **Purpose of study:** To gain a better understanding of the human visual system and of eye disorders by looking at (1) whether the SFAE and SAAE are encoded by a monocular or binocular mechanism, (2) whether stereoscopic depth influences our perception of them and (3) what the effect a parallel surround texture has on a contour. **Methods:** The stimuli, a pair of sine waves placed at equal distance, above and below a central fixation marker, were created using a VSG2/5 video-graphics card, presented on a calibrated monitor and viewed through a stereoscope. Each session began with an initial adaptation period of 90s after which a repeated test of 0.5s duration was shown, interspersed with top-up adaptation periods of 2.5s. Subjects, keeping their eyes on the fixation marker, were asked to judge whether the upper or bottom contour had a higher frequency/amplitude, indicating their choice via a button press. The computer then adjusted the ratio of test shape-frequencies/amplitudes, in order to move towards the point of subjective equality (PSE) from which the size of the after-effects was calculated. **Results:** (1) The size of the after-effects measured in the interocular condition (adaptation and test stimuli presented to different eyes) was comparable to that obtained in the intraocular condition (stimuli presented to the same eye). (2) The magnitude of the SFAE and SAAE when the adapting and test stimuli were presented in different depth planes was similar to when the stimuli were in the same depth plane. (3) The size of both after-effects was significantly reduced when a surround texture was located in the same depth plane as the contour compared to when they were in different depth planes and when there was only a single adapting contour. **Conclusions:** (1) Simple shape encoding occurs via a binocular mechanism (2) stereoscopic depth does not affect our perception of simple shapes and (3) a parallel surround texture has an inhibitory effect on a contour when they are placed in the same depth plane

Keywords: Shape-frequency / Shape-amplitude after-effect; Adaptation; Binocular contour-shape processing; Stereoscopic depth; Parallel surround texture

The relative spatial and temporal contributions to biological motion processing

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Background information: A Point light walker is an ensemble of dynamic point lights where each "point light" represents the joint of an actor (Johansson 1973). **Purpose of the Study:** Biological motion perception refers to our ability to perceive and understand the movements of other people. The aim of this study was to measure the relative spatial (form) and temporal (motion) contributions to biological motion perception in both central and peripheral vision using point light walker stimuli. By testing the relative sensitivities to spatial and temporal distortions, the information sources most relied on by central and peripheral vision could be established. **Methods:** Following Thompson, Troje, Hansen and Hess (2007), two walkers were presented for two seconds consecutively. After stimulus presentation, the subject then chose the walker closest to the ideal form using one of two keys on the keyboard. A staircase function of three down one up was used to calculate the threshold value for the run. **Results:** In the spatial conditions designed to evaluate form information, it was found that central vision could detect much finer spatial distortions than the periphery at the lower pedestal distortion levels as evidenced by lower distortion thresholds. However as the pedestal distortion level increased, the discrimination thresholds for central and peripheral vision seemed to converge. In the temporal conditions designed to evaluate motion information, subjects found identifying a walker with intact form but distorted motion much easier than a walker with only motion. With the extra form information, in the subjects' central vision, the performance of form and motion walker was two-fold

easier than that of the pure motion walker. However, in the periphery, this two-fold increase was not seen. **Conclusion:** Both form and temporal manipulations affected fovea and peripheral performance on the biological motion task. Central vision was more sensitive than the periphery to the incremental distortion of spatial information whereas peripheral vision was just as sensitive as central vision to the incremental distortion of motion information. **Keywords:** Biological Motion, Spatial Distortions, Temporal Distortions, Peripheral Vision, Central Vision

Contour shape processing independence from motion direction

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The aim of the project is to determine if the mechanisms in the visual system that are involved in processing the shape of a contour (such as a line or edge) are selective for motion direction (e.g. selective for contours moving, for example, leftwards versus rightwards). The experiment employed the idea of after-effect, where human subjects “adapted” to two sinusoidal (wiggles) contours of different frequencies (number of wiggles) or amplitudes (height of wiggles), and then were presented two sinusoidal contours of same frequency or amplitude. Although physically identical, the two contours were perceived as different due to the prior adaptation. Through a series of steps, a computer calculated the magnitude of these after-effects. In order to test for motion selectivity, we compared the magnitude of the after-effects between the condition where the “adaptor” and “test” contours moved in the same or opposite direction. We tested global motion (the whole sinusoidal contour moved left or right), and local motion (the sinusoidal contour was divided into little segments through which alternating black and white bands drifted). Our results demonstrated that the magnitude of the after-effects were relatively similar if the adaptor and test moved in the same or opposite direction, both for global and local motion. A possible explanation is perceptual invariance, which implies that an object can be recognized even though it moves or is placed in different depths.

Assessment of venous thromboembolism treatment in hospitalized cancer patients

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Introduction: Venous thromboembolism (VTE) is a serious and potentially fatal condition in cancer patients. The American College of Chest Physicians (ACCP) have acknowledged this, and in their most recent published guidelines (2004), have recommended that patients with cancer and VTE be treated with subcutaneous low-molecular weight heparin instead of an oral vitamin K inhibitor, such as warfarin. Despite this advisement, it seems that the implementation of the guidelines may be inconsistent and inadequate, with many physicians continuing to treat VTE patients in the same manner, regardless of whether they have malignancies or not. **Purpose of study:** The main objective of this study is to assess physicians’ compliance with the ACCP guideline (2004) recommendations for the treatment of VTE in hospitalized cancer patients and to identify the obstacles that interfere with the successful implementation. **Methods:** A retrospective cohort study was conducted in which a medical chart review was performed on all hospitalized patients with cancer and an objectively diagnosed VTE so as to examine the prevention and treatment strategies for VTE. **Results:** In all, 57 patients were included in the cohort. For VTE prophylaxis, 57.9% of the patient did not receive prophylaxis, and of those who were prophylaxed, 50% of them received ACCP-recommended prophylaxis therapy. Prior history of VTE was associated with ACCP-recommended prophylaxis therapy. With regard to VTE therapy (initial and long-term), 28.1% of patients received ACCP-recommended therapy. None of patients with color-rectal cancer received ACCP-recommended therapy, but among cancer patients receiving hormonal chemotherapy, 40% received treatment that was ACCP-recommended. **Conclusion:** Physicians treating cancer patients with VTE are implementing ACCP guidelines but adherence is not complete. Evaluation of VTE risk factors (such as prior history of VTE) is appropriately being considered in VTE prophylaxis and treatment, but there are still many missed opportunities for appropriate treatment. Fear of bleeding complications as a result of anticoagulant treatment may be one obstacle that prevents successful guideline implementation.

Keywords: Venous thromboembolism (VTE), subcutaneous low-molecular weight heparin (LMWH), warfarin, cancer, VTE prophylaxis.

Lumbar pedicle screw insertion with preoperative ct based navigation: review of 135 consecutive cases

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Background information: Traditionally, pedicle screws in the lumbar spine were inserted using anatomical landmarks. For planning the screw trajectory, surgeons use 2-D images such as simple X-Rays, CT and MRI scans. To improve intraoperative screw accuracy, surgeons use intra-operative X-Rays, which have shown a rate of misplaced screws varying between 14% and 55%, measured on postoperative CT scans. Using preoperative CT-based navigation, the literature reports a rate of misplaced screws varying between 4% to 7%, measured by postoperative CT scans. None of those reports rated the screw length error or reviewed simultaneously the detailed clinical results.

Purpose of the study: In this study, we described both the short-term and long-term technical and clinical results of a large population having had a lumbar fusion. Our main goal was to determine the results of lumbar fusions planned with CT based navigation. **Methods:** This series included 44 men and 91 women (mean age 61 years, range 24-90 years). All screws were preoperatively planned for diameter, length and direction. Instrumentation included the lumbar spine only (49), S1 (80) or the thoracic spine (6) during a lumbar fusion surgery. The senior author inserted 840 screws and all of them were assessed with post-operative CT scans. Osseous union was assessed using dynamic plain films. Screw quality and listhesis was assessed on post-operative CT-scan sagittal reconstructions. Pain was surveyed using a self-rated scale /10, a visual analogue scale, and Oswestry and SF-36 questionnaires. **Results:** Misplacement of screws in the pedicle was found in 5.7% of screws, (2.3% laterality, 1.7% inferiorly, 1.1% superiorly, 0.7% medially). There were no major errors (>4.1mm); the three intermediate errors (0.4%) were all lateral (2.1 to 4mm). We found 45 minor errors (5.4%) (0.1 to 2mm). Postoperative segmental degenerations were found most frequently in fusions ending at L2 superiorly and with iliac screws inferiorly. Above level degenerations were found in 30 patients (26/135; 19%) 15 months postoperatively on average. Self-rated back and leg pain was improved by 48% and 72% respectively one year postoperatively, and the improvement in pain was stable over time.

Conclusion: CT based preoperative navigation was shown to be safe and relatively accurate in our series. Accurate screw placement was associated with a good clinical outcome but did not prevent above level degenerations. This is reported as a major drawback for long fusions.

Keywords: lumbar spine, navigation • pedicle, screw

What influences the perceived impact of email alerts? Analysis of responses from a national study

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Background information: Email alerts are one type of computer-mediated communication available to practicing physicians to assist with knowledge translation of results from clinical research. Research involving knowledge exchange needs a valid measure of the impact of email alerts, and an acceptable method of deploying such a measure to health professionals. In 2006, Drs. Grad and Pluye were funded by the Canadian Institutes of Health Research to conduct a naturalistic mixed-methods study to validate a new method of gauging the impact of email alerts. Preliminary analyses of more than 29,000 POEM ratings submitted by 1,364 doctors revealed that:

- 16% of all ratings are statements of “No Impact” on the doctor,
- 14% of all ratings are statements that “My Practice Will Be Improved”.

Purpose of study: To systematically examine the content of the InfoPOEMs in order to determine what elements are associated with a perceived positive impact on the physician’s knowledge and practice. **Method:** We defined ten PECODR elements (table 1), and I extracted relevant sentences, segments and words, as well as data on number of characters, setting and level of evidence out of each InfoPOEM into an Excel® spreadsheet. Using 65,535 ratings collected from 1,008 family practitioners, we classified 109 InfoPOEM that had been evaluated by at least one physician into two categories, the preferred InfoPOEMs, those having high positive ratings, and those having at least one negative and/or neutral assessment by at least 40% of the rating physicians. We first compared preferred InfoPOEMs versus unfavorable ones with logistic regression; we then focused on how content of an InfoPOEM could affect impact perceived by physicians. **Results:** Level of Evidence (LOE), Number of Characters (NOC), Complexity, Number of Results (NOR) and Study Design (SD) have confidence intervals overlapping the null value (Odds Ratio of 1.0). We therefore concluded that these variables did not seem to be significantly predictive of a negative perceived impact. The only variable of study setting that approached statistical significance in the regression analysis was studies using inpatients. The odds ratio was 3.7 with only a slight overlap with the null value in the lower confidence interval (95% CI 0.85-16.1). This finding suggests that inpatient studies may increase the likelihood that physicians will perceive the impact of the POEM as negative or neutral. **Conclusion:** Using our initial analysis, we were able to conclude that studies with an inpatient setting increase the likelihood that physicians will perceive the impact of the POEM as negative or neutral.

Keywords: InfoPOEM, Family medicine