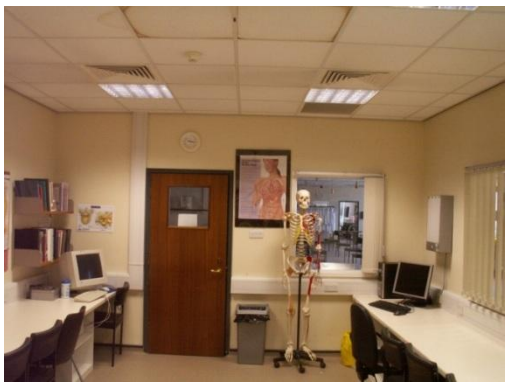
Anatomy Teaching in the School of Life Sciences, Faculty of Medicine & Health Sciences, University of Nottingham, UK.

The undergraduate Medicine Course in Nottingham (approximately 254 students per year) is a 5 year degree course that leads to a BMBS Medicine and a Bachelor of Medical Science degree (after first 3 years). In the first two years, basic medical science is taught in four concurrent themes: molecular/cellular aspects of medicine; human structure and function; healthcare in the community; and early clinical and professional development. In the third year, students undertake a supervised research project. Following this, students move into the clinical phases where they rotate through a series of placements at teaching trusts (Nottinghamshire, Derbyshire and Lincolnshire) encompassing five teaching hospitals (including Queens Medical Centre & City Hospital in Nottingham) and in the community. The University of Nottingham prides itself as being one of the few medical schools in the country that offers students the opportunity to participate in full-body dissection; the belief being there is no substitute for the real thing.

Anatomy is taught by colleagues from the newly formed School of Life Sciences (2013). The actual Department of Human Morphology and Cell Biology ceased to exist in 1996, merging with Physiology& Pharmacology and Biochemistry to become the School of Biomedical Sciences and then to the larger Life Sciences with addition of Genetics, Biology and the Microbiology, Immunology, Virology and Human Genetics elements of Molecular Medical Sciences. Gross Anatomy is taught within the Dissecting Room Suite (DR) under licence from the Human Tissue Authority. Alison Bexon is the Anatomy Administrator and is responsible for running the Anatomy Office and administering the body bequest programme. The DR suite consists of a central room which houses 12 rotating anatomical tables with 24 cadavers. There are 4 connecting seminar rooms suitable for small group teaching. Each room is equipped with anatomical models, articulated and ½ skeleton sets, x-ray films and light boxes, an AV system with multimedia projector and two workstations dedicated to a radiological imaging database and e-learning packages. The DR suite and associated mortuary also houses museum pots and prosected parts. There is a dedicated Anatomy Prosector (Natasha Russell) and a Trainee Dissection Technician (Louise Cope). The Dissection Room is used predominantly by undergraduate medical students who undertake dissection as part of their Early Clinical Experience phase of the course. Students study all regions of the body and complete the dissection in 12 months. The DR Suite also provides anatomical teaching for undergraduate physiotherapy and nursing students, as well as postgraduate anatomy teaching as part of a Sports Medicine course. Students may also elect to produce prosections used for teaching either during their intercalating BMedSci degree, or as part of an elective Special Study Module. Outside of anatomical teaching, the Dissecting Suite provides a facility for surgical skills training using fresh frozen whole cadavers; it is equipped with operating theatre tables, radiopaque tables and operating room lights for surgical training. In collaboration with the Trent Simulation and Clinical Skills Centre, the DR was able to support the Low Rectal Cancer Development Programme in becoming one of three centres to deliver regional training to surgeons to optimise operative technique and so improve oncological outcomes for patients.



THE ANATOMY COURSE AT NOTTINGHAM MEDICAL SCHOOL. The undergraduate course is based around the student-centred learning approach. In addition to introductory lectures for each anatomical region, student centred tasking using multi-media approaches and dissection, is used to allow students to explore the functional and clinical anatomy of the human body. Surface anatomy and radiographic images are used to introduce students to some of the methods of clinical examination. A learning environment is provided in which

students can develop confidence in group work, use anatomical terms correctly and exercise a measure of independence in their practical work. For DR Sessions, students have a 3 hour timetabled slot during which they spend half their time multi-tasking and half their time undertaking exploratory dissection. The multi-tasking takes place in the seminar rooms where they have access to computers, DVDs, conventional radiographic and CT/MRI images, osteological specimens and prosected cadaveric material. Their study here is supported by a demonstrator and a carefully designed workbook which outlines in detail a series of tasks they should complete during a particular week. The workbook also highlights the clinical importance of the particular region, so that a greater emphasis is placed on clinically relevant information, and this is reinforced by a series of clinical problems for the students to consider in terms of the underlying anatomy. In addition, the students are encouraged to explore surface anatomy both on themselves and their colleagues.

The other half of their time medical students, organised in small groups (7-10 per table), work as a team to dissect the region under study in order to find a series of structures on a check list provided. This is done with the guidance of the workbook, where some dissection instructions are provided, the use of a dissection guide which links to the recommended text and the help, where needed, of a sessional demonstrator. The dissection element has been retained because of the great importance of hands on experience of dissection that our student feedback has emphasised.

RESEARCH AT NOTTINGHAM

The School of Life Sciences (137 academics, 300 postgraduate students) is organised and administered around Research groups rather than traditional teaching disciplines. Academics teaching Anatomy belong to one or more of these research groups which include Cell and Development Biology, Genetics, Immunity, Microbiology, Neuroscience, Physiology & Pharmacology. In the REF 2014, University of Nottingham was ranked eighth in the UK on a measure of 'research power', which takes into account both the quality of research and the number of research-active staff who made REF returns. In the Faculty of Medicine and Health Sciences, more than 97 per cent of research was deemed to be of international quality, with 79 per cent graded as 'world-leading' or internationally excellent'.

PROFILES OF THE ANATOMY TEACHING GROUP

Rudolf Billeter-Clark is a Swiss citizen who has been living in England for a good dozen years. He did his undergraduate degree in Biochemistry at the ETH Zürich, has a PhD in Cell Biology and got his *venia legendi* (Habilitation) from the University of Bern for Histology and Cell Biology. He picked up human Anatomy "on the fly" at the University of Bern, where he taught it for 5 years before coming to Nottingham via Leeds. His interest is muscle adaptation to exercise (e.g. "Effects of strength training with eccentric overload on muscle adaptation in male athletes", Friedmann et al, Eur J Appl Physiol. 108(4), 821-36 (2010)). His studies correlate functional changes with changes in molecular markers, currently molecular chaperones. Much of the work includes human muscle biopsies, taken mainly from the mid belly of *m. vastus lateralis.*

The anatomy aspect of his research is ongoing and includes the dissection of the intra-muscular branches of nerves and vessels in human *m. vastus lateralis* (Figure x) and *m. gastrocnemius*. The resulting maps have shown remarkable intra- and inter- individual variability for both vessels and nerves.

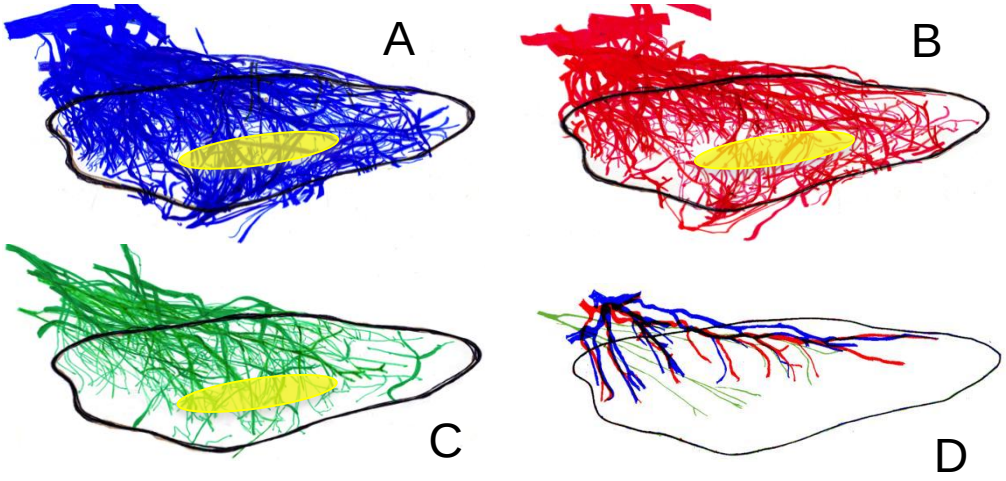


Figure represents the superimposition of A) venous (blue), B) artery (red), C) nerve (green) trees from 15 different human *m. vasti laterales*. The intra-muscular course of the vessels and nerves was followed by dissection as far as they were visible by naked eye (~ 1/2mm diameter). The resulting trees were traced on transparencies. In order to superimpose the trees from many muscles, the individual muscle circumferences were adjusted to the circumference of one particular muscle, using the plugin bUnwarpJ in imageJ. The warping vector fields were then applied to the respective tracings of vessels and nerves. The yellow ellipse indicates the region they target when taking needle biopsies, which is the area with the lowest density of dissectable vessels when accounting for the muscle's thickness. Despite of vessels being present in this region in some individual's *vasti laterales*, complications are very rare, most probably because the Bergström needle displaces vessels and nerves when inserted. D shows the artery, vein and nerve branching in a single *m. vastus lateralis*. This individual's traceable blood supply was from the medial side only. The majority of the analysed vasti did receive some contribution from *a. profunda femoris* as well.

Selected Publications

Murton AJ, Billeter R, Stephens FB, Des Etages SG, Graber F, Hill RJ, Marimuthu K, Greenhaff PL. Transient transcriptional events in human skeletal muscle at the outset of concentric resistance exercise training. J Appl Physiol (2014), 116(1):113-25.

Friedmann-Bette B, Schwartz FR, Eckhardt H, Billeter R, Bonaterra G, Kinscherf R. Similar changes of gene expression in human skeletal muscle after resistance exercise and multiple fine needle biopsies. J Appl Physiol. (2012), 112(2):289-95.

Friedmann-Bette B, Bauer T, Kinscherf R, Vorwald S, Klute K, Bischoff D, Müller H, Weber MA, Metz J, Kauczor HU, Bärtsch P, Billeter R. Effects of strength training with eccentric overload on muscle adaptation in male athletes. Eur J Appl Physiol. (2010), 108(4):821-36.

Chandler NJ, Greener ID, Tellez JO, Inada S, Musa H, Molenaar P, Difrancesco D, Baruscotti M, Longhi R, Anderson RH, Billeter R, Sharma V, Sigg DC, Boyett MR, Dobrzynski H. Molecular architecture of the human sinus node: insights into the function of the cardiac pacemaker. Circulation. (2009), 119(12):1562-75.

Tsintzas K, Norton L, Chokkalingam K, Nizamani N, Cooper S, Stephens F, Billeter R, Bennett A. Independent and combined effects of acute physiological hyperglycaemia and hyperinsulinaemia on metabolic gene expression in human skeletal muscle. Clin Sci (Lond). (2013), 124(11):675-84.

Tracy Farr is the newest member of the School of Life Sciences, joining the Neuroscience Research Group in January 2015. She comes to us from the Center for Stroke Research Berlin (CSB), which is an integrated research and treatment center embedded within the Charité University Hospital in Berlin, Germany. While in Berlin Tracy was the Scientific Director of the Core 7T Experimental MRI Facilities, and her Research Group (Vascular Cognitive Impairment), was focussed on developing novel imaging strategies to detect biomarkers of vascular dementia (Figure 1). Her initial training was in behavioural neuroscience, but she is now considered an expert in animal models of ischemic stroke, having spent nearly 15 years studying various aspects of the pathophysiology of this disease. Here in Nottingham, she will be teaching Anatomy in the undergraduate Medicine Course as well as contributing to both teaching and research in the Neuroscience Program.

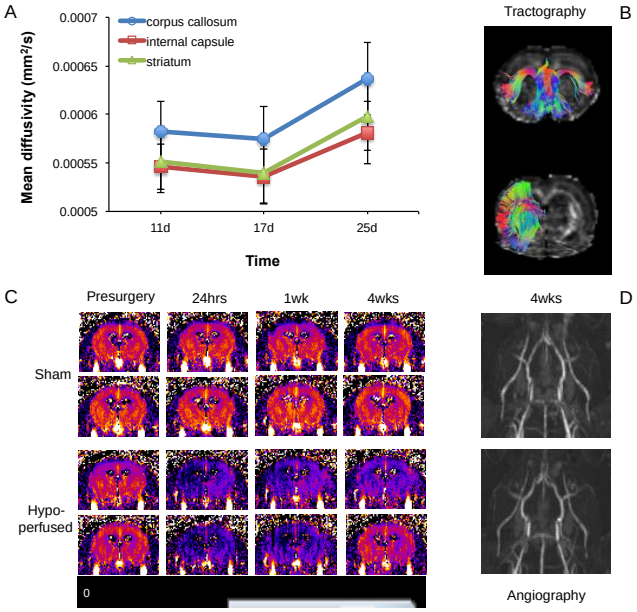


Figure 1: Neuroimaging characterization of a novel murine model of vascular cognitive impairment based on chronic hypoperfusion to the brain. A: Changes in mean diffusivity in hypoperfused mice reveal loss of white matter integrity after approximately 3 weeks of hypoperfusion. B: Tractography images indicating potential white matter trajectories in the brain of a control animal. C: Cerebral blood flow (CBF) maps reveal lasting perfusion impairments in hypoperfused mice. D: Angiography projections indicate dilation and remodeling of the Circle of Willis in hypoperfused mice.

Selected Publications:

Füchtemeier M, Brinckmann MP, Foddis M, Kunz A, Po C, Curato C, Dirnagl U, Farr TD (2015) Vascular change and opposing effects of the angiotensin type 2 receptor in a mouse model of vascular cognitive impairment. *JCBFM*. DOI: 10.1038/jcbfm.2014.221.

López-Gil X, Amat-Roldan I, Tudela R, Castañé A, Prats-Galino A, Planas AM, Farr TD, Soria G (2014) DWI and complex brain network analysis predicts vascular cognitive impairment in spontaneously hypertensive rats undergoing executive function tests. *Front Aging Neurosci*. 6(167): 1-13.

Farr TD, Lai C, Grünstein D, Orts-Gil G, Wang C, Boehm-Sturm P, Seeberger PH, Harms C (2014) Imaging early endothelial inflammation following stroke by core shell silica superparamagnetic glyconanoparticles that target selectin. *Nano Lett*. 14(4): 2130-4.

Harms C, Datwyler AL, Wiekhorst F, Trahms L, Lindquist R, Schellenberger E, Mueller S, Schütz G, Roohi F, Ide A, Füchtemeier M, Gertz K, Kronenberg G, Harms U, Endres M, Dirnagl U, Farr TD (2013) Certain types of iron oxide nanoparticles are not suited to passively target inflammatory cells that infiltrate the brain in response to stroke. *JCBFM*. 33(5): e1-e9.

Trueman RC, Harrison DJ, Dwyer DM, Dunnett SB, Hoehn M, Farr TD (2011) A critical re-examination of the intraluminal filament MCAO model: impact of external carotid artery transection. *Transl Stroke Res*. 2(4): 651-61.

Lopa Leach (BSc hons, PhD, FAS), is an Associate Professor of Anatomy & Vascular Biology. She graduated in Biology from Goldsmiths' College, University of London, obtained her PhD at King's College London and then spent her postdoctoral years (including a fellowship) at Imperial College studying trans-placental transport of IgG and characterising the human placental microcirculation. She obtained a faculty position in the Department of Human Morphology and Cell Biology at the University of Nottingham in 1995. Since then her research has mainly focussed on the role of junctional adhesion molecules in regulating human placental vascular permeability and angiogenesis, with special emphasis on mechanisms behind and consequences of feto-placental vascular impairment in pregnancies complicated by diabetes mellitus (Funded by the Wellcome Trust, AICR, EPSRC & Anatomical Society). Her current research extends into angiogenic growth factors and pre-eclampsia (British Heart Foundation), Mathematical Modelling of Placental Blood Flow (EU, MRC), Mechanisms behind endothelial fenestration and the role of mesenchymal stem cells in vascular repair.

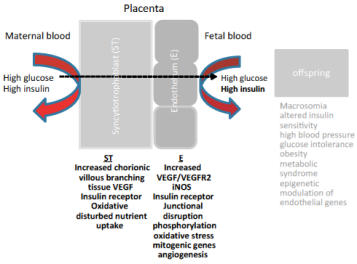


Fig. Summary of phenotypic changes in the placenta in pregnancies complicated by diabetes. Increased risk to offspring shown in grey.

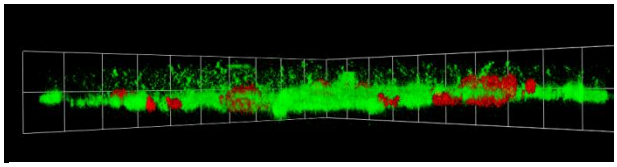


Fig. Confocal micrograph (Z tilt- Volocity) showing mesenchymal stem cells (red) transmigrating endothelial monolayer (VE-cadherin).

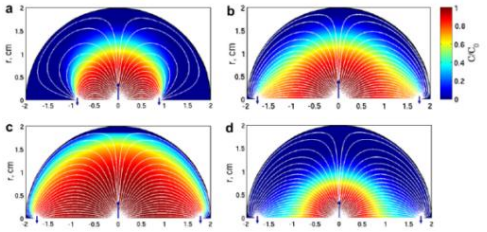


Fig. Streamlines showing predicted flow and solute distribution (red highest) in a mathematical model of the utero-placental circulation with differing distance between the central spiral artery and the decidual veins.

Dr Leach is a Councillor for the Anatomical Society (AS), serving on the Executive Management, Research and the Treasury Committee. She was a past Newsletter Editor of Anastomosis (2000-2009) for the society and served briefly as Assistant Secretary (2008-10). She has organised two symposia for the AS society (2000; 2008). Dr Leach was the Honorary Secretary of the British Microcirculation Society (2008-2013) and is a member of the Editorial board of Microcirculation. She is on the Planning Committee for the European Placenta Group. Dr Leach is the current External Examiner for Anatomy at University College, Cork and also served as external examiner (Anatomy) for Royal College of Surgeons, Dublin and University of Glasgow.

Selected Publications

Ebrahim N, Leach L (2014). Temporal studies into attachment, VE-cadherin perturbation and paracellular migration of human umbilical mesenchymal stem cells across umbilical vein endothelial monolayers. Stem Cells Dev. 2014 Oct 15. [Epub ahead of print]; PMID: 25317631 .

Leach L, Hamilton RD, Foss AJ (2012). Phenotypic plasticity of human umbilical vein endothelial cells. Br J Ophthalmol. 96:1152.

Leach L (2011). Placental Vascular dysfunction in diabetic pregnancies: intimations of fetal cardiovascular disease? Microcirculation 18 (4): 263-270.

Chernyavsky IL, Leach L, Dryden IL and Jensen OE (2011). Transport in the placenta: homogenizing haemodynamics in a disordered medium. Phil. Trans. Roy. Soc. A; Towards the Virtual Physiological Human: Mathematical and Computational Case Studies. 369: 4162-4182.

Chernyavsky I, Jensen OE and Leach L (2010). A mathematical model of intervillous blood flow in the human placentone. Placenta. 31: 44-52.

Leach L, Taylor, A and Sciota F (2009). Vascular Dysfunction in the diabetic placenta: Causes and Consequences. Journal of Anatomy. 215: 69-77.

Siobhan Loughna (BSc Hons, PhD, PGCHE, FAS) graduated from the University of Sheffield with a BSc (Hons) in Genetics, and obtained her PhD in Developmental Biology from the Royal Postgraduate Medical School, University of London. She then worked as a British Heart Foundation funded postdoctoral researcher at the Institute of Child Health in London where her research focused on the vascularisation of the developing kidney. Her next position was in the US, in the Cardiology Laboratories at The University of Texas Southwestern Medical Center, Dallas, working as a postdoctoral fellow. Her interests were on the role the Angiopoietin/Tie signalling system plays in the formation of the embryonic cardiovascular system. She was then appointed as Lecturer in Anatomy and Developmental Biology, at the University of Nottingham.

Congenital heart defects are relatively common (approximately 0.8% of the population), with most cases having an unknown cause. Dr Loughna's research interests are to provide insights into how the heart forms during early stages of cardiogenesis, and how it goes wrong leading to defects. Current interests include the role sarcomeric structural proteins play in the early developing heart. Ongoing studies involve the analysis of structural proteins that are associated with either the thick or thin filament of the sarcomere. Another area of interest involves analysing the effect that altering the haemodynamics during critical stages of cardiogenesis has on developmental processes within the heart. Heart defects of particular interest in the laboratory are those associated with the developing atrial septa, chamber specification, cardiac valves and the formation of the conduction system. Her research group uses the chick as a model organism, and methodologies to perform

gene-specific knockdown. A range of developmental, cell and molecular biology techniques are employed to decipher the expression of the genes of interest and the abnormalities seen. Further, functional studies are performed to provide insights into what role the genes play in the heart in order to explain how defects form. Dr Loughna runs an active laboratory and currently has three PhD students and a part-time technician. She is funded mainly by the British Heart Foundation, with an Anatomical Society Studentship recently awarded to commence in October 2015.

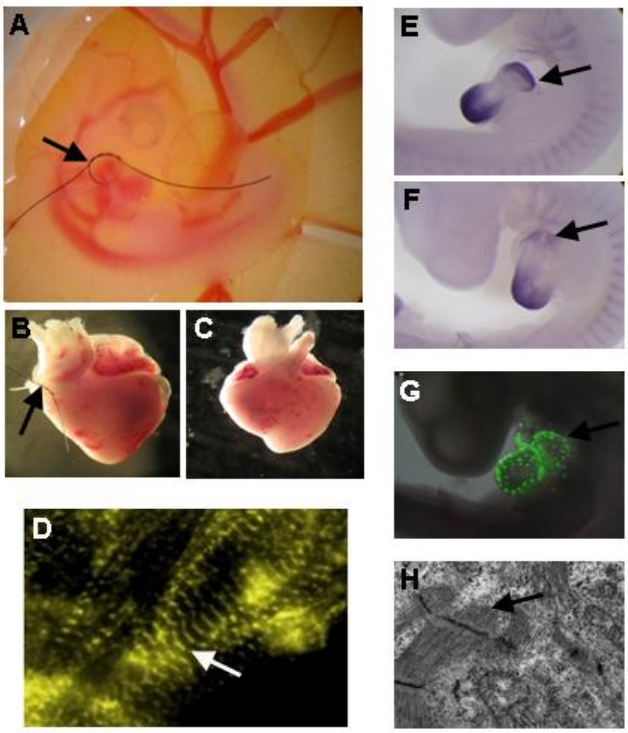


Figure: Some of the techniques used in Siobhan Loughna's lab. Haemodynamics is altered by conotruncal banding of a chick embryo at HH21 (A; ligature denoted) with harvesting of the heart at HH35 (B). A control HH35 heart is shown (C). Cardiomyocytes are cultured in vitro (D); arrow denotes sarcomeres immunofluorescently labelled with sarcomeric alpha actinin. Whole mount in situ hybridisation is used to label mRNA for connexin in control (E) and a knockdown experimental heart (F); arrows denote differential expression. A construct expressing GFP is transfected to the heart (G). Normal sarcomeres (arrow) can be seen by electron microscopy (H).

Dr Loughna teaches gross anatomy and embryology to first and second year medical students. She has a particular interest in improving the exposure medical students in their early years have to radiological teaching and its interpretation, and is involved in a number of strategies to achieve this goal. She is also Deputy Head of the Anatomy Teaching Section and is the Dissection Room Course. She has also been involved with a number of outreach activities for local primary and secondary schools and is actively involved in performing widening participation for the University of Nottingham. She is a Councillor for the Anatomical Society, serving on the Research and the Membership Committees.

Selected publications:

Ghosh TK, Granados-Riveron JT, Buxton S, Setchfield K, Loughna S and Brook JD (2014). Studies of Genes Involved in Congenital Heart Disease. *Journal of Cardiovascular Development and* Disease 1:134-145

England J and Loughna S (2013). Myosin and the developing heart. *Cellular and Molecular Life Sciences* 70(7):1221-1239.

CS Rutland, L Polo-Parada, E Ehler, A Alibhai, A Thorpe, S Suren, RD Emes, B Patel and S Loughna (2011). Knockdown of embryonic myosin heavy chain reveals an essential role in the morphology and function of the developing heart. *Development*. 138:3655-3966.

Walsh R, Rutland C, Thomas R, Loughna S (2010). Cardiomyopathy: A systematic review of disease causing mutations in myosin heavy chain 7 and their phenotypic manifestations. *Cardiology* 115:49-60.

Rutland C, Warner L, Thorpe A, Alibhai A, Robinson T, Shaw B, Layfield R, Brook JD and Loughna S (2009). Knockdown of alpha myosin heavy chain disrupts the cytoskeleton and leads to multiple defects during chick cardiogenesis. *Journal of Anatomy* 214:905-915.

Deborah Merrick graduated from Cardiff University with a BSc (Hons) in Anatomical Sciences (2001) and obtained her PhD in Developmental and Cell Biology from University of Birmingham (2006). Whilst at Birmingham she was given the opportunity to combine her PhD studies with a teaching assistantship. Now at the University of Nottingham Dr Merrick is a Senior Tutor for the Medical Course and teaches Gross Anatomy and Embryology to medical students in the preclinical years. She has a growing interest in Medical Education, with a specific focus on how we teach anatomy. Current research is focussing on the benefits of peer teaching and how e-learning can help support anatomy learning and teaching. She is passionate about widening participation and outreach

initiatives and has been involved in organising numerous workshops based around exploring the human body on a microscopic and macroscopic level.

Selected Publications

Pratten MK, Merrick D, Burr SA (2014). Group in-course assessment promotes cooperative learning and increases performance. Anat Sci Educ. 7(3):224-233

E. James, C. Vinten, E. Wood & D. Merrick (2011). University undergraduate projects can successfully enhance sixth form Science teaching. School Science Review 93(343):105-107.

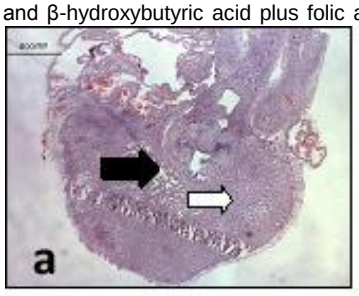
Merrick D, Chen H-C, Larner D, Smith J (2010).Embryonic Skeletal Muscle Microexplant Culture and Isolation of Skeletal Muscle Stem Cells. J Vis Exp. 43.

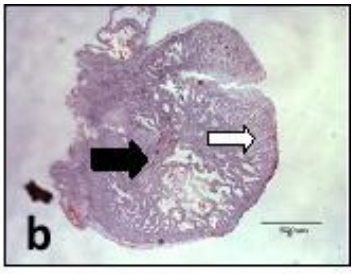
Smith J. & Merrick D. (2010). Embryonic skeletal muscle microexplant culture and isolation of skeletal muscle stem cells. In: Methods in Molecular Biology: Mouse Cell Culture. Editors Ward A. & Tosh D. Humana Press. 633:29-56.

Merrick D., Stadler L., Larner D., Smith J. (2009). Muscular dystrophy begins in embryonic development deriving from stem cell loss and disrupted skeletal muscle formation. Disease Models and Mechanisms 2(7-8): 374-388.

Margaret Pratten is Head of the Anatomy Teaching Section and Associate Professor of Anatomy. She also undertakes research in the area of developmental toxicology using the chick cardiomyocyte micromass system and mouse and human stem cell differentiation along specific pathways. These data are then used to predict potential embryotoxic effects and elucidate their mechanism at the molecular level. The mechanisms by which developmental toxins have an effect on heart development are relatively poorly understood, and yet if such mechanisms were elucidated it would allow for better and safer drug therapies. A particular focus has been drugs taken during pregnancy such as antidepressant and antiepileptic drugs. Use has been made of immunocytochemistry and Western blotting to look for expression of different developmentally important proteins such as members of the connexin family in order to elucidate the mechanism of action via disruption of gap junction formation and the production of free radicals. In addition a completely novel method for chick neural stem cell culture is being developed to look at effects on the development of neurones and glial cells. Margaret graduated from the University of Sheffield with a degree in Zoology and subsequently did a PhD in the Department of Anatomy and Cell Biology in Sheffield on Membrane trafficking during secretion. She then went to the Biochemistry research Unit, University of Keele where she studied uptake of macromolecules by macrophages and rat yolk sac tissue. In 1983 she moved to a Wellcome Lectureship in Anatomy at the University of Leicester where her research interest turned to uptake of macromolecules by whole rat embryos in culture and to developmental toxicology using WEC and Yolk sac culture. She moved to Nottingham in 1993.

Figure: Effect of diabetic conditions on heart development. Shows typical representative views of H&E staining of (a) control hearts, (b) treated with glucose and β-hydroxybutyric acid, (c) glucose and β-hydroxybutyric acid plus vitamin C and(d) glucose and β-hydroxybutyric acid plus folic acid. Black arrows show the interventricular septum which is not developed normally in glucose plus β hydroxybutyric acid treated embryonic hearts as compared to other groups while white arrows indicate ventricular muscle which is also very thin in glucose plus β hydroxybutyric acid treated embryonic hearts as compared to other groups. Original magnification 200x.





Selected Publications

Shaikh Qureshi WM, Memon S, Latif ML, Garle MJ, Parker TL, Pratten MK (2014). Carbamazepine toxic effects in chick cardiomyocyte micromass culture and embryonic stem cell derived cardiomyocyte systems Possible protective role of antioxidants. Reprod Toxicol. 50:49-59.

Shaikh Qureshi WM, Latif ML, Parker TL, Pratten MK (2014). Evaluation of bupropion hydrochloride developmental cardiotoxic effects in chick cardiomyocyte micromass culture and stem cell derived cardiomyocyte systems. Birth Defects Res B Dev Reprod Toxicol. 101(5):371-8.

Ahir BK, Pratten MK (2014). Developmental cardiotoxicity effects of four commonly used antiepileptic drugs in embryonic chick heart micromass culture and embryonic stem cell culture systems.Toxicol In Vitro.28(5):948-60.

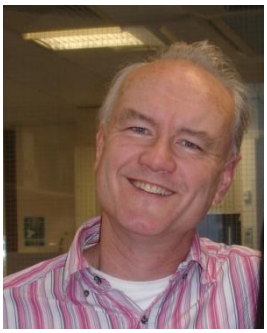
Qureshi WM, Latif ML, Parker TL, Pratten MK (2014). Lithium carbonate teratogenic effects in chick cardiomyocyte micromass system and mouse embryonic stem cell derived cardiomyocyte--possible protective role of myo-inositol. Reprod Toxicol. 46:106-14.

Pratten MK, Merrick D, Burr SA (2014). Group in-course assessment promotes cooperative learning and increases performance. Anat Sci Educ. 7(3):224-33.

Memon S, Pratten MK (2013). Teratogenic effects of diabetic conditions in chick heart in ovo and in micromass culture may be prevented by addition of vitamin C and folic acid. Reprod Toxicol. 35:117-24.

Michael Rittig is a German medical doctor and anatomist who studied and trained at the University of Erlangen-Nürnberg in southern Germany. He obtained his M.D. (Dr. med.) with a clinical trial on a potential anti-diarrheal drug and his Ph.D. (Dr. med. habil.) with a cell biological study on phagocytic mechanisms. During his time at the Institute of Anatomy in Erlangen he also qualified as an anatomist (Fachanatom der Anatomischen Gesellschaft). After a short time at the Max-von-Pettenkofer Institute in Munich, Germany, he held an INSERM Senior Research Fellowship at the University of Montpellier, France, after which he came to Nottingham.

His research has been focused on ultrastructural details of host cell-pathogen interaction in persistent bacterial and protozoan infections of humans, mainly by *Borrelia burgdorferi*, *Leishmania donovani*, and *Brucella* spp., usually combining electron microscopy with infection assays. More recently, he addressed the interaction of bacterial LPS with host cell membranes, especially the role of lipid rafts as site of attachment and port of entry for the pathogens, using solid state NMR with various lipid bilayers and purified LPS. Due to the restructuring of the Medical School, he is in the process of shifting more towards physiological research on human volunteers, studying muscle adaptation and fat metabolism with interventional methods such as muscle biopsies, implanting microdialysis probes, and glucose clamps.



Peter Wigmore graduated in Biology from Aberdeen University and then went to the vet college in Edinburgh to do a PhD on muscle growth in pigs. He is an Associate Professor of Anatomy & Neuroanatomy. His current research is on the generation of new neurons in the adult brain in the process of adult neurogenesis. Peter is particularly interested in the role these new cells have in the process of memory in the hippocampus and the impact of drugs and exercise on the rate of neurogenesis. Systemic chemotherapy can cause prolonged memory impairment in patients amongst whom it is called “chemobrain”. Patient studies and animal models have shown that these cognitive effects are associated with a reduction in hippocampal volume and reduced cell proliferation in the hippocampus. His group is quantifying the impact of chemotherapy on neural stem cell numbers and proliferation and are currently using transgenic mouse lines to identify the specific stages and duration of changes in neurogenesis. A number of factors including antidepressants and exercise increase hippocampal neurogenesis and improve cognition. These also seem to protect the brain from the impact of chemotherapy and we are investigating the mechanism behind these effects as potential treatments for this condition.

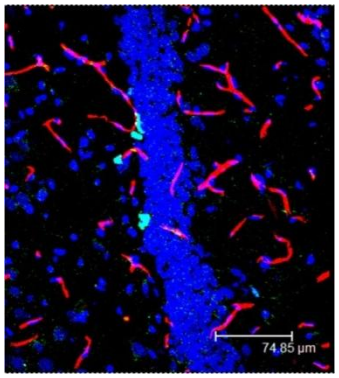


Fig. 1. Image of the dentate gyrus within the hippocampus showing dividing cells in the subgranular zone associated with blood vessels. Cell nuclei – blue. Dividing cells – green. Blood vessels – red.

Selected Publications

Lyons L. ElBeltagy M. Bennett G. Wigmore P. 2012 Fluoxetine counteracts the cognitive and cellular effects of 5-Fluoruracil in the rat hippocampus by a mechanism of prevention rather than recovery. PlosOne 7(1):e30010.

ElBeltagy M. Mustafa S. Umka J. Lyons L. Salman A. Dormon K. Allcock C. Bennett G. Wigmore P. 2012 The effect of 5-Fluorouracil on the long term survival and proliferation of cells in the rat hippocampus. Brain Research Bulletin 88 514-18.

Wigmore P. 2013 The effect of systemic chemotherapy on neurogenesis, placticity and memory. Current Topics in Behavioural Neuroscience 15, 211-40.

Jones S. Fileccia E.L. Murphy M. Fowler M.J. King M.V. Shortall S.E. Wigmore P.M. Green A.R. Fone K.C.F. Ebling F.J.P. 2014 Cathinone increases body temperature, enhances locomotor activity, and induces striatal c-fos expression in the Siberian hamster. Neuroscience Letters 559 34-38

Erdozain A. A. Morentin B. Bedford L. King E. Tooth D. Brewer C. Wayne D. Wigmore P. Callado L.F. Carter W. G. 2014 Alcohol-related brain damage of the human prefrontal cortex. PlosOne 9(4):e93586

Terry Parker BSc, PhD was an Associate Professor of Anatomy & Neuroanatomy, who died (and is dearly missed) in 2014. After obtaining his PhD in 1974 (University College of Wales Aberystwyth**)**, Terry worked in University of the Ruhr, Bochum, Germany as a post-doc (1974-76) and Assistant Lecturer (1976-80) before joining University of Nottingham as a Lecturer in Anatomy, Department of Human Morphology, University of Nottingham Medical School in 1980. His research interests were Neurodegeneration – animal models of neurodegenerative diseases; adult Neural Stem Cells as therapeutic agents for cerebellar repair (Cerbellar Ataxias), stroke and Alzheimer's disease; Inflammation in neurodegenerative disease; Therapeutic value of Natural plant products (ginseng); The anatomy of subdural haematomas: importance of venous drainage in accidental and non-accidental infant brain injury. Terry was also a Visiting Professor at University of Xi'an PRC, China. He had over 125 publications in Neuroscience and related fields and his funders included BBSRC; MRC; ICUK & EPSRC.

Selected Publications

Roach, P., Parker, T., Gadegaard, N. & Alexander, M.R. (2013). A bio-inspired neural environment to control neurons comprising radial glia, substrate chemistry and topography. Biomaterials Sci 2013, 1, pp 83 -93

Lu, H., Searle, K; Liu, Y., Parker, T. (2012).The effect of dimensionality on growth and differentiation of neural progenitors from different regions of fetal rat brain *in vitro*: 3-D spheroid versus 2-D monolayer cultures. *Cells Tissues Organs 196:48-55.*

Hai-xia Lu, Hannah Levis, Yong Liu, Terry Parker.(2011) Organotypic slices culture model for cerebellar ataxia: Potential use to study Purkinje cell induction from neural stem cells. Brain Research Bulletin 84 (2011) 169–173.

P. Roach, T**. Parker**, N. Gadegaard and M.R. Alexander (2010). Surface Strategies for Control of Neuronal Cell Adhesion Invited Review. Surface Science Reports, 65, 145-173.

Lu, H., Levis, H., Melhem,N**.,** Parker, T. (2008) Toxin-produced Purkinje cell death: A model for neural stem cell transplantation studies . Brain Research 1207, 207-313.