Professional Summary:

Professor Daqing Ma, MD, PhD, FRCA, MAE :
Professor of Anaesthesia,
Macintosh Professor of Royal College of Anaesthetists (RCoA) (2014-16),
BOC Chair and Head of Anaesthesia Research of the Section of Anaesthetics,
Pain Medicine & Intensive Care, Department of Surgery & Cancer,
Faculty of Medicine, Imperial College London, and Chelsea and Westminster Hospital.

Research contributions and impact

1) Anaesthetics and neuroprotection

Together with Prof. Nick Franks, FRS, and Prof Mervyn Maze, FMedSci, First to discover its neuroprotective efficacy, and utilising a novel neonatal asphyxia model in rats, they yielded valuable insight into the neuroprotective mechanisms of xenon, and discovered the great clinical potential of xenon in perinatal asphyxia/hypoxic-ischaemia encephalopathy, affecting approx. 5/1000 termed birth with high mortality and devastating morbidities (Ma et al., Anesthesiology 2003; Ann Neurol 2005; J Cereb Blood Flow Metab 2006). Their key findings facilitated the clinical trial on xenon combined mild hypothermia in hypoxic-ischaemia encephalopathy (HIE) infants. Current group has been investigating the organoprotective effects of another noble gas Argon.

2) Anaesthetics and kidney protection

While continuing research in neuroprotection, he started to investigate the protective effects of anaesthetics on other organs such as the kidneys. My group found that xenon protects the kidney from ischemia-reperfusion injury, significantly improved short-term graft function and long-term graft survival, by up-regulating the expression of hypoxic inducible factor (HIF) (J Am Soc Nephrol 2009). This research prompted the Medical Research Council, London, to consider the role of this novel strategy in kidney transplantation (Zhao et al, Am J Physiol Renal Physiol. 2014; Zhao et al, Am J Transplant. 2013; Zhao et al, FASEB J. 2013 x 2) and the work is now entering into the clinical study phase subjected to a funding application. Moreover, their findings on xenon's stimulatory effect on HIF and its downstream protein erythropoietin (EPO) had constituted the key evidences to prompt the World Anti-Doping Agency (WADA) to include xenon and argon into the WADA Prohibition List .

3) Postoperative cognitive dysfunction

Pioneered research into the molecular mechanisms of cognitive deterioration following surgery and anaesthesia in the elderly. The first group to report that neuroinflammation, specifically pathological hallmarks characteristic of Alzheimer's disease, contributed to this post-surgical complication. This work has yielded publications in several high impact factor journals (Wan, et al., Anesthesiology 2007; Cibelli, et al., Ann Neurol 2010; Terrando, et al., Proc Nat Acad Sci USA. 2010; Wan, et al., Crit Care Med 2010; Ann Surgery 2014; Lancet 2016), and were reported in mainstream media, as well as being granted a patent (US Patent No. 61/305500). With an aging population and a surge in the number of operations being performed on the elderly, our knowledge in POCD pathologies and mechanisms would hopefully enable the development of more efficacies treatment.

4) Anaesthetics and cancer cell biology

The prominent effects of anaesthetics on hypoxia-inducible factor (HIF) have inspired our group to investigate whether anaesthetics could influence cancer behaviour and recurrence, given that HIF is a powerful molecular regulator of cancer proliferation, metastasis and chemotherapy resistance. We found the routinely used inhalational anaesthetic isoflurane increased cancer cell growth and migration in vitro, coinciding with upregulated expressions of HIF proteins. Collectively, our timely research provided convincing evidences at biochemical level have encouraged us explore deeper into the mechanisms underlying the cancer-and-anaesthetics phenomenon, and prompted clinical investigation.Future research into the differential actions of anaesthetics on different cancer cells has great potential to influence the clinical practice of anaesthetics, depending on the type/malignancy of cancer, different anaesthetics, techniques and perioperative strategies will be employed to minimise recurrence following tumour resection.

In summary, he has been studying science in a dedicated manner through his research career from a trainee doctor to senior post as a personal chair. The research output is indeed very productive with more than 365 papers (H index: Web of Science 63; Google scholar 76) published in peer reviewed journals as well as awards, patents and success in translation to the clinical arena.

Honours, Memberships, Teaching and Research Areas

Honours and Memberships:

Members of Professional Bodies

Council Member, Anaesthetic Research Society (UK)
Member of Alzheimer's Association, USA
Member of Alzheimer's society, UK
Member of Anaesthetic Research Society of UK
Member of British Neuroscience Society
Member of European Society of Anaesthesiologist
Member of Physiological Society of UK
Member of Society of Neuroscience, USA

Editorial Boards

Journal of Alzhermer's Disease, Assocaite Editor, 2012
BJA in Chinese edition, Editor, 2008
PLoS One, Academic Editor
British Journal of Anaesthesia, Board member

Research Area

Neuroprotection in Adults
Perinatal Asphyxia
Cognitive Dysfunction and Alzheimer's Disease

Research Interests

Organoprotection (Stroke, neonatal asphyxia and kidney transplant)
Postoperative delirium/cognitive dysfunction and Alzheimer's disease
Cancer growth and metastasis

*The research has being supported with the grants from MRC, Alzheimer's Society-Bupa Foundation, BOC, BJA/RCoA, AAGBI, Westminster Medical School Research Trust, Action Medical Research and SPARKS, UK and European Society of Anesthesiology, Brussels.

Teaching

Course/Module (Imperial College London)

Organiser, MRes. (Postgraduate)
Lecturer, Surgery and Anaesthesia. (Undergraduate)
Lecturer, Urinary Course. (Undergraduate)
Lecturer, Urinary course. (Undergraduate)

Publication

1. Wong R, Zhang Y, Zhao H, Ma Det al., 2022, Circular RNAs in organ injury: recent development., J Transl Med, Vol: 20
2. Yang Z, Pan X, Wu X, Lin Q, Chen Y, Cai S, Zhang Y, Mai Z, Ahmad N, Ma D, Deng Let al., 2022, TREM-1 induces pyroptosis in cardiomyocytes by activating NLRP3 inflammasome through the SMC4/NEMO pathway, FEBS JOURNAL, ISSN: 1742-464X
3. Hu C, Wang B, Liu Z, Chen Q, Ishikawa M, Lin H, Lian Q, Li J, Li J, Ma Det al., 2022, Sevoflurane but not propofol enhances ovarian cancer cell biology through regulating cellular metabolic and signaling mechanisms, CELL BIOLOGY AND TOXICOLOGY, ISSN: 0742-2091
4. Iwasaki M, Zhao H, Hu C, Saito J, Wu L, Sherwin A, Ishikawa M, Sakamoto A, Buggy D, Ma Det al., 2022, The differential cancer growth associated with anaesthetics in a cancer xenograft model of mice: mechanisms and implications of postoperative cancer recurrence, CELL BIOLOGY AND TOXICOLOGY, ISSN: 0742-2091
5. Lin JA, Ma D, Wu SY, 2022, Editorial: Impact of anesthetics on cancer behavior and outcome, Frontiers in Pharmacology, Vol: 13
6. Liu F, Duan M, Fu H, Zhao G, Han Y, Lan F, Ahmed Z, Cao G, Li Z, Ma D, Wang Tet al., 2022, Orthopedic Surgery Causes Gut Microbiome Dysbiosis and Intestinal Barrier Dysfunction in Prodromal Alzheimer Disease Patients A Prospective Observational Cohort Study, ANNALS OF SURGERY, Vol: 276, Pages: 270-280, ISSN: 0003-4932
7. Deng C-M, Ding T, Liu Z-H, He S-T, Ma J-H, Xu M-J, Wang L, Li M, Liang W-L, Li X-Y, Ma D, Wang D-Xet al., 2022, Impact of maternal neuraxial labor analgesia exposure on offspring's neurodevelopment: A longitudinal prospective cohort study with propensity score matching, FRONTIERS IN PUBLIC HEALTH, Vol: 10