

# English

## Short question

1. Recent research on treatments for chronic kidney disease in cats?
2. What are the most recent studies on early biomarkers of type 2 diabetes mellitus?
3. What do recent papers discuss regarding serotonin imbalance and anxiety disorders?
4. What are the latest clinical outcomes of robot-assisted knee replacement surgery?
5. What new findings have been reported on antimicrobial resistance in companion animals?

## Medium question

1. Recent studies highlight strong links between gut microbiota diversity and the risk of type 2 diabetes and metabolic syndrome. Specific bacterial strains appear to modulate glucose metabolism, insulin sensitivity, and systemic inflammation. British and European research indicates that dietary fibre, probiotics, and short-chain fatty acids help restore metabolic balance. These microbial patterns may serve as predictive biomarkers for metabolic disorders, and personalised nutrition could support long-term glycaemic control.
2. How effective are current vaccination protocols in preventing viral respiratory infections in domestic cats and dogs, according to recent veterinary research? Do multivalent vaccines offer sufficient cross-protection against emerging strains such as canine influenza and feline calicivirus? Reports from European veterinary bodies have questioned whether annual boosters are necessary for all animals. How do environmental factors, population density, and prior exposure influence vaccine response, and how might evidence-based updates to the UK's small-animal vaccination guidelines enhance both efficacy and safety?
3. What evidence does current psychiatric research provide on the long-term effects of chronic stress and insufficient sleep on cognition and emotional regulation? How do neuroendocrine alterations in the hypothalamic-pituitary-adrenal axis interact with inflammatory pathways linked to mood instability? UK cohort studies have associated persistent sleep deprivation with reduced hippocampal volume and impaired executive function. Could lifestyle interventions such as structured relaxation, mindfulness training, or circadian-rhythm therapy mitigate these effects and strengthen neurocognitive resilience?
4. What are the most recent findings on optimising anaesthesia management and multimodal pain control in elderly patients undergoing orthopaedic surgery? Which

anaesthetic techniques, regional blocks or pharmacological combinations yield the best balance between analgesia and haemodynamic stability? British clinical guidelines increasingly recommend personalised peri-operative assessment to reduce delirium and respiratory complications. How can pre-habilitation, careful opioid stewardship and post-operative physiotherapy contribute to faster recovery and sustained functional independence in this growing patient population?

5. Recent research has compared post-operative recovery between open surgery and minimally invasive laparoscopy. Studies show that pain, infection rate, and rehabilitation time vary across age and risk groups. European trials indicate that combining laparoscopy with enhanced-recovery-after-surgery (ERAS) protocols can reduce hospital stays without compromising safety. However, replicating these results across NHS hospitals with differing resources and patient populations remains challenging. Further work is needed to explore how multidisciplinary teams can improve access to and outcomes of minimally invasive care.

### **Long question**

1. Over the past decade there has been a growing body of research exploring the complex relationship between metabolic disorders, inflammation and cardiovascular disease. I am particularly interested in recent large-scale cohort or meta-analytic studies examining how insulin resistance, visceral adiposity and systemic low-grade inflammation contribute to the development of atherosclerosis and coronary artery disease. How do recent findings clarify the mechanistic pathways linking elevated fasting insulin concentrations or HOMA-IR indices with endothelial dysfunction and plaque instability? In addition, are there novel biomarkers—such as adiponectin, leptin or high-sensitivity CRP—that are gaining recognition as predictive indicators of early cardiovascular risk? I would like to understand whether current evidence supports the integration of these biomarkers into preventive screening frameworks for individuals with pre-diabetes or early-stage metabolic syndrome, and whether any interventional trials (for example, those involving GLP-1 receptor agonists or SGLT2 inhibitors) have demonstrated measurable cardioprotective effects independent of glycaemic control.
2. In recent years the role of the gut microbiome in regulating systemic immune function has become a major focus in both human and veterinary medicine. I am particularly interested in recent veterinary clinical studies or reviews exploring how modulation of the gut microbiota—through probiotics, prebiotics or dietary interventions—affects immune resilience in domestic animals such as dogs and cats. How do bacterial taxa diversity and the presence of beneficial genera such as *Lactobacillus* or *Bifidobacterium* correlate with reduced incidence of chronic inflammatory conditions including atopic dermatitis, inflammatory bowel disease or recurrent respiratory infections? Are there any controlled trials demonstrating measurable improvements in immunoglobulin concentrations or cytokine balance following long-term probiotic supplementation? Furthermore, has comparative research between species (for

example, canine versus feline) identified consistent patterns that could inform broader One Health approaches linking animal microbiome health to zoonotic disease prevention?

3. Emerging research increasingly highlights neuroinflammation as a key factor in the onset and persistence of mood disorders such as major depressive disorder and generalised anxiety disorder. I am seeking recent interdisciplinary reviews or meta-analyses that integrate findings from neuroimaging, immunology and molecular psychiatry to explain how chronic inflammation—mediated by cytokines such as IL-6, TNF- $\alpha$  and CRP—affects neurotransmitter balance, neuroplasticity and the hypothalamic-pituitary-adrenal (HPA) axis. To what extent do recent studies support the concept of an ‘inflammatory subtype’ of depression that responds more effectively to anti-inflammatory or metabolic-modulating treatments rather than traditional SSRIs? Moreover, how have longitudinal or population-based studies quantified the long-term effects of chronic stress, poor sleep and dietary inflammation on neurocognitive decline and emotional regulation? I would also like to know whether any recent clinical trials have evaluated the combined use of psychotropic medication with adjunctive anti-inflammatory or microbiome-targeted therapies to improve outcomes in treatment-resistant depression.
4. Recent advances in surgical technology have shifted the paradigm towards minimally invasive and robot-assisted approaches that aim to reduce tissue trauma, shorten hospital stays and enhance recovery quality. I am interested in up-to-date comparative research on post-operative outcomes between traditional open surgery, laparoscopic methods and robotic-assisted techniques across major procedures such as colorectal resection, cholecystectomy and joint replacement. How do recent randomised or meta-analytic studies evaluate differences in complication rates, intra-operative blood loss, wound infection and patient-reported pain scores? Moreover, has the implementation of enhanced recovery after surgery (ERAS) protocols been consistently shown to improve functional recovery and reduce opioid dependence in post-discharge follow-up? I would also like to know whether recent trials have investigated sex- or age-based differences in recovery profiles, and how digital monitoring tools—such as wearable sensors or AI-assisted wound tracking—are being integrated into post-operative care to personalise rehabilitation strategies.
5. What are the major challenges related to data heterogeneity, bias and interpretability that current researchers are addressing when deploying artificial intelligence in diverse populations? Are there published frameworks that discuss ethical or regulatory standards for integrating AI-generated predictions into clinician decision-making, particularly in cases involving automated alerts or digital-twin simulations for patient monitoring? Furthermore, I am curious whether recent literature identifies specific laboratory panels—such as lipid sub-fraction analysis, high-sensitivity CRP or metabolomic signatures—that enhance AI performance when incorporated as structured inputs. Lastly, what emerging consensus exists on combining AI-based risk models with precision lifestyle or pharmacological interventions to reduce long-term

cardiometabolic complications, and how are such systems being validated prospectively in multi-centre or international cohorts?