PIG MODEL FOR BIOMEDIACAL STUDY INTAIWAN

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Pigs are considered to be the major alternative animal model to the dog or nonhuman primate in preclinical study in medical devices, surgical training models, and also as the choice of nonrodent models in pharmaceuticals testing. Because of the anatomic and physiologic characteristics involving the cardiovascular, skeletal, urinary, integumentary, and digestive systems are similar with humans.

In cardiovascular System, the distribution of blood supply by the coronary artery system is almost identical to that of humans. In addition, the size of the heart per body weight and blood vessels is more analogous to the size in humans. Pigs have been used successfully in studies of the cardiac conduction system, also as ischemic preconditioning model for drug testing, cryo-preservation of heart valves, heart valve transplantation, coronary artery restenosis, echocardiographic training course, stem cell therapy in AMI model. The hypercholesterolemic pig model induced with high-cholesterol diet has been successfully used to induce atherosclerosis for the hyperlipidemic vasculopathy study instead of humans in 4 months. The vascular lesions can include atheroma plaques in vessels.

Cardiovascular models include the following: myocardial infarction, transplantation, dilated cardiomyopathy, valve replacement. The pig has been particularly useful in studies involving the treatment of atherosclerosis, myocardial infarction, and ischemic heart disease. The pig is a model for studying the efficacy of stem cell therapy in acute myocardial infarctions and in chronic heart disease.

In respiratory system, we used pigs to study occupational hazard in lung function defect with nanoparticle

In gastrointestinal system, because the physiology of digestion in pigs is remarkably like that in humans, pigs induced inflammatory bowel disease with Dinitrobenzene sulphonic acid (DNBS) for preclinical trial testing of hyaluronic acid. The biocompatibility of dental implants studied in pigs with bone graft or platelet-rich plasma.

There is hepatic failure (acute & chronic) model, haemostatic effects of dressing model, and preparation of CYP-450 study in pig liver. Fatty liver is a common finding in the pig model of hypertriglyceridemia. In pancreas, the isolation of islet cells from pig pancreas for DM therapy because the islet cells are functionally similar to humans.

In dermatologic models, the pig skin is well suited for wound healing studies and plastic surgery techniques. Pig skin has shown the most similar to human skin, because of the ratios of epidermal thickness and dermal–epidermal thickness. The content of dermal collagen and elastic in pig is similar to humans. Pigs are especially useful in wound healing and burn lesions study. There were small, identical wounded squares on the back of a single pig so that various treatment modalities and controls could be confined to a small area. This model has been study various wound types such as full thickness, various burns, ischemic wounds, and infected wounds. Treatment modalities such as ointments, antibiotics, bandages, cultured epidermal autograft, and laser therapy have all been evaluated.

In Surgical Models, pigs are the suitable model for nonsurvival surgical training classes, such as endoscopic and laparoscopic procedures. The pig is commonly used in developing devices and techniques in laboratories has led to the widespread use of pig as preclinical models for biocompatibility and function of implanted devices and materials for preclinical files.

In urinary system models, the pig model is used for renal transplantation, and renal hypertension. Retrograde passage of catheters through the penis is not possible, but that approach is easily performed in the female for collecting the urine.

In preclinical trial of drug development, pig models is the best model in pharmacology safety studies evaluate the pharmaceuticals, biopharmaceuticals, pharmacokinetic, pharmacodynamics, and drug interactions.

Pig model is a suitable model for biomedical study and make the better life for human.