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General Large Animal Surgery
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Education

Bachelor of Veterinary Medicine (Vet MB) - University of Cambridge, England - 1983
Master of Arts (MA) - University of Cambridge, England - 1984

Board Certification

American College of Veterinary Surgeons
European College of Veterinary Surgeons

Laboratory Post-doctoral Personnel
Marianne Stark

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General Research Interest

Investigative Interests

- Bone growth and remodeling, bone repair in response to injury, bone grafting.
- Bone inductive and mitotic proteins.
- Bone cell culture therapy. Surgical and other orthopedic disease models.
- Bone and soft tissue mechanics. Ligament and tendon physiology and response to injury.
- Skeletal tissue engineering.
- Orthopedic device development.
- Per-cutaneous treatment of cardiac disease. Animal models of cardiac disease.
- Intervential cardiology.

Clinical Interests

- Clinical equine athletic injury including non-adaptive bone disease.
- Orthopedic surgery, particularly internal fixation and arthroscopy.
- Equine hoof form and function, including corrective farriery.
- Equine vascular disease.
- Clinical pharmaceuticals.

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On-going Studies

"Bone Regeneration Via Silk Biomaterials" National Institutes of Health funded.
Assessment of natural silk as facilitator of new bone formation and delivery vehicle for bone inducing proteins and bone forming stem cells.

" Radiofrequency energy for arthroscopic synovial ablation". Industry funded assessment of novel arthroscopic (key-hole) surgical instruments for use in humans

and animals.

“ Validation of a novel intracardiac implant for treatment of mitral regurgitation”. Industry funded assessment of a novel minimally invasive technique for treating cardiac valve disease in humans.

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Specialized Capabilities or Interests

1. Orthopedic equine surgery
2. General equine surgery
3. Arthroscopic surgery
4. Implantology
5. Medical device and drug testing
6. Disease models
7. Advanced imaging modalities

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Major Specialized Equipment Items Available:

Instron Model 8511 servohydraulic materials testing device; a Picker 5000 spiral CT; a Siemens Symphony 1.5 Tesla MRI; an Hologic Q1000 DXA scanner; a digital high resolution gamma camera (IS2 NuCamma?Enhanced Technologies, Dallas/Fort Worth, Texas.); digitized fluoroscopy (Shimadzu RS-110 Remote radiology/fluoroscopy room with UD150L 630MA 50 KW); and a Kistler model Z4852 piezoelectric quartz crystal force plate Gait Analysis System. Video-endoscopy, a high speed treadmill, comprehensive surgical facilities, a media center, and clinical pathology and pathology facilities complement the environment.

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Selected Publications

1. Kleine L, Solano M, Rusckowski M, Hunt K, Johnson K, Kirker-Head C. MA, Evaluation of ^{99m}Technitium-EDTA-Biotin as a Soft Tissue Imaging Agent in Horses. In press. American J Vet Res.
2. Jenei TM, Garcia-Lopez JM, Provost PJ, Kirker-Head C. Surgical management of small intestinal incarceration through the gastrosplenic ligament: 14 cases (1994-2006). J Am Vet Med Assoc. 2007.231:1221-4.
3. Kirker-Head C, Boudrieau RJ, Kraus KH. Use of bone morphogenetic proteins for augmentation of bone regeneration. J Am Vet Med Assoc. 2007. 231:1039-55.
4. Kirker-Head C, Karageorgiou V, Hofmann S, Fajardo R, Betz O, Merkle HP, Hilbe M, von Rechenberg B, McCool J, Abrahamsen L, Nazarian A, Cory E, Curtis M, Kaplan D, Meinel L. BMP-silk composite matrices heal critically sized femoral defects. Bone. 2007. 41:247-55.
5. Meinel L, Betz O, Fajardo R, Hofmann S, Nazarian A, Cory E, Hilbe M, McCool J, Langer R, Vunjak-Novakovic G, Merkle HP, Rechenberg B, Kaplan DL, Kirker-Head C. Silk based biomaterials to heal critical sized femur defects. Bone. 2006. 39:922-31.
6. Kraus KH, Kirker-Head C. Mesenchymal stem cells and bone regeneration. Vet Surg. 2006. 35:232-42.
7. Kirker-Head CA, Van Sickle DC, Ek SW, McCool JC. Safety of, and biological and functional response to, a novel metallic implant for the management of focal full-thickness cartilage defects: Preliminary assessment in an animal model out to 1 year. J Orthop Res. 2006. 24:1095-108.
8. Kirker-Head C . Development and Application of Bone Morphogenetic Proteins for the Enhancement of Bone Healing. J Orthopaed Traumatol. 6: 1-9. 2005.
9. Bellezzo F. Hunt RJ. Provost R. Bain FT. Kirker-Head C. Surgical repair of rib fractures in 14 neonatal foals: case selection, surgical technique and results. Equine Vet J. 36:557-62, 2004
10. Garcia-Lopez JM. Kirker-Head CA. Occult subchondral osseous cyst-like lesions

- of the equine tarsocrural joint. *Vet Surg.* 33(5):557-64, 2004
11. Hile D, Kirker-Head C, Doherty S, Kowaleski P, McCool J, Wise D, Trantolo D. Mechanical evaluation of a porous bone graft substitute based on poly (propylene glycol-co-fumaric acid). *J Biomed Mater Res.* 66B:311-317, 2003.
 12. Kirker-Head CA. Potential Applications and Delivery Strategies of Bone Morphogenetic Proteins. *Advanced Drug Delivery Reviews.* 43:65-92, 2000.
 13. Kirker-Head CA, Chandna VK, Agarwal RK, Morris EA, Tidwell A, O'Callaghan MW, Rand W, and Kumar MSA . Substance P and PGE2 levels in normal and abnormal equine joint fluids. *Amer J Vet Res* 61:714-718, 2000.
 14. Kirker-Head CA, Gerhart TN, Armstrong R, Schelling S, Carmel LA. ³Healing bone using recombinant human bone morphogenetic protein-2 and copolymer². *Clin Orthop.* 349:205-217, 1998.

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