

Publications: Fetal Sheep



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Theory of Operation

- 1T Drost, C.J., "Volume Flow Measurement System," U.S. Patent # 4,227,407, Cornell Research Foundation, Inc., Ithaca NY, October 14, 1980.
- 2T Drost, C.J., "Homogeneous Full Flow Illumination to Ultrasonic Systems," Proceedings of the 31st Annual Conference of Engineering in Medicine and Biology, Bethesda MD: Alliance for Engineering in Medicine and Biology, Vol. 20, p. 183, 1978.
- 3T Drost, C.J., "Vessel Diameter-Independent Volume Flow Measurements Using Ultrasound," Proceedings of San Diego Biomed. Symposium, San Diego CA: San Diego Biomed. Society, Vol. 17, pp. 299-302, 1978.
- 4T Hemisch, W., "Blood Flow during Cardiovascular Surgery: Methodological, Technical and Practical Considerations," Gefäßchirurgie, Springer-Verlag, 1996.

Validation Studies

- 8V Wilkening, R.B., Boyle, D.W., Meschia, G., "Measurement of Oxygen Consumption of the Pelvic Limb in Fetal Sheep," Accepted by the American Pediatric Society for presentation at the annual meeting. Dept. of Pediatrics, Univ. of Colorado HSC, Denver CO, 1987. (*fetal sheep, pelvic limb, against microspheres*)
- 11V Wilkening, R.B., Boyle, D.W., and Meschia, G., "Measurement of Blood Flow and Oxygen Consumption in the Pelvic Limb of the Fetal Sheep," Proceed. Soc. Exper. Biol. Med., Vol. 187, pp. 498-505, 1988. (*fetal sheep, pelvic limb, against microspheres*)
- 15V Spencer, J., Moore, P., Hanson, M., "Studies of Reflex Control of Fetal Carotid and Femoral Blood Flow in Hypoxia," Proceedings of the Society for the Study of Fetal Physiology, Vol. 16, C6, 1989. (*fetal sheep, femoral, carotid, beaker stopwatch*)
- 24V Shiraishi, H., Silverman, N.H., Rudolph, A.M., "Accuracy of Right Ventricular Output Estimated by Doppler Echocardiography in the Sheep Fetus," American Journal of Obstetrics & Gynecology, Vol. 168, p. 947-953, 1993. (*fetal sheep, pulmonary artery*)
- 32V Sokol, G.M., Liechty, E.A., Boyle, D.W., "Comparision of Steady-State Diffusion and Transit Time Ultrasonic Measurements of Unbilical Blood Flow in the Chronic Fetal Sheep Preparation," American Journal of Obstetrics and Gynolcology, Vol. 174, No. 5, p. 1446-1450, 1996. (*fetal sheep, umbilical a., chronic*)

Applications

Aorta, Abdominal

- 722A Parkinson, S., Belleau, C., Homan, J., Richardson, B., "Flow and Velocity Waveform Indices in the Ovine Fetal Abdominal Aorta with Changes in Behavioral State," Reproduction, Fertility, Development, Vol. 7, No. 5, p. 1299-304, 1995. (*fetal sheep, abdominal aorta, chronic*)

Aorta / Brachiocephalic trunk

- 2332A Wothe, D., Hohimer, A., Morton, M., Thornburg, K., Giraud, G., Davis, L., "Increased coronary blood flow signals growth of coronary resistance vessels in near-term ovine fetuses," AJP, Vol. 282, No. 1, p. R295-302, 2002. (*fetal sheep, asc. aorta, chronic*)

Aorta, Descending

- 2723A Acharya G, Erkinaro T, Makikallio K, Lappalainen T, Rasanen J., "Relationships between Doppler-derived umbilical artery absolute velocities, cardiac function, and placental volume blood flow and resistance in fetal sheep," Am J Physiol Heart Circ Physiol. 2003 Nov 20. (*fetal sheep, desc. aorta, chronic*)
- 2409A Vedrinne, C, Tronc, F, Martinot, S., Robin, J., Allevard, A.M., Vincent, M., Lehot, J.J., Franck, M., Champsaur, G., "Better preservation of endothelial function and decreased activation of the fetal renin-angiotensin pathway with the use of pulsatile flow during experimental fetal bypass," J Thorac Cardiovasc Surg, Vol. 120, No. 4, p. 770-7, 2000. (*fetal sheep, desc. aorta, umbilical a., acute*)



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- 1056A Champsaur, G., Vedrinne, C., Martinot, S., Tronc, F., Robin, J., Ninet, J., Franck, M., "Flow-Induced Release of Endothelium-Derived Relaxing Factor during Pulsatile Bypass: Experimental Study in the Fetal Lamb," *Journal of Thoracic and Cardiovascular Surgery*, Vol. 114, No. 5, p. 738-745, 1997. (*fetal sheep, desc. aorta, umbilical artery, acute*)
- 740A Maulik, D., Kadado, T., Downing, G., Phillips, C., "In Vitro and In Vivo Validation of Time Domain Velocity and Flow Measurement Technique," *Journal of Ultrasound in Medicine*, Vol. 14, p. 939-947, 1995. (*fetal sheep, desc. aorta, chronic*)
- Carotid a.**
- 15V Spencer, J., Moore, P., Hanson, M., "Studies of Reflex Control of Fetal Carotid and Femoral Blood Flow in Hypoxia," *Proceedings of the Society for the Study of Fetal Physiology*, Vol. 16, C6, 1989. (*fetal sheep, femoral, carotid, beaker stopwatch*)
- 2425A Newman, J.P., Peebles, D.M., Hanson, M.A., "Adenosine produces changes in cerebral hemodynamics and metabolism as assessed by near-infrared spectroscopy in late-gestation fetal sheep in utero," *Pediatr Res*, Vol. 50, No. 2, p. 217-21, 2001. (*fetal sheep, carotid a., chronic*)
- 2353A Bennet, L., Rossenrode, S., Gunning, M.I., Gluckman, P.D., Gunn, A.J., "The cardiovascular and cerebrovascular responses of the immature fetal sheep to acute umbilical cord occlusion," *J Physiol*, Vol. 517., No. 1, p. 247-57, 1999. (*fetal sheep, carotid a., femoral a., chronic*)
- 2209A van Cappelen van Walsum, A-M., Jongsma, H.W., Wevers, R.A., Nijhuis, J.G., Crevels, J., Engelke, U.F.H., Moolenaar, S.H., Oeseburg, B., Nijland, R., "Hypoxia in fetal lambs: a study with N-NMR spectroscopy of cerebrospinal fluid," *Pediatric Research*, Vol. 49, No. 5, p. 698-704, 2001. (*fetal sheep, carotid a., chronic*)
- 2171A Braaksma, M.A., Douma, B.R., Nyakas, C., Luiten, P.G., Aarnoudse, J.G., "Delayed neuronal migration of protein kinase Cgamma immunoreactive cells in hippocampal CA1 area after 48 h of moderate hypoxemia in the near term ovine fetus," *Brain Res Dev Brain Res*, Vol. 114, No. 2, p. 253-60, 1999. (*fetal sheep, carotid a., chronic*)
- 1877A Skarsgard, E.D., VanderWall, K.J., Morris, J.A., Roman, C., Heymann, M.A., Harrison, M.R., "Effects of nitroglycerin and indomethacin on fetal-maternal circulation and on fetal cerebral blood flow and metabolism in sheep," *American Journal of Obstetrics and Gynecology*, Vol. 181, No. 2, p. 440-445, 2000. (*fetal sheep, carotid a., chronic*)
- 1851A Lumbers, E.R., Gunn, A.J., Zhang, D.Y., Wu, J.J., Maxwell, L., Bennet, L., "Nonimmune hydrops fetalis and activation of the renin-angiotensin system after asphyxia in preterm fetal sheep," *AJP*, vol. 280, No. 4, p. R1045-51, 2001. (*fetal sheep, carotid a., femoral a., chronic*)
- 1615A Stein, P., White, S.E., Homan, J., Hanson, M.A., Bocking, A.D., "Altered Fetal Cardiovascular Responses to Prolonged Hypoxia after Sinoaortic Denervation," *American Journal of Physiology*, Vol. 276, No. 2, p. R340-R346, 1999. (*carotid artery*)
- 1487A Gunn, A.J., Gunn, T.R., de Haan, H.H., Williams, C.E., Gluckman, P.D., "Dramatic Neuronal Rescue with Prolonged Selective Head Cooling after Ischemia in Fetal Lambs," *Journal of Clinical Investigation*, Vol. 99, NO. 2. p. 248-256, 1997. (*fetal sheep, carotid artery, chronic*)
- 1377A Gagnon, R., Lamb, T., Richardson, B., "Cerebral Circulatory Responses of Near-Term Ovine Fetuses during Sustained Fetal Placental Embolization," *American Journal of Physiology*, Vol. 273, pp. H2001-2008, 1997. (*fetal sheep, pulmonary a., carotid a., chronic*)
- 721A Gratton, R., Carmichael, L., Homan, J., Richardson, B., "Carotid Arterial Blood Flow in the Ovine Fetus As a Continuous Measure of Cerebral Blood Flow," *Journal of the Society of Gynecological Investigation*, Vol. 3, No. 2, p. 60-65 1996. (*fetal sheep, carotid a., chronic*)
- 686A Van Bel, F., Bartelds, B., Teitel, D.F., Rudolph, A.M., "Effect of Indomethacin on Cerebral Blood Flow and Oxygenation in the Normal and Ventilated Fetal Lamb," *Pediatric Research*, Vol 38 p.243-250, 1995. (*fetal sheep, carotid, chronic*)
- 661A Bennet, L., Giussani, D.A., Hanson, M.A., "Fetal Cardiovascular Function," *Scientific Essentials of Reproductive Medicine*, Editor, S.G. Hillier et al, W.B. Saunders Co. Ltd, London. (*fetal sheep, chronic, femoral a., carotid a.*)
- 659A Giussani, D.A., Spencer, J.A.D., Hanson, M.A., "Fetal Cardiovascular Reflect Responses to Hypoxaemia," *Fetal and Maternal Medicine Review*, Vol. 6, p. 17-37, 1994. (*fetal sheep, chronic, femoral, carotid*)
- 438A Giussani, D.A., McGarrigle, H.H.G., Spencer, J.A.D., Moore, P.J., Bennet, L., Hanson, M.A., "Effect of Carotid Denervation on Plasma Vasopressin Levels During Acute Hypoxia in the Late Gestation Sheep Fetus", *Journal of Physiology*, Vol. 477, No. 1, p. 81-87, 1994. (*fetal sheep, carotid a., femoral a., chronic*)

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- 356A Giussani, D.A., Spencer, J.A.D., Moore, P.J., Bennet, L., Hanson, M.A., "Afferent and Efferent Components of the Cardiovascular Reflex Responses to Acute Hypoxia in Term Fetal Sheep" *Journal of Physiology*, Vol. 461, p. 431-449, 1993. (*fetal sheep, chronic, carotid a., femoral a.*)
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Ductus Arteriosus

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- 2385A Jaillard, S., Houfflin-Debarge, V., Riou, Y., Storme, L., Puech, F., Wurtz, A., "Experimental model of perinatal pulmonary circulation in lambs," *Ann Chir*, Vol. 126, No. 7, p. 659-65, 2001. (*fetal sheep, ductus arteriosus, pulmonary a., chronic*)
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Esophagus (amniotic fluid)

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- 1303A Ross, M.G., Nijland, M.J., "Fetal Swallowing: Relation to Amniotic Fluid Regulation," *Clinical Obstetrics Gynecology*, Vol. 40, No. 2, p. 352-365, 1997. (*sheep, esophageal flow,)*
- 921A Ross, M.G., Nijland, M.J., Kullama, L.K., "1-Deamino-[8-d-arginine] vasopressin-induced maternal plasma hypoosmolality increases ovine amniotic fluid volume." *American Journal of Obstetrics & Gynecology*. April 1996; 174(4): 1118-25; discussion 1125-7. (*fetal sheep, chronic*)
- 920A Kullama, L.K., Nijland, M.J., Ross, M.G., "Development of Concentration Thresholds for Fetal Swallowing and Arginine Vasopressin Stimulation in the Preterm Ovine Fetus," *Journal of Maternal & Fetal Medicine*, Vol. 5, No. 2, p.51-7, 1996. (*fetal sheep, chronic*)
- 783A Ross, M.G., Dodd, A., Agnew, C., Fujino, Y., Ervin, M.G., "Ovine Fetal Swallowing and Behavioral State Responses to Sublingual Water," *Biological Neoate*, Vol. 64, p. 127-133, 1993. (*fetal sheep, chronic*)
- 765A Schreyer, P., Sherman, D.J., Ervin, M.G., Day, L., Ross, M.G., "Ovine Fetal Breathing and Swallowing Activity in Response to Plasma Glucose Changes," *Gynecology, Obstetrics, Investigation*, Vol. 32, No. 1, p. 15-19, 1991. (*fetal sheep, chronic*)
- 764A Ross, M.G., Agnew, C., Fujino, Y., Ervin, M.G., Day, L., "Concentration Thresholds for Fetal Swallowing and Vasopressin Secretion," *American Journal of Physiology*, Vol. 262, p. R1057-R1063, 1992. (*fetal sheep, chronic*)
- 763A Fujino, Y., Agnew, C.L., Schreyer, P., Ervin, M.G., Sherman, D.J., Ross, M.G. "Amniotic Fluid Volume Response to Esophageal Occlusion in Fetal Sheep," *American Journal of Obstetrics and Gynecology*, Vol. 165, p. R1620-1626, 1991. (*fetal sheep, chronic*)
- 762A Ross, M.G., Sherman, D.J., Ervin, M.G., Day, L., Humme, J., "Fetal Swallowing: Response to Systemic Hypotension," *American Journal of Physiology*, Vol. 258, p. R130-134, 1990. (*fetal sheep, chronic*)
- 736A Ross, M.G., Nijland, M.J.M., Kullama, L.K., Chan, "Cocaine Stimulation of Ovine Fetal Swallowing," *Developmental Brain Research*, Vol. 87, p. 120-124, 1995. (*fetal sheep, chronic*)
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- 646A Ross, M.G., Kullama, L.K., Ogundipe, A., Chan, K., Ervin, M.G., "Central Angiotensin II Stimulation of Ovine Fetal Swallowing," *Journal of Applied Physiology*, Vol. 76, No. 3, p. 1340-1345, 1994. (*fetal sheep, chronic*)
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External Iliac

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- 11V Wilkening, R.B., Boyle, D.W., and Meschia, G., "Measurement of Blood Flow and Oxygen Consumption in the Pelvic Limb of the Fetal Sheep," *Proceed. Soc. Exper. Biol. Med.*, Vol. 187, pp. 498-505, 1988. (*fetal sheep, pelvic limb, against microspheres*)
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Extracorporeal/In-Line

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- 632A Reddy, V.M. et al. "Long-Term Fetal Outcome after Fetal Cardiac Bypass: Fetal Survival to Full Term and Organ Abnormalities," *Journal of Thoracic and Cardiovascular Surgery*, Vol. 11, p.5536-44. (*fetal sheep, in-line, tubing, acute*)

Femoral a.

- 15V Spencer, J., Moore, P., Hanson, M., "Studies of Reflex Control of Fetal Carotid and Femoral Blood Flow in Hypoxia," *Proceedings of the Society for the Study of Fetal Physiology*, Vol. 16, C6, 1989. (*fetal sheep, femoral, carotid, beaker stopwatch*)
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- 2692A Fletcher, A.J., Gardner, D.S., Edwards, C.M., Fowden, A.L., Giussani, D.A., "Cardiovascular and endocrine responses to acute hypoxaemia during and following dexamethasone infusion in the ovine fetus," J Physiol, Vol. 549, Pt. 1, p. 271-87, 2003. (*fetal sheep, femoral a., chronic*)
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- 2487A Fletcher, A.J., McGarrigle, H.H., Edwards, C.M., Fowden, A.L., Giussani, D.A., "Effects of low dose dexamethasone treatment on basal cardiovascular and endocrine function in fetal sheep during late gestation," J Physiol, Vol. 545, Pt. 2, p. 649-60, 2002. (*fetal sheep, femoral a., chronic*)
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- 1147A Derks, J.B., Giussani, D.A., Jenkins, S.L., Wentworth, R.A., Visser, G.H., Padbury, J.F., Nathanielsz, P.W., "A Comparative Study of Cardiovascular, Endocrine and Behavioural Effects of Betamethasone and Dexamethasone Administration in Fetal Sheep," Journal of Physiology, Vol. 499, Pt. 1, p. 217-226, 1997. (*fetal sheep, femoral a., chronic*)
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- 659A Giussani, D.A., Spencer, J.A.D., Hanson, M.A., "Fetal Cardiovascular Reflect Responses to Hypoxaemia," Fetal and Maternal Medicine Review, Vol. 6, p. 17-37, 1994. (*fetal sheep, chronic, femoral, carotid*)
- 438A Giussano, D.A., McGarrigle, H.G., Spencer, J.A.D., Moore, P.J., Bennet, L., Hanson, M.A., "Effect of Carotid Denervation on Plasma Vasopressin Levels during Acute Hypoxia in the Late Gestation-Sheep Fetus," Journal of Physiology, Vol. 477, No. 1, p. 81-87, 1994. (*fetal sheep, carotid a. femoral a., chronic*)
- 356A Giussani, D.A., Spencer, J.A.D., Moore, P.J., Bennet, L., Hanson, M.A., "Afferent and Efferent Components of the Cardiovascular Reflex Responses to Acute Hypoxia in Term Fetal Sheep" Journal of Physiology, Vol. 461, p. 431-449, 1993. (*fetal sheep, femoral a., carotid a., chronic*)

Pulmonary a.

- 2622A Cornfield, D.N., Resnik, E.R., Herron, J.M., Reinhartz, O., Fineman, J.R., "Pulmonary vascular K⁺ channel expression and vasoreactivity in a model of congenital heart disease," AJP, Vol. 283, No. 6, p. L1210-9, 2002. (*fetal sheep, pul-*)



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- 2621A Konduri, G.G., Mattei, J., "Role of oxidative phosphorylation and ATP release in mediating birth-related pulmonary vasodilation in fetal lambs," AJP, Vol. 283, No. 4, p.H1600-8, 2002. (*fetal sheep, pulmonary a., chronic*)
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