

Name Brian S. Spooner

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Publications

Spooner, B. S. 1970. The expression of differentiation by chick embryo thyroid in cell culture. I. Functional and fine structural stability in mass and clonal culture. *J. Cell Physiol.*, 75:33-48.

Spooner, B. S. and N. K. Wessells. 1970. Effects of cytochalasin B upon microfilaments involved in morphogenesis of salivary epithelium. *Proc. Nat. Acad. Sci. U.S.A.*, 66:460-464.

Yamada, K. M., B. S. Spooner, and N. K. Wessells. 1970. Nerve growth: Roles of microfilaments and microtubules. *Proc. Nat. Acad. Sci. U.S.A.* 66:1206-1212.

Spooner, B. S., B. T. Walther, and W. J. Rutter. 1970. The development of the dorsal and ventral mammalian pancreas in vivo and in vitro. *J. Cell Biol.*, 46:235-246.

Spooner, B. S. and N. K. Wessells. 1970. Mammalian lung development: Interactions in primordium formation and bronchial morphogenesis. *J. Exp. Zool.*, 75:445-454.

Wessells, N. K., B. S. Spooner, J. F. Ash, M. O. Bradley, M. A. Luduena, E. L. Taylor, J. T. Wrenn, and K. M. Yamada. 1971. Microfilaments in cellular and developmental processes. *Science*, 171:135-143.

Spooner, B. S. and S. R. Hilfer. 1971. The expression of differentiation by chick embryo thyroid in cell culture. II. Modification of phenotype in monolayer culture by different media. *J. Cell Biol.*, 48:224-234.

Spooner, B. S., K. M. Yamada, and N. K. Wessells. 1971. Microfilaments and cell locomotion. *J. Cell Biol.*, 49:595-613.

Yamada, K. M., B. S. Spooner, and N. K. Wessells. 1971. Ultrastructure and function of growth cones and axons of cultured nerve cells. *J. Cell Biol.*, 49:614-635.

Wessells, N. K., B. S. Spooner, J. F. Ash, M. A. Luduena, and J. T. Wrenn. 1971. Microfilaments and "contractile" processes. *Science*, 173:358-359.

Spooner, B. S. and N. K. Wessells. 1972. An analysis of salivary gland morphogenesis: Role of cytoplasmic microtubules and microfilaments. *Develop. Biol.*, 27:38-54.

Spooner, B. S., J. F. Ash, J. T. Wrenn, R. B. Frater and N. K. Wessells. 1973. Heavy meromyosin binding to microfilaments involved in cell and morphogenetic movements. *Tissue and Cell*, 5:37-46.

Wessells, N. K., B. S. Spooner, and M. A. Luduena. 1973. Surface movements, microfilaments, and cell locomotion. In "Locomotion of Tissue Cells," Ciba Foundation Symposium, 14:53-73 (Assoc. Scientific Publ., Amsterdam).

- Ash, J. F., B. S. Spooner, and N. K. Wessells. 1973. Effects of papaverine and calcium-free medium on salivary gland morphogenesis. *Develop. Biol.*, 35:463-469.
- Spooner, B. S., S. R. Hilfer, and E. D. Hay. 1973. Control of cell shape changes during development. *Amer. Zool.*, 13:937-938.
- Spooner, B. S. 1973. Microfilaments, cell shape changes, and morphogenesis of salivary epithelium. *Amer. Zool.*, 13:1007-1022.
- Spooner, B. S. 1973. Cytochalasin B: Toward an understanding of its mode of action. *Develop. Biol.*, 35:f13-18.
- Spooner, B. S. 1974. Morphogenesis of vertebrate organs. In "Concepts of Development" (J. Lash and J. R. Whittaker, eds.), pp. 213-240, Sinauer Assoc., Stanford, Conn.
- Spooner, B. S., M. A. Luduena, and N. K. Wessells. 1974. Membrane fusion in the growth cone-microspike region of embryonic nerve cells undergoing axon elongation in cell culture. *Tissue and Cell*, 6:399-409.
- Wessells, N. K., M. A. Luduena, P. C. Letourneau, J. T. Wrenn, and B. S. Spooner. 1974. Thorotrast uptake and transit in embryonic glia, heart fibroblasts and neurons in vitro. *Tissue and Cell*, 6:757-776.
- Spooner, B. S. and G. W. Conrad. 1975. The role of extracellular materials in cell movement. I. Inhibition of mucopolysaccharide synthesis does not stop ruffling membrane activity or cell movement. *J. Cell Biol.*, 65:286-297.
- Spooner, B. S. 1975. Microfilaments, microtubules, and extracellular materials in morphogenesis. *BioScience*, 25:440-451.
- Spooner, B. S. 1976. Differentiation and growth of cells in vertebrate tissues (book review). *Quart. Rev. Biol.*, 51:308.
- Morgan, J. L., L. S. Rodkey, and B. S. Spooner. 1977. Quantitation of cytoplasmic tubulin by radioimmunoassay. *Science*, 197:578-580.
- Richardson, K. E. Y. and B. S. Spooner. 1977. Mammalian pancreas development: Regeneration and differentiation in vitro. *Develop. Biol.*, 58:402-420.
- Spooner, B. S., H. I. Cohen, and J. M. Faubion. 1977. Development of the embryonic mammalian pancreas: The relationship between morphogenesis and cytodifferentiation. *Develop. Biol.*, 61:119-130.
- Spooner, B. S. 1978. Cytochalasins as probes in selected morphogenetic systems. In "Cytochalasins: Biochemical and Cell Biological Aspects" (S. Tannenbaum, ed.), *Frontiers of Biology*, 46:65-89.

- Spooner, B. S. 1978. Cell and tissue interactions (book review). *Science*, 199:873-874.
- Morgan, J. L., C. R. Holladay, and B. S. Spooner. 1978. Species-dependent immunological differences between vertebrate brain tubulins. *Proc. Nat. Acad. Sci. U.S.A.*, 75:1414-1417.
- Spooner, B. S., J. F. Ash, and N. K. Wessells. 1978. Actin in embryonic organ epithelia. *Exp. Cell Res.*, 114:381-387.
- Morgan, J. L., C. R. Holladay, and B. S. Spooner. 1978. Tubulin antibody inhibits *in vitro* polymerization independently of microtubule-associated proteins. *FEBS Letters*, 93:141-145.
- Carlson, M. D. and B. S. Spooner. 1979. Nerve outgrowth by dorsal root ganglia *in vitro*: Stimulation by inhibitors of DNA metabolism in the absence of exogenous nerve growth factor. *Differentiation*, 13:117-123.
- Morgan, J. L., C. R. Holladay, and B. S. Spooner. 1980. Immunological differences between cardiac muscle, skeletal muscle, and brain actins. *Proc. Nat. Acad. Sci. U.S.A.*, 77:2069-2073.
- Spooner, B. S. and J. M. Faubion. 1980. Collagen involvement in branching morphogenesis of embryonic lung and salivary gland. *Develop. Biol.*, 77:84-102.
- Bulinski, J. C., J. L. Morgan, G. G. Borisy, and B. S. Spooner. 1980. Comparison of methods for tubulin quantitation in HeLa cell and brain tissue extracts. *Anal. Biochem.* 104:432-439.
- Spooner, B. S. and C. R. Holladay. 1981. Distribution of tubulin and Actin in neurites and growth cones of differentiating nerve cells. *Cell Motility*, 1:167-178.
- Thompson, H. A. and B. S. Spooner. 1982. Inhibition of branching morphogenesis and alteration of glycosaminoglycan biosynthesis in salivary glands treated with β -D-xyloside. *Developmental Biology*, 89:417-424.
- Spooner, B. S., C. R. Holladay, and G. R. Bright. 1982. Immunofluorescence comparisons of anti-actin specificity. *Europ. J. Cell Biol.*, 28:115-121.
- Thompson, H. A. and B. S. Spooner. 1983. Proteoglycan and glycosaminoglycan synthesis in embryonic mouse salivary glands: Effects of β -D-xyloside, an inhibitor of branching morphogenesis. *J. Cell Biol.*, 96:1443-1450.
- Wiens, D. and B.S. Spooner. 1983. Actin isotype biosynthetic transitions in early cardiac organogenesis. *Eur. J. Cell Biol.*, 30:60-66.
- Bright, G. R. and B. S. Spooner. 1983. Preparation and reactions of an iodinated imidoester reagent with actin and α -actinin. *Anal. Biochem.*, 131:301-311.

- Morgan, J. L. and B. S. Spooner. 1983. Immunological detection of microtubule poison induced conformational changes in tubulin. *J. Biol. Chem.*, 258:13127-13133.
- Wiens, D., M. Sullins, and B. S. Spooner. 1984. Pre-cardiac mesoderm differentiation in vitro: Actin isotype transitions, myofibrillogenesis, and the possible involvement of collagen. *Differentiation*, 28:62-72.
- Spooner, B. S. 1984. Citation Classic: Commentary on Science 171:135-143, 1971. *Current Contents/Life Sciences*, Vol. 27, no. 52, p. 19.
- Spooner, B. S., K. Bassett, and B. Stokes. 1985. Sulfated glycosaminoglycan deposition and processing at the basal epithelial surface in morphogenetically active and β -xyloside-inhibited embryonic salivary glands. *Develop. Biol.*, 109:177-183.
- Takemoto, D. J., B. S. Spooner, and L. J. Takemoto. 1985. Antisera to synthetic polypeptides of bovine rhodopsin: Use as site-specific probes of disc membrane changes in retinal dystrophic dogs. *Biochem. Biophys. Res. Comm.*, 132:438-444.
- Spooner, B. S., H. A. Thompson, B. Stokes, and K. Bassett. 1986. Extracellular matrix macromolecules and epithelial branching morphogenesis. *Amer. Zool.*, 26:545-547.
- Spooner, B. S., H. A. Thompson, B. Stokes, and K. Bassett. 1986. Extracellular matrix involvement in epithelial branching morphogenesis. In "Cell Surface in Development and Cancer" (M. Steinberg, ed.), pp. 225-260, Plenum Publishing Corp., NY. *Developmental Biology: A Comprehensive Synthesis*, volume 3.
- Spooner, B. S. and H. A. Thompson-Pletscher. 1986. Proteoglycans in epithelial branching morphogenesis. In "Biology of the Extracellular Matrix" (R. Mecham, ed.), Vol. 1, pp. 399-444, Academic Press, NY.
- Spooner, B. S. and A. Paulsen. 1986. Basal lamina anionic sites in the embryonic submandibular salivary gland: Resolution and distribution using ruthenium red and polyethyleneimine as cationic probes. *Eur. J. Cell Biol.*, 41:230-237.
- Bassett, K. E. and B. S. Spooner. 1987. An autoradiographic analysis of N-linked glycoconjugates in embryonic salivary gland morphogenesis. *J. Exp. Zool.*, 242:317-324.
- Spooner, B. S. 1988. Statement of Dr. Brian Spooner, Professor of Biology, Division of Biology, Ackert Hall, Kansas State University. In "How the United States Equips Itself to be Competitive in Space in the 21st Century: Maintaining Momentum in High Technology Research and Development", Hearing before the Subcommittee on Science, Technology, and Space of the Committee on Commerce, Science, and Transportation, United States Senate, One Hundredth Congress, Second Session, pp. 160-165, S. Hrg. 100-579, Part 2, U.S. Government Printing Office, Washington, D.C.
- Claassen, D. E. and B. S. Spooner. 1988. Reconstitution of cardiac gap junction channeling activity into liposomes: A functional assay for gap junctions. *Biochem. Biophys. Res.*

Comm., 154:194-198.

Spooner, B. S. 1989. The flight of NASA 930. A report on the reduced gravity experiments performed by KSU-Biology BioServe Space Technologies investigators aboard NASA parabolic flight aircraft in November, 1988. The Spooner Report, 32 pages.

Spooner, B. S., A. Paulsen, and M. S. Sullins. 1989. β -Xyloside effects on basal lamina structure and anionic site distribution in the embryonic submandibular salivary gland. Arch. Oral Biol., 34(7):541-549.

Spooner, B. S., K. E. Bassett, and B. S. Spooner, Jr. 1989. Embryonic salivary gland epithelial branching activity is experimentally independent of epithelial expansion activity. Develop. Biol., 133:5698-575.

Claassen, D. E. and B. S. Spooner. 1989. Effects of microgravity on liposome reconstituted cardiac channeling activity. Biochem. Biophys. Res. Comm., 161:358-362.

Spooner, B. S., J. A. Guikema, and G. Barnes. 1990. Binding of alpha-fetoprotein by immobilized monoclonal antibodies during episodes of zero-gravity obtained by parabolic flight. Aviat. Space Environ. Med., 61:725-728.

Layne, C. S. and B. S. Spooner. 1990. EMG analysis of human postural responses during parabolic flight microgravity episodes. Aviat. Space Environ. Med., 61:994-998.

Spooner, B. S., D. E. Claassen, and J. A. Guikema. 1990. Performance of a blood chemistry analyzer during parabolic flight. Space Technology, 10(3):135-138.

Hardman, P., B. J. Klement, and B. S. Spooner. 1990. Growth and development of embryonic mouse organs in Biopore membrane. In Vitro Cell Develop. Biol., 26:1119-1120.

Morrison, D. R., S. K. Chapes, J. A. Guikema, B. S. Spooner, and M. L. Lewis. 1992. Experiments with suspended cells on the Space Shuttle. The Physiologist 35:S31-S34.

Layne, C. S. and B. S. Spooner. 1992. Effects of postural set on anticipatory muscle activation prior to rapid arm flexion. Res. Quart. Exercise and Sport 63:196-199.

Chapes, S. K., D. R. Morrison, J. A. Guikema, M. L. Lewis, and B. S. Spooner. 1992. Cytokine secretion by immune cells in space. J. Leuk. Biol. 52:104-110.

Spooner, B. S. 1992. Gravitational studies in cellular and developmental biology. Trans. Kansas Acad. Sci. 95:4-10.

Spooner, B. S. and J. A. Guikema. 1992. The NASA Specialized Center of Research and Training (NSCORT) in gravitational biology. Trans. Kansas Acad. Sci. 95:1-3.

Klement, B. J. and B. S. Spooner. 1992. Endochondral bone formation in embryonic pre-metatarsals. Trans. Kansas Acad. Sci. 95:39-44.

- Hardman, P. and B. S. Spooner. 1992. Collagen in organ development. *Trans. Kansas Acad. Sci.* 95:29-33.
- Spooner, B. S., L. DeBell, L. Hawkins, J. Metcalf, J. A. Guikema, and J. Rosowski. 1992. Brine shrimp development in space: Ground-based data to spaceflight results. *Trans. Kansas Acad. Sci.* 95:87-92.
- Hardman, P. and B. S. Spooner. 1992. Alterations in biosynthetic accumulation of type I and III collagens during growth and morphogenesis of mouse embryonic salivary glands. *Int. J. Develop. Biol.* 423-427.
- Hardman, P. and B. S. Spooner. 1992. Localization of extracellular matrix components in developing mouse salivary glands by confocal microscopy. *Anat. Rec.* 234:452-459.
- Hardman, P. and B. S. Spooner. 1992. Salivary epithelium morphogenesis. IN: Epithelial Organization and Development (Fleming, T., ed.), Chapman and Hall, U.K., 353-375.
- DeBell, L., A. Paulsen, and B. S. Spooner. 1992. Scanning electron microscope observations of brine shrimp larvae from Space shuttle experiments. *Scanning Microscopy* 6(4):1129-1135.
- Spooner, B. S., K. E. Bassett, and B. S. Spooner, Jr. 1993. Embryonic lung morphogenesis in organ culture: experimental evidence for a proteoglycan function in the extracellular matrix. *Kans. Trans. Acad. Sci.* 96(1-2):46-55.
- Klement, B. J. and B. S. Spooner. 1993. Embryonic mouse pre-metatarsal development in organ culture. *J. Exp. Zool.* 265:285-294.
- Klement, B. J. and B. S. Spooner. 1993. Utilization of the microgravity bioreactor for differentiation of mammalian skeletal tissue. *J. Cell. Biochem.* 51:252-256.
- Hardman, P. and B. S. Spooner. 1993. Extracellular matrix and growth factors in branching morphogenesis. *Kans. Trans. Acad. Sci.* 96(1-2):56-61.
- Spooner, B. S. 1993. The second annual symposium of the NASA specialized center of research and training (NSCORT) in gravitational biology. *Kans. Trans. Acad. Sci.* 96(1-2):1-6.
- Claassen, D. E., J. S. van Twest, and B. S. Spooner. 1994. Formation and vesiculation of biomembranes during spaceflight. *Adv. Space Res.* 14(8):111-114.
- Chapes, S. K., D. R. Morrison, J. A. Guikema, M. L. Lewis, and B. S. Spooner. 1994. Production and action of cytokines in space. *Adv. Space Res.* 14(8):5-9.
- Layne, C. S. and B. S. Spooner. 1994. Microgravity effects on "postural" muscle activity patterns. *Adv. Space Res.* 114(8):381-184.
- Guikema, J. A. and B. S. Spooner. 1994. Educational opportunities within the NASA

- Specialized Center of Research and Training (NSCORT) in gravitational biology. *Adv. Space Res.* 114(8):435-438.
- Spooner, B. S., L. DeBell, L. Armbrust, J. A. Guikema, J. Metcalf, and A. Paulsen. 1994. Embryogenesis, hatching, and larval development of artemia during orbital spaceflight. *Adv. Space Res.* 114(8):229-238.
- Guikema, J. A., L. DeBell, A. Paulsen, B. S. Spooner, and P. P. Wong. 1994. Clover root development during spaceflight: a model system. *Adv. Space Res.* 14(8): 173-176.
- Claassen, D. E. and B. S. Spooner. 1994. The impact of alterations in gravity on aspects of cell biology. *Internat. Rev. Cytology* 156:301-373.
- Spooner, B.S. 1994. Introduction: Gravitational cellular and developmental biology. *J. Exp. Zool.* 269:177.
- Spooner, B. S., P. Hardman, and A. Paulsen. 1994. Gravity in mammalian organ development: Differentiation of cultured lung and pancreas rudiments during spaceflight. *J. Exp. Zool.* 269:212-222.
- Klement, B. J. and B. S. Spooner. 1994. Pre-metatarsal skeletal development in tissue culture at unit- and microgravity. *J. Exp. Zool.* 269:230-241.
- Spooner, B. S., J. Metcalf, L. DeBell, A. Paulsen, W. Noren, and J.A. Guikema. 1994. Development of the bring shrimp Artemia is accelerated during spaceflight. *J. Exp. Zool.* 209:253-262.
- Hardman, P., E. Landels, A. S. Woolf, and B. S. Spooner. 1994. TGF-Beta 1 inhibits growth and branching morphogenesis in embryonic mouse submandibular and sublingual glands in vitro. *Develop. Growth & Differ.* 36(6):567-577.
- van Twest, J. S., A. Paulsen, and B. S. Spooner. 1995. In vitro chick precardiac explant tissue differentiation during spaceflight on Spacelab-02. *Acta Anat.* 154:169-180.
- Rosowski, J. R., M. A. Guthro, K. K. Schmidt, B. J. Klement, and B. S. Spooner. 1995. The effect of microgravity and hypergravity on embryo axis alignment during postencystment embryogenesis in Artemia franciscana (Anostraca). *J. Crustacean Biol.*, 15:625-632.
- Claassen, D. E. and B. S. Spooner. 1996. Liposome formation in microgravity. *Adv. Space Res.*, 17(6/7):151-160.
- Klement, B.J., J. van Twest, R.A. Staudenmaier, H. Brittain, and B.S. Spooner. 1997. The use of reduced temperatures for reversible developmental arrest of organ cultures prior to spaceflight experimentation and for postflight analyses. IN "American Institute of Physics Conference #970115" (M.S. El-Genk, ed.), pp.933-938, Amer. Inst. Physics, New York, NY.
- Klement, B.J. and B.S. Spooner. 1997. Assessment of three types of spaceflight hardware for

tissue culture studies: Comparison of skeletal tissue growth and differentiation. IN "American Institute of Physics Conference #970115" (M.S. El-Genk, ed.), pp. 827-932, Amer. Inst. Physics, New York, NY.

Norton, W.N., D. Wiens, and B. Spooner. 1997. Employment of a bioreactor vessel to simulate elements of microgravity during early chick heart development. *Microscopy & Microanalysis Proceedings* 3(Suppl. 2):171-172.

Spooner, B.S. 1998. Life sciences experiments in amicrogravity environment. Project Re-Entry, 7 pp, USRA website; <http://www.usra.edu/whats_news/re-entry/follow-on/pres/spoon01.html>.

Klement, B.J. and B.S. Spooner. 1999. Mineralization and growth of cultured embryonic skeletal tissue in microgravity. *Bone* 24:349-359.

Lwigale, P.Y., B.S. Spooner, and D.J. Wiens. 2000. Simulated microgravity and hypergravity attenuate heart development in explant culture. *Cells Tissues Organs* 167:171-183.

Klement, B.J., B.J. George, Q.M. Young and B.S. Spooner. 2004. Tissue growth and mineralization in the Rotating Wall Vessel and in spaceflight. *Journal of Gravitational Physiology*. 11:67-82.

Abstracts

Spooner, B. S. 1967. Clonal cell culture of embryonic chick pancreas. *In Vitro*, 3:179.

Spooner, B. S. 1968. Phenotypic stability of embryonic chick thyroid in mass and clonal culture. *J. Cell Biol.*, 39:128a.

Spooner, B. S. 1969. Modification of differentiated thyroid phenotype in monolayer culture by different media. *J. Cell Biol.*, 43:137a.

Spooner, B. S. and G. W. Conrad. 1973. Mucopolysaccharides in cell movement: Non-correlation between synthesis and undulating membrane activity. *J. Cell Biol.*, 59:331a.

Spooner, B. S., H. I. Cohen, J. M. Faubion, and K. L. Winkel. 1974. Exocrine pancreas cytodifferentiation in the absence of morphogenesis. *J. Cell Biol.*, 63:328a.

Morgan, J. L., S. Zielke, L. S. Rodkey, and B. S. Spooner. 1976. A radioimmunoassay for the quantitation of tubulin. *J. Cell Biol.*, 70:95a.

Richardson, K. E. Y. and B. S. Spooner. 1976. Regeneration and differentiation in vitro of the protodifferentiated pancreas in the mouse embryo. *J. Cell Biol.*, 70:184a.

Faubion, J. M. and B. S. Spooner. 1977. Epithelial branching morphogenesis: The involvement of collagen. *J. Cell Biol.*, 75:162a.

Morgan, J. L., C. R. Holladay, and B. S. Spooner. 1977. Tubulin - antitubulin interactions:

- Species differences, polymerization, and colchicine binding. *J. Cell Biol.*, 75:292a.
- Morgan, J. L., R. F. Ludena, and B. S. Spooner. 1978. Tubulin conformation changes induced by anti-mitotic drug binding. *J. Cell Biol.*, 79:292a.
- Spooner, B. S., J. L. Morgan, C. R. Holladay, and G. R. Bright. 1979. Structural differences in actins revealed by radioimmunoassay. *J. Cell Biol.* 83:325a.
- Thompson, H. and B. S. Spooner. 1980. Branching morphogenesis of embryonic salivary epithelia: Inhibition by β -D-xyloside. *J. Cell Biol.*, 87:116a.
- Weins, D. and B. S. Spooner. 1981. Cardiac myogenesis: Biosynthetic changes in actin isoforms during heart development. *J. Cell Biol.*, 91:350a.
- Spooner, B. S. and B. Stokes. 1983. Basal lamina proteoglycan and branching morphogenesis of embryonic mouse submandibular gland. *J. Cell Biol.*, 97:319a.
- Spooner, B. S. and A. Paulsen. 1984. ECM anionic sites in embryonic submandibular glands: Resolution and distribution in basal laminae of branching and β -xyloside-inhibited rudiments. *J. Cell Biol.* 99:74a.
- Bassett, K. and B. S. Spooner. 1985. Surface-associated glycoproteins and epithelial morphogenesis: Tunicamycin-sensitive aspects of embryonic salivary gland growth and branching activity. *J. Cell Biol.*, 101:92a.
- Spooner, B. S., I. Davis, and M. Sullins. 1985. Immunological comparison of tropomyosins from chicken cardiac muscle, skeletal muscle, and brain. *J. Cell Biol.*, 101:403a.
- Claassen, D. E. and B. S. Spooner. 1987. Functional assay for cardiac gap junctions: Reconstitution of gap junction function into liposomes. *J. Cell Biol.*, 105:263a.
- Iandolo, J. J. and B. S. Spooner. 1988. Testing of biological self-assembly in variable G-forces. *ASGSB Bulletin*, 2:31a.
- Claassen, D. E. and B. S. Spooner. 1988. Channeling activity of liposome-reconstituted cardiac gap junctions: An assay amenable to short-duration microgravity bouts. *ASGSB Bulletin*, 2:58a.
- Spooner, B. S., K. E. Bassett, and B. S. Spooner, Jr. 1988. Sulfated GAG and lung development. *J. Cell Biol.*, 107:159a.
- Layne, C. S., J. A. Guikema, and B. S. Spooner. 1989. The interaction between prime mover and postural activity in a zero gravity environment: EMG analyses during parabolic flight-generated microgravity. *ASGSB Bulletin*, 3:34.
- Hardman, P. and B. S. Spooner. 1989. Embryonic organ morphogenesis in culture: developmental processes amenable to analysis in microgravity. *ASGSB Bulletin*, 3:106.

- Guikema, J. A. and B. S. Spooner. 1989. Receptor/ligand binding during zero-gravity episodes of parabolic flight. *ASGSB Bulletin*, 3:51.
- Claassen, D. E., J.A. Guikema, and B. S. Spooner. 1989. Performance of the VISION system blood analyzer during parabolic flight. *ASGSB Bulletin*, 3:51.
- Hardman, P. and B. S. Spooner. 1989. Biosynthesis of collagens by embryonic mouse salivary glands in vitro. *J. Cell Biol.*, 109:112a.
- Claassen, D. E. and B. S. Spooner. 1989. Effects of microgravity on liposome-reconstituted cardiac gap junction channeling activity. *ASGSB Bulletin*, 3:86.
- Hardman, P., B. J. Klement, and B. S. Spooner. 1990. Growth and development of embryonic mouse organs on noncoated and extracellular matrix-coated Biopore membrane. Abstracts of 49th Annual Symposium, Society for Developmental Biology, Washington, D.C., 34.
- Klement, B. J. and B. S. Spooner. 1990. Mammalian cartilage differentiation and hypertrophy in organ culture. *ASGSB Bulletin*, 4:65.
- DeBell, L., J. Rosowski, L. Stodieck, B. Spooner, and J. Guikema. 1990. Microgravity effects on pre-adult brine shrimp. *ASGSB Bulletin*, 4:24.
- DeBell, L., J. A. Guikema, P. Wong, and B. S. Spooner. 1990. Rhizobia trifolii bind to root hairs of white clover seedlings in microgravity. *ASGSB Bulletin*, 4:71.
- Claassen, D. E. and B. S. Spooner. 1990. Effects of microgravity on liposome formation. *ASGSB Bulletin*, 4:69.
- Hardman, P. and B. S. Spooner. 1990. Localization of extracellular matrix components in developing mouse salivary glands by confocal microscopy. *J. Cell Biol.* 111:396a.
- Claassen, D. E. and B. S. Spooner. 1991. Use of microgravity to elucidate micelle-vesicle transition during liposome formation. *ASGSB Bulletin*, 5:28.
- Chapes, S. K., B. S. Spooner, J. A. Guikema, and D. Morrison. 1991. Macrophage production of monokines in space. *ASGSB Bulletin*, 5:31.
- Klement, B. J. and B. S. Spooner. 1991. Regulation of mammalian skeletal tissue morphogenesis and differentiation in organ culture. *ASGSB Bull.* 5:55.
- DeBell, L., B. S. Spooner, and J. R. Rosowski. 1991. Reinitiation of brine shrimp embryonic development from gastrula-arrested formancy during space shuttle flight. *ASGSB Bulletin*, 5:58.
- Klement, B. J., J. A. Guikema, J. R. Rosowski, and B. S. Spooner. 1991. Brine shrimp motility in microgravity. *ASGSB Bulletin*, 5:31.

- Hardman, P. and B. S. Spooner. 1991. The effect of growth factors on mouse embryonic salivary gland growth and development in vitro. *J. Cell Biol.* 115:225a.
- Chapes, S. K., D. R. Morrison, J. A. Guikema, M. L. Lewis, and B. S. Spooner. 1992. Production of cytokines in space by macrophages. 29th Plenary Meeting of the Committee on Space Research, COSPAR, Washington, DC.
- Claassen, D. E. and B. S. Spooner. 1992. Formation and vesiculation of biomembranes during spaceflight. 29th Plenary Meeting of the Committee on Space Research, COSPAR, Washington, DC.
- Guikema, J. A. and B. S. Spooner. 1992. Educational opportunities within the NASA specialized center for research and training (NSCORT) in gravitational biology. 29th Plenary Meeting of the Committee on Space Research, COSPAR, Washington, DC.
- Guikema, J. A., L. DeBell, L. Paulsen, B. S. Spooner, and P. P. Wong. 1992. Clover development during spaceflight: a model system. 29th Plenary Meeting of the Committee on Space Research, COSPAR, Washington, DC.
- Spooner, B. S., L. DeBell, J. A. Guikema, and J. Rosowski. 1992. Embryogenesis, hatching and larval development of *Artemia* during orbital spaceflight. 29th Plenary Meeting of the Committee on Space Research, COSPAR, Washington, DC.
- Layne, C. S. and B. S. Spooner. 1992. Microgravity effects on "postural" muscle activity patterns. 29th Plenary Meeting of the Committee on Space Research, COSPAR, Washington, DC.
- Klement, B. J. and B. S. Spooner. 1992. Mouse embryo pre-metatarsal development in organ culture. 51st Annual Symposium, Society for Developmental Biology, Seattle, WA.
- Hardman, P. and B. S. Spooner. 1992. Effects of TGF-beta on growth, branching morphogenesis, and collagen biosynthetic patterns of mouse embryonic salivary glands. 51st Annual Symposium, Society for Developmental Biology, Seattle, WA.
- Spooner, B. S. and J. A. Guikema. 1992. The NASA specialized center of research and training (NSCORT) in gravitational biology. *ASGSB Bull.* 6(1):42a.
- Spooner, B. S. and J. A. Guikema. 1992. Graduate and postgraduate training activities of the gravitational biology NSCORT. *ASGSB Bull.* 6(1):60a.
- Guikema, J. A. and B. S. Spooner. 1992. Graduate and postgraduate training activities of the gravitational biology NSCORT. *ASGSB Bull.* 6(1):78a.
- Buyle, K. R., J. A. Guikema, and B. S. Spooner. 1992. Educational and outreach activities in the gravitational biology NSCORT. *ASGSB Bull.* 6(1):42a.
- van Twest, J. S., D. E. Claassen, and B. S. Spooner. 1992. Gap junctional communication in microgravity. *ASGSB Bull.* 6(1):61a.

- Klement, B. J. and B. S. Spooner. 1992. Embryonic skeletal tissue development in vitro. ASGSB Bull. 6(1):33a.
- Hardman, P. and B. S. Spooner. 1992. Effects of clinorotation on embryonic mouse salivary gland growth and morphogenesis. ASGSB Bull. 6(1):79a.
- Klement, B. J. and B. S. Spooner. 1992. Cartilage differentiation and calcification during skeletal development in organ culture. Mol. Biol. Cell 3:229a.
- Claassen, D. E., J. S. van Twest, D. J. Wiens, and B. S. Spooner. 1992. Connexin43 peptide antibody studies on chicken cardiac muscle. Mol. Biol. Cell 3:293a.
- Hardman, P. and B. S. Spooner. 1992. TGF-beta1 inhibits growth and branching morphogenesis of mouse embryonic salivary glands and alters collagen biosynthetic patterns. Mol. Biol. Cell 3:313a.
- Spooner, B. S., Hardman, P., and Paulsen, A. 1993. Differentiation of embryonic mouse pancreas in microgravity: organ cultures studies aboard the space shuttle Endeavor (STS-54). ASGSB Bull. 7(1):82.
- Spooner, B. S., J. Metcalf, L. DeBell, and A. Paulsen. 1993. Brine shrimp development is accelerated during spaceflight. ASGSB Bull. 7(1):82.
- van Twest, J. A., D. E. Claassen, and B. S. Spooner. 1993. Connexin43 (CX43) channeling activity and size exclusion in microgravity. ASGSB Bull. 7(1):44.
- Klement, B. J. and B. S. Spooner. 1993. Pre-metatarsal organ culture in microgravity. ASGSB Bull. 7(1):59.
- Klement, B. J. and B. S. Spooner. 1994. Pre-metatarsal growth and mineralization during spaceflight. ASGSB Bull. 8(1):51.
- van Twest, J., A. Paulsen, and B. S. Spooner. 1994. The effects of spaceflight on cardiac differentiation: culture of pre-heart chick embryo explants on SpaceLab-02. ASGSB Bull. 8(1):50.
- Klement, B. J. and B. S. Spooner. 1995. Mineralization and growth of pre-metatarsal cultures during spaceflight. ASGSB Bull. 9(1):62.
- Klement, B.J. and B.S. Spooner. 1996. Pre-metatarsal mineralization and growth during culture in spaceflight. Grav. Space Biol. Bull. 10(1):47.
- Norton, W.M., D. Wiens, and B. Spooner. 1997. Employment of a bioreactor vessel to simulate elements of microgravity during early chick heart development. Proceedings, Annual Meeting of the Microscopy Society, p. 171.
- Lwigale, P., J. Denning, A. Juhl, W. Norton, B.S. Spooner, and D. Wiens. 1997. Exposure to

either hypo- or hypergravity attenuates heart development in culture. *Grav. Space Biol. Bull.* 11(1):28.

Klement, B.J. and B.S. Spooner. 1998. Pre-metatarsal differentiation during spaceflight. 32nd Plenary Meeting of the Committee on Space Research. COSPAR, Nagoya, Japan.