**T186 Assessment of third-ventricle cerebrospinal fluid concentrations of GHRH in cattle: Correspondence with serum concentrations of GH and influences of appetite-regulating peptides.** M. G. Thomas*[1], M. Amstalden[2], D. M. Hallford[1], G. A. Silver[1], M. D. Garcia[1], D. H. Keisler[3], and G. L. Williams[4], [1]*New Mexico State University*, *Las Cruces*, [2]*Texas A&M University*, *College Station*, [3]*University of Missouri*, *Columbia*, [4]*Texas AgriLife*, *Beeville, TX*.

Hypothalamic hormones, GHRH and somatostatin, are important regulators of adenohypophyseal secretion of GH. Direct evaluation of these neuroendocrine events is an anatomical challenge in cattle. Objectives were to: 1) characterize the relationship of third-ventricle cerebrospinal fluid (CSF) concentrations of GHRH with concentrations of GH in circulation, and 2) assess the influence of acute administration of appetite-regulating peptides, leptin (anti-orexigenic) and neuropeptide Y (NPY; orexigenic) on release of GHRH. Six mature, well-fed, Braford cows fitted with third cerebroventricle and jugular vein cannulae were treated intracerebroventricularly with saline, leptin (600 μg), or NPY (500 μg) in a replicated 3 × 3 Latin Square. Third-ventricle CSF and blood were collected 10 min before and for an additional 220 min after delivery of treatments. Concentrations of GHRH in CSF and GH in blood were evaluated with RIA. Hormone secretion patterns were assessed with Pulse_XP software. Mean concentrations of GHRH and GH were similar among treatments as was frequency of pulses of GHRH and GH. Mean concentrations of GHRH and frequency of pulses were 2.2 ± 0.13 ng/mL and 1.2 ± 0.15 pulses/240 min, respectively. Concentrations of GHRH in CSF were weakly correlated (r = 0.15; $P < 0.03$) with serum concentrations of GH; however, 58.2% of the GH pulses were preceded by a pulse of GHRH and 90% of the GHRH pulses occurred within 2 samples preceding a pulse of GH. Area under the curve (AUC) values for saline, leptin, and NPY treatments were 4,887, 3,719, 6,058 ± 444, respectively. Relative to saline, leptin tended ($P < 0.10$) to suppress GH AUC. Concomitantly, NPY tended ($P < 0.10$) to increase GH AUC, which appeared to be a consequence of increased ($P < 0.05$) pulse amplitude. Infusion of NPY also increased ($P < 0.05$) AUC of GHRH relative to saline. Sampling CSF from the third-cerebroventricle appears to be a viable procedure for assessing hypothalamic release of GHRH coincident with anterior pituitary gland secretion of GH in cattle.

**Key Words:** Bovine, GHRH, GH

**T187 IGF-I modulation of GH and LH secretion in the pig.** C. R. Barb and G. J. Hausman*, *USDA, ARS, Russell Research Center*, *Athens, GA*.

Three experiments (EXP) were conducted to determine the role of IGF-I in modulating GH and LH secretion. In EXP I, prepuberal gilts, 65± 6 kg BW and 140 d of age received intracerebroventricular (ICV) injections of saline (n = 4), 25μg (n = 4) or 75μg (n = 4) IGF-I and jugular blood samples were collected. In EXP II, anterior pituitary cells in culture collected from 150 d old prepuberal gilts (n = 6) were challenged with 0.1, 10 or 1000 nM [$Ala^{15}$]-h growth hormone-releasing factor-(1-29)$NH_2$ (GRF), or 0.01, 0.1, 1, 10, 30 nM IGF-I individually or in combination with 1000 nM GRF. Secreted GH was measured at 4 and 24 h after treatment. In EXP III, anterior pituitary cells in culture collected from 150 d old barrows (n = 5) were challenged with 10, 100 or 1000 nM GnRH or 0.01, 0.1, 1, 10, 30 nM IGF-I individually or in combinations with 100 nM GnRH. Secreted LH was measured at 4 h after treatment. In EXP I, serum GH and LH concentrations were unaffected by ICV IGF-I treatment. In EXP II, relative to control all doses of GRF increased ($P < 0.01$) GH secretion. Only 1, 10, 30 nM IGF-I enhanced ($P < 0.02$) basal GH secretion whereas by 24 h all doses except for 30 nM IGF-I suppressed ($P < 0.02$) GH secretion compared to control wells. All doses of IGF-I in combination with 1000 nM GRF increased ($P < 0.04$) the GH response to GRF compared to GRF alone at 4 h. In contrast by 24 h all doses of IGF-I except for 1 nM suppressed ($P < 0.04$) the GH response to GRF. In EXP III, all doses of IGF-I increased ($P < 0.01$) basal LH levels while the LH response to GnRH was unaffected by IGF-I ($P > 0.1$). In conclusion, under these experimental conditions the results suggest that IGF-I may directly modulate GH secretion at the level of the pituitary gland and although IGF-I increased basal LH secretion from pituitary cultures further examination of the role of IGF-I on LH secretion is needed.

**Key Words:** LH, GH, IGF-I

**T188 Growth hormone directly stimulates insulin production from the bovine pancreatic islets.** J. Feng[1,2], F. C. Gwazdauskas[1], and H. Jiang*[1], [1]*Virginia Polytechnic Institute and State University*, *Blacksburg*, [2]*Zhejiang University*, *Hangzhou, Zhejiang, China*.

The objective of this study was to determine the effect of GH on insulin secretion in cattle and the mechanism responsible for this effect. Administration of 500 mg of recombinant bovine GH in a slow-release formulation caused a continuous increase ($P < 0.01$) in serum concentration of insulin and IGF-I in nonlactating, nonpregnant beef cows (n = 8) during the 7 d following the administration, with serum concentration of insulin being nearly 5 times greater on d 7 after GH administration than on d 1 before GH administration ($P < 0.01$). Treatment of isolated bovine pancreatic islets with 100 ng/mL of GH for 1 h, 10 ng/mL of GH for 24 h, or 100 ng/mL of GH for 24 h in the presence of 3.3 mM of glucose each increased secretion of insulin in the culture medium by 20 to 30% as compared to 3.3 mM glucose only ($P < 0.05$, n = 6). Treatment of the islets with 100 ng/mL of GH for 24 h in the presence of 3.3 mM of glucose increased insulin mRNA abundance in the cultured islets by nearly 200% ($P < 0.05$, n = 4) as compared to 3.3 mM glucose only. Immunohistochemical analyses using antibodies recognizing the bovine GH receptor and insulin indicated that GH receptor protein is expressed in at least some of the insulin-producing beta cells in the bovine pancreatic islets. Taken together, these results suggest that GH administration increases serum concentration of insulin in cattle and that this effect is at least in part due to direct action of GH on insulin gene expression and secretion from the pancreatic beta cells.

**Key Words:** Growth Hormone, Insulin, Islets

**T189 Milk composition is not affected by retail milk labels regarding farm management practices.** J. L. Vicini*[1], T. D. Etherton[2], P. M. Kris-Etherton[2], J. M. Ballam[1], R. D. Cady[1], M. F. McGrath[1], M. C. Lucy[3], A. C. Fitzgerald[1], T. D. Klusmeyer[1], and M. F. Migliazzo[1], [1]*Monsanto Co., LC*, *St. Louis, MO*, [2]*Pennsylvania State University*, *University Park*, [3]*University of Missouri*, *Columbia*.

A survey was conducted to determine if composition of retail milk is affected by label claims related to dairy farm management. Retail milk samples (n = 334) from 48 states were collected. Samples were blocked in complete or incomplete blocks such that within a block all samples were collected on the same date, by the same collector, in the same city and state and were shipped in the same container. Milk was purchased with one of three types of labels: 1) conventional (no claims about type of management), 2) recombinant bovine somatotropin (rbST)-free (processor certified not from cows supplemented with rbST) and 3) organic (follows USDA organic practices). Only samples not labeled as ultra-pasteurized (UP) were selected but it is known that some organic milk was UP and this was not indicated on the label. None of the samples tested positive for antibiotics. An analysis for all samples was conducted and least-squares means within whole milk are presented below (values with unlike superscripts are different ($P$<0.05). Although some significant differences were detected, values were within normal ranges and indicate that management labels predict no meaningful differences in composition. Consumption of all dairy products should be encouraged to achieve nutrient adequacy.

**Table 1.**

| | Conventional | rbST-Free | Organic | SE† |
|---|---|---|---|---|
| Bacteria, $10^3$ cfu/ml | 11[a] | 26[b] | 22[c] | 7.8 |
| Fat, % | 3.30 | 3.38 | 3.38 | 0.024 |
| Lactose, % | 4.71 | 4.70 | 4.67 | 0.015 |
| Protein, % | 3.14[a] | 3.15[a] | 3.22[b] | 0.013 |
| SNF, % | 8.77 | 8.77 | 8.82 | 0.023 |
| bST, ng/ml | 0.005 | 0.042 | 0.002 | 0.0066 |
| IGF-1, ng/ml | 3.12[a] | 3.04[a] | 2.73[b] | 0.063 |
| Progesterone, ng/ml | 12.0[a] | 12.8[a] | 13.9[b] | 0.43 |
| Estradiol, pg/ml | 4.97[a] | 6.63[b] | 6.40[b] | 0.269 |
| Price, $/0.5 gal‡ | 2.03 | 2.66 | 3.46 | 0.115 |

†Weighted SE. ‡Not statistically analyzed. [a,b,c] $P$<0.05.

**Key Words:** Somatotropin, bST, Organic