seems to take place during the 17E embryonic development stage of the *S. lilium*. In the case of *A. jamaicensis* CGP entering meiosis are detected in stage 17. Therefore, structural changes that lead to ovarian and testicular development in both species of bats are similar to those observed in mice, but the differences will be established at the time that these processes are carried out.

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Program/Abstract # 93
Using pluripotency cell markers to identify primordial germ cells in embryos of the laboratory opossum, *Monodelphis domestica*
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The lineage which becomes primordial germ cells (PGCs), and later the gametes, in various animals is sequestered early during embryonic development. This population of pluripotent cells is first observed in the extra-embryonic portion of the mouse epiblast on day 7.25 of gestation. They then undergo mitosis and migrate, reaching the genital ridge on day 9.5 of gestation. Marsupial PGCs, by contrast, are poorly characterized. Meanwhile, the embryos of these mammals are larger and more accessible because implantation occurs late during pregnancy, and with only meager yolk-sac adhesivity to the endometrium. Moreover, the topology of the conceptus and the superficial position of the fetus itself on the yolk sac suggest that visualization of PGCs should be amenable to analysis by different microscopy approaches, including whole-mounts. We are using immunohistochemistry, fluorescence and confocal microscopy to determine the expression pattern of the pluripotency cell-marker proteins encoded by Oct-3/4, vasa, and Nanog. We anticipate our results to be useful in studying PGC differentiation and migration in the laboratory opossum. Support for this work was provided by the National Science Foundation (No. 0718404) and the Oberlin College Research Fellows Program.

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Program/Abstract # 94
Implantation disorder related to impaired translation in the oocyte and in the resulting embryo
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Program/Abstract # 95
Cyclic GMP from the somatic cells of the mouse ovarian follicle regulates cyclic AMP and meiosis in the oocyte
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Mammalian oocytes are arrested in meiotic prophase by an inhibitory signal from the somatic cells of the follicle surrounding them. Luteinizing hormone (LH) then binds to receptors on the somatic cells, and causes the oocyte cell cycle to resume, in preparation for fertilization. We investigated how the somatic cells regulate the prophase-to-metaphase transition in the oocyte, using FRET-based cyclic nucleotide sensors in follicle-enclosed mouse oocytes. Our results show that cGMP passes through gap junctions from the somatic cells into the oocyte, where it inhibits the hydrolysis of cAMP by the phosphodiesterase PDE3A. This maintains a high concentration of cAMP in the oocyte, which inhibits meiotic progression. LH reverses the inhibition by lowering cGMP in the somatic cells (from ~2 μM to ~80 nM at 1 h after LH) and by closing gap junctions between the somatic cells. Both of these events cause oocyte cGMP to decrease (from ~1 μM to ~40 nM), which increases the activity of PDE3A by ~5-fold. As a result, oocyte cAMP decreases (from ~700 nM to ~140 nM) and meiosis resumes.

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Program/Abstract # 96
The DM domain protein DMRT1 is a dose-sensitive regulator of germ cell pluripotency
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DMRT1 (*Doublesex* and *Mab 3 Related Transcription factor 1*) is a member of a conserved group of sexual regulators sharing the DM DNA binding motif. In mice, *Dmrt1* is expressed specifically in the gonad and *Dmrt1* null mutants have severe defects in differentiation of germ and Sertoli cells starting at birth, leading to a highly dysgenic testis. *Dmrt1* mutants on the 129/Sv genetic background develop testicular germ cell tumors (teratomas) with a very high incidence. Conditional gene targeting reveals that DMRT1 activity is required primarily in embryonic germ cells to prevent tumor formation. mRNA expression profiling at E13.5 comparing 129/Sv wt to *Dmrt1* mutants implicates GDNF signaling as possibly underlying teratoma formation. GDNF signaling through RET and GFRA1 coreceptors is essential for survival of undifferentiated spermatocytes in the adult mouse. We are testing the role of GDNF signaling in 129/Sv embryonic gonads. 129/Sv *Dmrt1* mutant gonocytes undergo normal early differentiation, including sex determination, but a subset of germ cells fail to exit mitosis and ectopically express the pluripotency regulators OCT4, SOX2 and NANOG. DMRT1 binds to the promoters of cell cycle and pluripotency regulators in the neonatal testis. Currently we are using ChIP to test which genes DMRT1 binds in the embryonic testis. Genetic analysis indicates that *Dmrt1* acts as a highly dose sensitive tumor suppressor gene and that natural variation in DMRT1 activity can be a factor in germ cell tumor susceptibility. We are investigating the role of *DMRT1* in human germ cell tumors.

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