gene lose epithelial integrity; they are irregular in shape and lose apical–basal polarity. Significantly we detect BM components in an apical location in these cells. We are currently investigating the molecular basis of these phenotypes and will present our analysis of the role of GB73 in regulating BM polarity.

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Program/Abstract # 167
Identification of an evolutionarily conserved regulatory element of the zebrafish collagen 2 alpha 1a gene
Rodney Dale, Jacek Topczewski
Northwestern University Feinburg School of Medicine, Children's Memorial Research Center, Chicago, IL, USA

With the many techniques and available mutants, the zebrafish (*Danio rerio*) is an excellent model to study cartilage and skeletal development. However, no genetic tool is currently available in zebrafish allowing targeted ectopic expression of genes in craniofacial chondrocytes after they differentiate from the neural crest. In an effort to identify such a regulatory unit, we analyzed the col2a1a gene, expressed in both the stacked chondrocytes and the perichondrium of cartilage. By comparing genome sequence of four teleost, we identified a small, highly conserved region (R2) located 1.7 kb upstream of the presumptive transcriptional start site. We generated transgenic lines where reporter gene expression was driven by the R2 element or the entire 1.7 kb fragment and observed the presence of the reporter in domains corresponding to endogenous col2a1a expression. We were able to track the development of numerous tissues expressing col2a1a such as the craniofacial cartilage, skull sutures, ear, floor plate, hypochord and fins at developmental stages from early segmentation through adulthood. In particular, we analyzed the process of notochord sheath cells formation as these cells withdraw from the stack and encase the centrally located, vacuolated cells. R2 element activity, like col2a1a, depends on sox9a for craniofacial expression, while notochord and ear expression are maintained after sox9a knockdown, suggesting that other factors can activate expression through the R2 element. We believe that these newly generated tools will be very useful for developmental studies of multiple tissues in the zebrafish.

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Program/Abstract # 168
Nanoparticle effects on morphology in *Danio rerio*
Nancy Wall[a], Sarah Mohrmann[b], David Hall[a], Matt Weinlander[a]
[a]*Appleton, WI, USA*
[b]*George Washington University, Washington, DC, USA*

Nanotechnology utilizes nanoparticles (particles ranging from 1 to 100 nm) of a wide range of substances for applications in medicine, energy development, and daily life (ex. clothing and cosmetics). However, nanoscale particles have physical properties that are distinct from larger sized particles of the same substance. Like many new technologies, the environmental and health implications of nanotechnology have not been thoroughly investigated. To better understand nanoparticle toxicity, we looked at the effects of Au, Ag, and PMMA (polymethyl methacrylate) nanoparticles on embryonic and larval development in zebrafish (*Danio rerio*), focusing on survival and developmental morphology. Au and PMMA nanoparticles did not have an observable effect on embryo survival or development. However, embryos treated with Ag nanoparticles had reduced survival rates and exhibited a bent tail phenotype as well as cardiac edema. Ag nanoparticle treated embryos were further analyzed for abnormal patterns of apoptosis and gene expression. Patterns of apoptosis were not significantly different from untreated embryos. Since knockdown of ribosomal proteins produce phenotypes similar to Ag nanoparticle treatment (Uechi et al., 2006), expression of ribosomal protein genes are examined. Preliminary RT-PCR results indicate that expression of ribosomal protein 3 (rp3) is reduced in Ag nanoparticle treated embryos.

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Program/Abstract # 169
The search for mutant alleles affecting pharynx in the model organism: *C. elegans*
Lynn Switaj[a], Anneliese Szutenbach[b], Pliny Smith[b]
[a]*Lake Forest College Biology, Lake Forest, IL, USA*
[b]*Lake Forest College, Lake Forest, IL, USA*

Caenorhabditis elegans, a microscopic hermaphroditic nematode with only 959 somatic cells, serves as a great biological model to study development. *C. elegans* develop and reproduce rapidly, are transparent, and each cell can be traced in its defined patterns of lineage. It has therefore been used extensively in studies of conserved genetic pathways. Our current research includes RNAi experiments as well as genetic mapping of the mutant lines of *C. elegans*, M77 and M136, in an attempt to identify the mutant alleles. Unlike the phenotype of Dpy worms, the short pharynx phenotype of M77 does not accompany a proportional decrease of length of the entire worm. The mutant allele is recessive lethal, although treating embryos with ethanol prevents the normal L1 arrest. We have shown that the worms are not capable of ingesting bacteria, which is a possible cause of the normal larval lethality. The allele is mapped to the left arm of linkage group III, and has been complementation mapped to within a map unit. The M136 strain exhibits an abnormal, nonfunctional pharynx, with differentiation of the muscle cells causing severe disorganization; the animals also were shown to be incapable of ingesting bacteria. The morphology of the pharynx muscle by myo-2::GFP shows a lack of adhesion of many of the muscle cells, although cell counts show that all muscle cells are present in the larval pharynx. The allele has been mapped to the left arm of linkage group I. We are using RNA to induce suppression of the highly specific genes in the region of M138. The discoveries in *C. elegans* research provide a pathway into a better understanding of the full range of genetics in multicellular eukaryotes.

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Program/Abstract # 170
Unbalance between cell proliferation and cell death induced by ultraviolet radiation on freshwater prawn morphogenesis
Dib Ammar[a], Evelise Nazari[a], Valquíria M. Cardoso[a], Yara M.R. Muller[a], Silvana Allodi[b]
[a]*Universidade federal de Santa Catarina, Florianopolis, Brazil*
[b]*Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil*

Crustacean with yolky eggs display meroblastic cleavage resulting in the embryonized nauplius and subsequently embryonized post-nauplius stages. Cell proliferation and cell death are essential to the naupliar and postnaupliar morphogenesis. In this study we evaluated three groups of early postnaupliar embryos: the first was to assess whether UV-B radiation produced proliferation and cell death impairments in the laboratory; the second was to check whether embryos with the same impairments as those observed in the