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Commentary

# Developmental Biology's Latest Advances

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Developmental biology [1] has progressed dramatically in the last 15 years, maybe more than at any other point in the field's history. The genotype of a large animal's trillions of cells, such as a mammal's, is now understood to be the same as that of the single-celled zygote (fertilized egg) from which the animal emerges. That is, the genetic content of somatic cells in most animals does not change during development. The latest cloning of Dolly the lamb, the Cumulina mouse family , and a nonhuman primate [2] reaffirm that a specialized cell, such as a mammary or cumulus cell, holds the genes for all of the animal's other cells.

These cloning were based on earlier frog nuclear transplantation achievements, including Briggs and King (1952) and Gurdon (1960, which led to similar conclusions for a non mammalian vertebrate. Despite sharing the same genes, the cells of each organism have vastly different appearances and functions, implying that they are not identical. The ribonucleic acids (RNAs) [3] and proteins found in different cell types vary greatly. They vary in which subset of genes from their total genomic repertoire they express. In humans, at least 300 cell types have been identified (e.g., red blood cells, Purkinje nerve cells, and smooth or striated muscle cells). When additional variations related to the cell's stage of development and position in the body are taken into account, as has been discovered in recent years, the number of cell subtypes grows to tens of thousands. The crowning example of complex gene regulation in evolution is growth.

Thousands of different gene combinations must be expressed at specific times and places in the developing organism from a single genome, and information for selecting combinations must be produced from the developing egg. The transfer of chemical information (i.e., signals) between cells during development is a major factor in this regulation. The following has now been realized as a result of new research that has built on previous findings:

Arthropod and nematode embryonic cells, like vertebrate embryonic cells, base many of their developmental decisions on which chemical signals they receive from other cells. Many of these species' embryonic cells will later make decisions based on other signals. As production continues, the signaling and responding processes are repeated again and again.

There are 17 different forms of signaling pathways involved in this information transfer (a few more may remain undiscovered). They are used at various levels and locations in the embryo, from the earliest stages of organogenesis and cytodifferentiation.

The signaling pathways [4] are strongly conserved across phyla of animals (from chordates to arthropods to roundworms), implying that they were present and functional in their pre-Cambrian common ancestor.

The chick, Drosophila melanogaster (the fruit fly), Caenorhabditis elegans (a free-living nematode), Danio Rerio (the zebra fish), Xenopus laevis (a frog), and other model organisms were studied in the lab has recently yielded a molecular understanding of developmental processes and components.

## REFERENCES

1. National Research Council. "Recent Advances in Development Biology."Scientific frontiers in developmental toxicology and risk assessment. 2000.
2. Chan FK, Siegel RM, Lenardo MJ. Signaling by the TNF receptor super family and T cell homeostasis. Immun. 2000; 13: 419-22.
3. Sifuentes-Romero I, Milton SL, Garcia-Gasca A. Post-transcriptional gene silencing by RNA interference in non-mammalian vertebrate systems: Where do we stand? Mutat Res-Rev Mutat. 2011; 728: 158-71.
4. Gerhart J.Warkany lecture: signaling pathways in development.Teratology.1999;60:226-39

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