Servicio de Estudios Económicos

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Global Highlights

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Health Developments

Genes: It turns out we had it almost all wrong

- *RNA, a chemical similar to DNA was mistakenly thought to be a mere carrier of genetic information, says The Economist. New discoveries about its true role have even changed the perception of what a gene is. Evidence suggests that there are few cellular processes that do not happen under microRNAs-one of many types of RNA-watch. These could even turn out to be the key to understanding embryonic stem cells.*

- *Another important implication has to do with explaining why some creatures are more complex than others, while they share a similar number of protein-encoding genes. It turns out that what counts is how these genes are regulated by RNA. Evo-devo (the combined study of evolution and development) researchers go further to suggest that RNA could itself provide an alternative evolutionary substrate because RNA molecules sometimes stimulate changes in the DNA, that is, mutations.*

- *In addition, the new discovery opens exciting new avenues for explaining and treating diseases. For instance, small RNAs have been linked to many types of cancer, to genetic diseases of the central nervous system and even to infection. Drugs based on a technology called RNA interference (RNAi) are being tested to halt a disease that is one the most common forms of blindness in elderly people. Moreover, by affecting the insulin-receptor gene, RNAi has helped over-eating mice stay slim and live a fifth-longer.*

Stem cell research might get more accessible, thanks to new discoveries

- *Embryonic stem cells are of great interest to scientists because they have the potential to give rise to any type of cell or tissue in the body, and might therefore be used to treat disease. Ethical concerns have prevented federal financing of research in the US. In fact, last week President Bush issued his second veto of a measure lifting the restrictions on human embryonic stem cell experiments imposed in 2001, when he decreed that research could begin, but only with cell lines already in stock at that date.*

- *In the meantime, two important discoveries have recently opened new research avenues. On the one hand, an easy-to-use technique for reprogramming a skin cell of a mouse back to the embryonic state was discovered at Kyoto University. If the technique can be adapted to human cells, researchers could use a patient's skin cells to generate new heart, liver or kidney cells that might be transplantable and would not be rejected by the patient's immune system. Still there are considerable problems that need to be overcome.*

- *On the other hand, two independent studies from Britain's Oxford and Cambridge universities discovered a new type of embryonic stem cell in mice and rats - epiblast stem cells- that are almost identical to human embryonic stem cells. The new cells are taken after implantation. Because they are further along the developmental timeline, they may offer a unique insight into how stem cells start producing mature cell types, like neurons, muscle and bone. It should also help researchers derive stem cells in other species, including agricultural livestock, which are better models of human disease than rodents.*