

Top 10 Medical Breakthroughs in 2009

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Medicine is an ever-changing science. In fact the saying nothing is more permanent than change is apt for medicine. The quest for new medical breakthroughs is an ongoing one and what did the scientists and researchers have for the medical society in the year 2009? A quick glance at the top 10 medical breakthroughs of the year that has gone by:

1. Spraying on Skin Cells: New Technique in Burn Treatment

Usually, treatment for severe second-[degree](#) burns include adding insult to injury: cutting a swath of skin from another site on the same patient in order to graft it over the burn. But this procedure causes more pain for the burn victim and doubles the area in need of healing. A new discovery has shown fruitful results to heal burns which are economical compared to skin grafts. The ReCell kit, is much larger than a trendy sunglasses case, Accommodates a minute lab for harvesting the skin basal cells.

With the help of a small skin biopsy and ReCell kit, surgeons can create a suspension of the skin's basal cells - the stem cells of the epidermis - and spray the solution directly onto the burn. This procedure has shown results comparable to those from skin grafts.

2. A New Cancer Vaccine

It is known that vaccines work by [training](#) the body's immune system to distinguish the diseased cells and to attack them. The theory is that once the body can distinguish cancer cells, it can kill them before cancer has an opportunity to recur in a patient. A vaccine called gp 100:209-217, or gp 100 that targets skin cancer (melanoma) has shown improved response rates and progression-free survival for patients when combined with the immunotherapy drug, Interleukin-2. The vaccine helped to shrink tumors and delayed the worsening of the disease as well.

It was observed that approximately 22% of patients given the vaccine plus interleukin-2 showed their tumors shrink by half or more, compared with 10% of people getting interleukin-2 alone. In addition, vaccine users saw that cancer stabilized for three months versus half that time for the others.

3. Breakthrough in Spinal Cord Reconstruction Finally, it's come true—researchers from the [University](#) of California have discovered a chemical entity that can rewire the spinal cord after injury. The study was conducted in rats. The researchers have found a way to regenerate synapses (nerve junctions) that were damaged in rats. Using neurotrophin-3 (NT-3) the nerves steered themselves to the correct destination synapse but also supported the complete connection to the synapse.

Using electron microscopes, the research group proved that the nerves were moving to the correct locations and automatically healing. Neurotrophin-3 has reached two important milestones of spinal cord damage research— to allow

nerves to move through tissue towards a synapse that was originally used, and to complete the healing process so the connection worked as before.

4. New Method for Creating Stem Cells

Dr. Andras Nagy from the Mount Sinai Hospital has discovered a new method of creating stem cells that could possibly cure devastating diseases or conditions such as spinal cord injury, macular degeneration, [diabetes](#) and Parkinson's disease.

Dr. Nagy has reported a new method for the creation of pluripotent stem cells (cells that can develop into most other cell types) without causing harm to healthy genes. This method involves a novel wrapping procedure in order to deliver specific genes for reprogramming cells into stem cells. According to the researchers, this novel method for generating stem cells will not require embryos as starting points and adult tissues such as a patient's own skin cells can be used to generate stem cells. These stem cells can form the basis for treatment of many disorders and conditions that are currently considered incurable.

5. New Drug Dabigatran for Stroke Patients

A new drug known as dabigatran has been noted to prevent a higher number of strokes with less bleeding than existing medicines such as warfarin. The results of a study of 18,113 people with atrial fibrillation, a key risk factor for stroke confirmed this finding. This new drug waiting [FDA approval](#) has been considered to be more effective than the existing medications. It doesn't interact with many other medications; this negates the need to constantly test and adjust the dose.

6. New Hope for A HIV Vaccine

Two new antibodies that can offer promise as an HIV vaccine has been discovered by researchers at the International AIDS Vaccine Initiative and the Scripps Research Institute in La Jolla, CA. These antibodies were noted to be produced only by a minority of patients and are considered to be "broadly neutralizing," as they cripple many different strains of the deadly virus that causes AIDS. Further research is on to develop an active ingredient that would stimulate the production of these antibodies.

7. Stem cells for lung and heart disorders

Two recent studies have shown that human-derived umbilical [cord blood](#) (UCB) stem cells when transplanted in an animal model had curative effects on certain specific types of lung and heart disorders in the animal model. The researchers have found that the stem cells have a protective effect against hypoxia-induced lung injury. The researchers expect that their findings can have major therapeutic potential for treating conditions such as hyperoxic neonatal lung disease, or bronchopulmonary dysplasia (BPD), in premature human [infants](#) that are presently considered untreatable.

8. New mechanism of insulin production discovered that can lead to better treatment for diabetes

Researchers from the Hebrew University of Jerusalem, in collaboration with the Japanese and American universities have explored the role of LKB1, a gene that is involved in numerous cellular functions, and whose role in the functioning of the pancreas was never examined till now. They were able to demonstrate that eliminating this particular gene from beta cells in the pancreas resulted in the production and secretion of more insulin when compared to normal beta cells. The enhanced production of insulin leads to an improved response to increases in blood [glucose levels](#). This has led to possibility of developing a novel therapy for diabetics that would limit the functioning of this gene to improve insulin production.

9. Skin test for detecting Alzheimer's

Researchers at the Blanchette Rockefeller Neuro-sciences Institute at West Virginia University have discovered a skin test that can detect the presence of Alzheimer's disease. The test involves pricking of a finger to detect the presence of certain defective enzymes involved with memory function that are present in both brain and skin cells. The test results were noted to be 98% accurate in detecting Alzheimer's, according to Daniel Alkon, MD, the institute's scientific director.

10. New genetic cause of cardiac failure discovered

A research group that was headed by Dr. Wolfgang Rottbauer, vice chair of the Department of Medicine III at Heidelberg University Hospital has discovered a protein that is considered responsible for the stability of one of the smallest muscular unit, known as the sarcomere. They have proved in their study that mutations in this protein can cause heart failure. This protein is one of the factors that are responsible for the stability of the heart muscles and abnormalities can cause the muscles to lose strength leading to weakening of the heart. Early treatment with medications to reduce stress on the heart in patients with such mutations might be beneficial.