Omega-3 fatty acids. The work funded by the Council for Biotechnology Information, whose members include all of the major biotech seed producers, made a report on effects of adding Omega-3 fatty acids to soybeans or canola, which provide cooking oils used in processed foods ranging from potato chips to salad dressing. They followed methods that have been used to measure health benefits of nonbiotech-enriched foods, such as milk with added vitamin D and calcium fortified orange juice.

Fish is the best dietary source of omega-3 fatty acids, which have been shown to improve heart condition and decrease the risk of irregular heartbeats. In the U. S. only 17% of consumers eat fish at least twice a week, a practice recommended by the American Heart Association. Nearly 10% of Americans never eat fish. Thus, the health service says that there is a lot of room for improvement in diet, particularly through agriculture.

Some people refuse fish on the table because of the smell. If one can make vegetables or meats rich in Omega-3 fatty acids, they may comfortably eat such foods. Companies are taking genes from algae consumed by fish– the essential ingredient that gives fish flesh its high Omega-3 content and adding them to food oil seeds. Monsanto has grown high yield Omega-3 enriched soybeans, extracted the oil and shown that it has a pleasant taste and no fish odor. If the oil proves to be stable enough for use in processing foods, which must sit on store shelves without spoiling, and gains regulatory approval, it may appear in salad dressings, soy milk, margarines, yogurts and other foods. When this happens, delivering Omega-3 fatty acids in the diet through food rather than supplements in pill form will becomes possible.

Scientists must study which particular type of Omega-3 fatty acids should be added to food materials. Stearic acid or α-linoleinic acid, which is a natural part of some vegetables, is converted by the body into stearidonic acid. Docosahexaenic acid is rich in fish. They must also confirm that there are no unwanted health impacts from eating these compounds. For example, some people taking an excessive amount of omega-3 supplement pills have experienced bleeding (U.S. Food and Drug Administration). On the other hand, over 90% of Americans who eat the most of naturally occurring omega-3 rich foods shows no adverse effects and thus further study.

Out break of O157: H7 via spinach In the fall of 2006, an outbreak of Escherichia coli 0157: H7 via spinach scared U.S. citizens and the government, particularly in Californian. A similar outbreak occurred in the western part of Japan via commercial radish sprout. The mass media competed to broad cast the contamination of radish sprout which are commonly used for salads, soups and many other dishes in home cooking and school lunches. The public responded senselessly and panicked. Many growers quit the business. The real reason for the contamination remains unclear and the government tried to persuade the people of the safety of radish sprout to recover the image of radish sprouts as sale.

How the outbreak of E. coli 157: H7 occurred in California is worth investigating. Outbreaks occur mainly when those monitoring each link in the chain of infection are not paying attention to the next ones. Cattle farmers are not thinking of the harmful effects of manure. Sellers of organic fertilizer made from manure are hoping their product will grow vegetables, not concerned that it will contaminate water or spinach. Salad makers screen and clean their food but do not use the equipment to detect the most elusive bacteria. There is also not enough separation between

animals and animal products before they become human food.

Cows shed harmful bacteria daily at variable rates. Changing feed from grain to hay decreases the acidity in the gut of cows that allows bacteria to thrive. Because a very small amount o O157: H4 can cause human infection and because shedding of the bacteria by cows is so variable, proper surveillance of manure is crucial in prevention of outbreaks. E. coli O157:H7 is a strain that produces a toxin that breaks down the lining of blood vessels, causing bloody diarrhea and sometimes kidney failure in human. Cows lack the receptor to absorb the toxin and they do not show any symptoms.

There have been close to 20 outbreaks linked to salad since 1995, in which the crops were given water contaminated with *E*. coli from manure. The easiest prevention method may be giving cows antibiotics but one must be careful because of the induction of resistant strains. We need some kind of comprehensive approach when it comes to animal management and food safety.

Salary of American life scientists.

The need for experienced top talent, especially those specializing in molecular and cellular biology, pharmacology and drug discovery have driven compensation for life scientists to lower level recently. Salaries leapt 7.2% from the prior year to a median of $74,000. (about ¥8700,000) according to The Scientist's latest survey. Meanwhile, the rise of the consumer price index was just 3.8%. Why the big jump? It is possible that this year's survey reflects a more favorable mix of specialties, degree levels, experience and geography. A survey of this sort is within a margin of error of plus or minus five percent of the median, so anything greater than that tends to be significant, according to Steven Langer, the president of Abbott, Langer Associates, Inc. Life science is not the only science profession to enjoy pay hikes in U.S. All engineers' salaries in 2006 climbed 5.2% to a $71,716 median annual income.

The typical life scientist with a Ph. D, after 10-14 years of experience is paid $73,l751 and his /her colleague in government or in academia gain 9.6% and 12.6%, respectively. For young scientists with a Ph. D in academia, salaries held steady increasing from $36.998 to $45,000. What is really driving salaries up is the competition for the very best people. Everybody wants the 10 or 15 best class people and they are driving the salary up (Alan Lambowitz, director of the Institute for Cellular and Molecular Biology at the University of Texas at Austin). Also, there is the fact that we have to offer higher salaries to compete for new faculty and for existing faculty, in order to maintain pay equity.

The median salary of a top-payed specialist working in industry could reach $144,550, followed by drug discovery / development / delivery at $99,500. Because the industry is under significant pressure to bring drug can control market more quickly and cost-effectively, companies are willing to pay a premium for investigators who posses strong technical skills and the ability to work as part of a team.

Nesfatin-1: Another satiety molecule for appetite.

Overweight condition and their derived illnesses are not only a biological but also a social calamity. When one visits hospital for a health check up, all the doctor say " Don't eat so much" or "Carry out exercise, walk, run or go to gym". We all wish we had some agents/factors to make our body healthy while not feeling pain and stress. Scientists in academia and industry are looking for chemicals which appease appetite. Nesfatin-1 is one of these which is a part of a secretory protein from the hypothalamus called nucleobindin2 (NUCB2). Injection of NUCB2 into brains of rats suppresses their appetite. The body fluid of rat's brain and myelon contains

nesfatin and the amount is reduced during starvation. Injection of nesfatin reduces the food intake while the antibody to nesfatin stimulates appetite. NUCB2 must be cleaves into nesfatin 1 to suppress attetite and body weight decreases if nesfatin is given over a period of time. On the other, if nesfatin antisence oligonucleotide is given, body weight increase steady. Zucker rats which lack the leptin receptor reuce food intake due to nesfatin-1. The function of nesfatin is a signal transfer of melanocortin in the hypothallumus and thus it suppressess appetite and contribute to prevent of fat accumulation.

Human stem cell line from "dead"embryos.

It has been generrally established that an embryonic stem cell can develop into any tissue, organ, or eventually any individual body. They are extremely useful for tissue repair and as a cure for diseases but the use of human embryo and stem cells in research has been objected to by some people on the grounds that they harm potential human life. If stem cells can be obtained from embryos that are no longer viable, such objections can be eliminated. Miodrag Stojkovic, in Valencia, Spain, generated a pluripotent ES cell line from one of 13 embryos that had stopped developing 6 to 7days after that last cell division to determine that the embryos, donated for research, were no longer viable (Stem Cells on 21 September, 2006).

Although there are some techniques that should be improved, scientists will be able to use this material that would otherwise be discarded. However, they have to come up with reasonable criteria to determine embryo death, which is currently a period of 24 hours without cell division. An alternative method for the use of dead embryo cells is a technique called altered nuclear transfer, involving the creation from embryo incapable of developing. Another is to use definitely unfertilized eggs, activated to form ES cell lines through parthenogenesis.

Mice with lower core body temperature live longer.

Keeping body temperature lower may extend life span. This is often true in organisms, microorganisms to mammals, due to calorie restriction and production of various superoxide molecules. However, it is not known whether the reduction is simply a consequence of calorie restriction or if it also contributes to some beneficial effects for life. Past research has showen lower core body temperatures slowed aging and prolonged life in poililotherms like fish. Whether this is also true for homeotherms like mammals has not been demonstrated.

Conti and colleagues (Science 314:825-8 (2006)) engineered transgenic mice with overheated hypothalamus. The preopic area of the hypothalamus serves as the central thermostat for the brain, so heating hypothalamus will reduce core body temperature. Specificlly, they focused on the hypocretin gene. Hypocretins are appetite-promoting neuropeptides expressed in just 3.000 or so neurons in the lateral hypothalamus, near the preoptic area. Transgenic mice were generated by using plasmids linking the hypocretin gene to the uncoupling protein 2 (UCP2). UCP2 elevates the hypothalamus temperature, when over-expressed. And thus lowers the body temperature by 0.3 to 0.5 degrees C.

Calorie restriction extends life expectancy.

The experimental female mice lived an average of 20 % longer than controls, while experimental males had a 12% greater life expectancy. Experimental mice lost significantly less weight than controls, when starved for a day while the transgenics consumed the same amount of food and water as controls. The experimental males weighed 10% more than females. This suggests that experimental males require fewer calories to live, most likely reflecting the reduced energy required to maintain a lower core temperature. The next question is to determine whether the

effects of lower core temperature are additive to the effects of calorie restriction through diet.

Calorie restriction slows immune system aging.

This experiment used rhesus monkeys given 30% fewer calories than a control group of 29 monkeys for 13 to 18 years , with calorie restriction starting at three to five years of age, which is around puberty for monkeys. The experimental and control animals received the same levels of vitamins and minerals. Another study had shown that monkeys that have restricted calorie intake for two to four years showed minimal differences from the controls in terms of native T cells. Using peripheral blood collected at four points over 42 months, the researchers calibrated for white blood cells, lymphocytes, and neutrophils and used flow cytometry to distinguish native and memory T cells. The results showed that control monkeys had a lower percentage of native T cells (20-25%) than the calorie restricted monkeys (30-35%).

What the T cell differences means in terms of lifespan remains an open question. It is not clear yet whether improvement of the immune system will increase lifespan due to a reduction of morbidity. The answer may come from the monkey's general quality of life, although calorie restriction improves their hearing, eyesight, muscle strength and the reactions of nervous and endocrine system. Nevertheless. caloric restriction can be a kind of stress to monkeys, and such stress may indirectly extend life span by protecting the body from toxic agents.

Global variation in copy number in the human genome in search of normality and individuality.

Our DNA contains many forms of variation. The most plentiful are the millions of single base-pair polymorphisms (SNPs) that were identified in the course of human genome studies and more systematically through the International HapMap Project. SNPs distinguish any two unrelated copies of the genome. They account for the long-hypothesized evolutionarily neutral forms of wide spread genetic variation that mark diversity within our species, as well as mutations, both rare and common, that account for or contribute to diagnosis and treatment of diseases.

The paper published in Nature (444: 444-454) with 44 authors, including five Japanese, present the results of a global genome-wide screen looking for all types of copy number variations (CNVs) using several hundred reference samples from four human populations documenting almost 1,500 variable regions, covering 12% of human genome. The data suggest that the greatest source of diversity in human is not from millions of SNPs, but rather, in larger segments of genomic DNA. A new discovery of chemical diversity in our genome has disclosed the existence of chemical specificity and we should expect difference between individuals and treatments of each patient judging by the evidence.

(Y.HOTTA)