Please translate the following paragraphs into Chinese.

1. Metals are highly genotoxic as environmental contaminants, whereas in low concentrations they are vitally important elements. With respect to their genotoxic potential, metals can be categorized either as essential and relatively nontoxic (e.g., zinc); as essential, but extremely toxic at elevated concentrations (e.g. copper); or as nonessential but highly cytotoxic (e.g., cadmium). Several testing methods have been used to assess the genotoxicity of water and soils contaminated with heavy metals. The usefulness of many mammalian cytogenetic and gene mutation assays to detect the genotoxic effects of heavy metals remains quite controversial. In several bacteria-based tests, the majority of metal compounds showed no effect, even at extremely high metal concentrations. Thus, evaluating the genotoxic effects of heavy metals using the existing mutagenicity protocols remains problematic, especially when assessing complex environmental mixture. Current research is focused on developing inexpensive, short-term assays that use whole organisms to absorb toxicants from polluted water and soil and provide information on the genetic effects at the molecular level. Because of their mobile lifestyle, it is difficult to use animals in environmental studies, especially when analyzing the effects of chronic exposure (25%).

2. Toxic metal pollution of waters and soils is a major environmental problem, and most conventional remediation approaches do not provide acceptable solutions. Nonradioactive As, Cd, Cu, Hg, Pb and Zn and radioactive Sr, Cs and U (referred to here as toxic metals) are the most environmentally important metallic pollutants. Microbial bioremediation has been somewhat successful for the degradation of certain organic contaminants, but is ineffective at addressing the challenge of toxic metal contamination, particularly in soil. Although organic molecules can be degraded, toxic metals can only be remediated by removal from soil. The use of specially selected and engineered metal-accumulating plants for environmental clean-up is an emerging technology called phytoremediation. Three subsets of this technology are applicable to toxic metal remediation: (1) Phytoextraction—the use of metal-accumulating plants to remove toxic metals from soil; (2) Rhizofiltration—the use of plant roots to remove toxic metals from polluted waters; and (3) Phytostabilization—the use of plants to eliminate the bioavailability of toxic metals hi soils. Biological mechanisms of toxic metal uptake, translocation and resistance as well as strategies for improving phytoremediation are also discussed (25%).

3. Lipids are commonly defined as predominantly hydrophobic substances that are soluble in organic solvents but insoluble in water. Consumption of lipids can have both positive and negative impacts on human health. Triacylglycerols are a major source of energy within the human diet, but their overconsumption has been linked to various health problems, such as coronary heart disease, obesity, and diabetes. In particular, overconsumption of saturated fatty acids, *trans*-FAs, and possibly cholesterol are believed to be detrimental to human health. However, consumption of certain bioactive lipid components, such as fat-soluble vitamins, phytosterols, carotenoids, and polyunsaturated FAs, has been found to be beneficial to human health. Beneficial bioactive lipids may be incorporated into food products in a variety of forms. One of the most efficacious bioactive lipids that has been widely introduced into food products is marine omega-3 polyunsaturated FAs. Global consumer spending on omega-3 enriched food and beverage products has been reported to be as high as $13 billion in 2011, with $4 billion being spent on foods and drinks in the United States (25%).

4. Fermentation is one of humans' oldest methods of food preservation. In fact, it has been used for more than 6,000 years. It is responsible for products ranging from beer, cheese, and bread to fermented vegetables. Fermentation increases the accessibility of nutrients in some foods, detoxifies other products, and enhances the flavor of various substrates. The primary function of fermentation, however, is preservation. It preserves products through consumption of nutrients and production of inhibitory compounds, usually ethanol or organic acids. Early food fermentations were natural, relying on indigenous microbes to carry out the process. An assortment of unknown microbes that inoculated these early fermentations originated in the environment and the substrate itself. This variability led to inconsistency in both the success of the fermentation and the quality of the products. In order to gain some control of the process, where possible, starter culture systems were developed, beginning with "back slopping" or using the material from a successful fermentation to conduct succeeding fermentations. This evolved to the controlled starter culture systems used today for the production of many fermented foods (25%).