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Commentary

Antibiotic Resistance Genes from the Bacteria: an Insight into the Newly Identified Antibiotic Resistance Mechanisms in the Clinical Setting

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1. Description

Antibiotics prevent millions of deaths each year and remain the primary treatment for deadly bacterial infections. Yet inaccurate prescription rates and overuse of antibiotics led to resistance, which created a global health emergency and killed at least 700,000 people a year. If no action is taken, it is projected to increase to 10 million deaths per year by 2050. So far, there has been a development of resistant bacterial variants in response to the introduction of any new antibiotic. Therefore, there is a constant need for new developments with the goal of making alternative medicine available. During the "golden age" of antibiotic development between 1940 and 1970, new materials were constantly developed with new mechanisms of action that made it possible to manage the problem of emerging resistant species.

2. Molecular application and antibiotic resistance

The CRISPR-Cas system has been found to be a form of adaptive immune system in bacteria. They have been used for many other purposes, including the treatment of genetic modification and hereditary disorders [1,2]. CRISPR systems act similarly to RNA interference (RNAi) in eukaryotic cells. In many studies, the CRISPR mechanism has been shown to have a significant negative association with resistance in some bacteria, such as enterococci. CRISPR1-Cas, orphan CRISPR2, absence of CAS mutations and CRIS PR3-Cas are the three CRISPR locations found in *E. coli.* Enterococci have been found to require pheromone-response plasmids in genome plasticity and virulence. The Inc18 Plasmid family has no spacer. Tn916, a vector of antibiotic resistance, has not yet been found with CRISPR spacers. Streptococcus thermophilic strains carrying the CRISPR gene have acquired new spacers derived from the virus, transforming them into immunity from phase infection [2,3]. In *E. coli,* there are 4 CRISPR locations: CRISPR1, CRISPR2, CRISPR3 and CRISPR4. CRISPR does not affect the distribution of plasmid or antibiotics resistant genes in *E. coli.* Recent research has shown that bacterial invasion of a sequence of genes using the CRISPR-Cas system can be intentionally or accidentally cytotoxic and lead to cell death [4,5]. The formation of RNA-guided nuclei requires the extraction and production of the distribution carrier and vector. Furthermore, due to the delivery mechanism used in most species, RNA-guided nuclei are able to modulate the presence of a specific gene in the wild-type population, *i.e.* Antibiotics tolerance genes and virus determinants.

3. Conclusions and future perspectives

Antibiotic-resistant is a very common occurrence, and over the centuries bacteria have developed to counteract the activity of antibacterial products. Antibiotic use should be better controlled locally and globally, including in developed countries. Stopping the use of over-the-counter antibiotics in these countries and educating prescribers about antimicrobial resistance may further reduce antibiotic use [6,7]. In order to reduce inappropriate demand, it is also necessary to raise awareness among the people of the world. Agricultural application should be limited to contaminated animal care rather than development stimulants.

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