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Sources of Antibiotic Resistance

Zoonotic, Human, Environment

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10.1 The Antibiotic Era

The industrial revolution nurtured the need to combat infectious diseases and encouraged the efforts of scientists and pharmaceutical companies to find drugs with antimicrobial activity capable of overcoming infection, the main cause of mortality until the middle of the twentieth century (Cohen 2000; Aminov 2010). Therefore, antibiotherapy processes that were successful in the control of humans and animals infectious diseases became one of the most important revolutions of the modern human and veterinary medicine. The recognition that penicillin, a natural fungal metabolite, was able to control the development of pathogenic bacteria set a mark in mankind's history and started what can be called the antibiotic era (Aminov 2010). The search for antibiotics able to control pathogenic bacteria led to the recognition that the production of molecules with antibacterial activity is widespread in the microbial world, being produced by both fungi and bacteria. The effectiveness of these compounds explains why most of the antibiotics used nowadays in human and veterinary medicine are natural (biosynthetic) or semisynthetic derivatives of these natural products (Butler and Buss 2006).

Regardless of being biosynthetic, semisynthetic, or fully synthetic, the therapeutic action of antibiotics is due to their capacity to interfere with key structural components and/or functions of the bacterial cell, which are not present in the host's cells. Most of the antibiotic classes with clinical relevance

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