CHAPTER 5

microbes in medicine

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MICROBES take various forms and shapes. Some deadly agents like coronaviruses are microscopically beautiful and portray a crown-wearing structure. Even the larger viruses like Ebola are also impressive in their structures and shapes.

Disease-causing microbes are called pathogens. They are either bloodborne, waterborne or airborne. They live in air, abundantly in soils, water, and within human and animals surfaces or body cavities. They cause many infectious diseases including AIDS, hepatitis, tuberculosis, malaria, candidiasis, influenza and many more. Most airborne illnesses are caused by viruses, bacteria or fungi and spread through coughing or sneezing due to their microscopic/ultramicroscopic sizes. A few recent outbreaks worldwide which resulted in high death toll rate have stirred fear amongst us particularly those which are caused by the emerging deadly-pathogens. Vector-borne diseases like dengue (causes by dengue virus) and leptospirosis (caused by bacterial spirochetes which infect human through direct contact with urine of infected animals) have also caused tremendous increase in morbidity and fatalities.

The 'once upon a time' only-animal-infecting agents like influenza viruses (H1N1, H5N1, and H7N9), coronaviruses (SAR-CoV, MERS-CoV) or EBOLA viruses have evolved to infect humans. The emergence of new influenza virus strains is a greater concern as some that are low pathogenicity poultry viruses may cause fatal infections in humans.

Vice versa, some viruses like Newcastle Disease Virus (NDV) are fatal to poultry but causes minor disease in human. It poses major economic impact for the poultry industry. However, the potential of the local strain NDV as anti-cancer agents shines the light in the beneficial usage of these viruses.

Microbes are also used in many vaccine productions. Vaccines help to prevent many types of illnesses and diseases by using "good" microbes in combating the harmful ones. The introduction of vaccines into medical health programs has saved millions of lives worldwide.

Microbes such as bacteria and fungi are used in the production of antibiotics. Antibiotics such as penicillin are derived from fungus (*Penicillium* sp.) by altering the genetic structure and material of the fungi.

In recent years, alternative antidotes against various microbes have been intensively studied. The usage, advantages and safety of bacteriophages are highlighted in the "Antidote to Antibiotic Resistance" article. They are a preferable biological approach over the emerging antibiotic resistance and tedious development of new antibiotics.

Malaysia's biodiversity has also contributed many antidotes against infectious microbes. One of the examples is when the antimicrobial property of plant *Alpinia conchigera* is incorporated in commercial daily personal care range to provide natural protection against selected microbes.

As a whole, we always regard microbes as disease-causing agents. However, they are groups of microbes named normal flora that are harmless and in fact beneficial to human/animals. They populate skin, gut lining, genital tract and many other surfaces. They help in digestion, substance metabolism and nutrient liberation. They also provide protection against harmful pathogens from causing diseases.

Microbes are not only the enemies that warrant fears and tears. They can be our friendly sources of food, protective agents as well as disease-preventive alternatives in the modern medicinal era.

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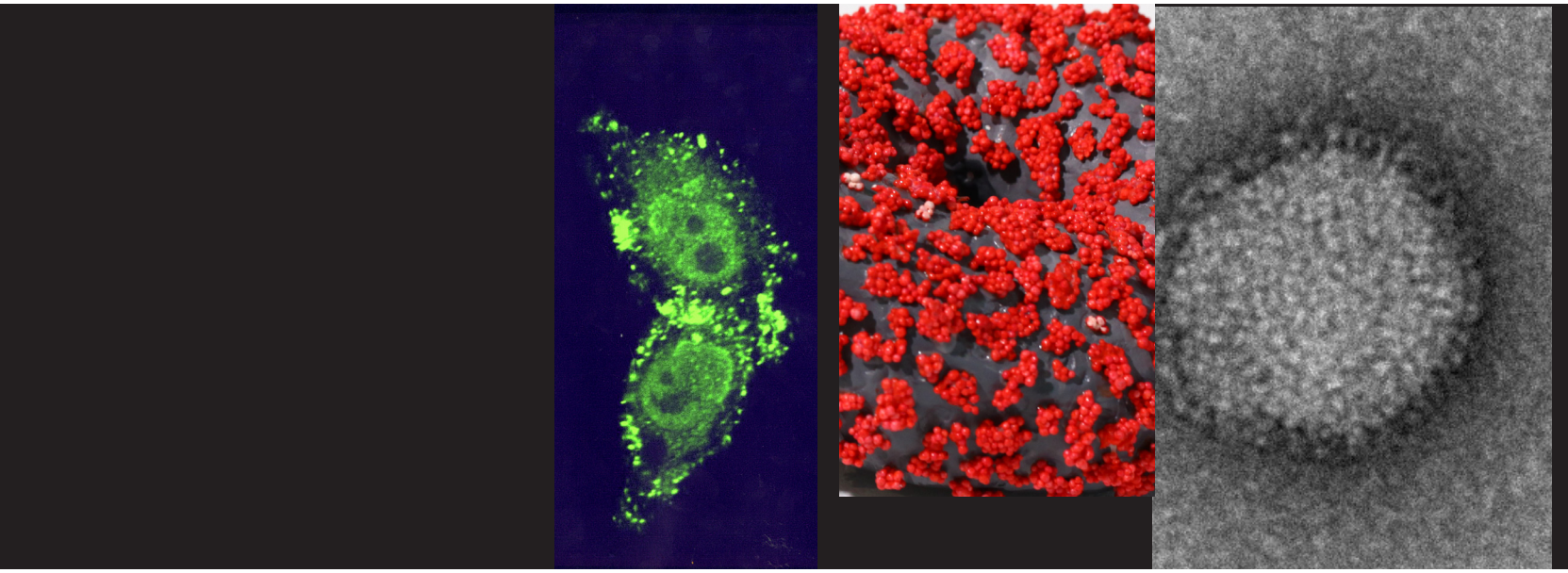



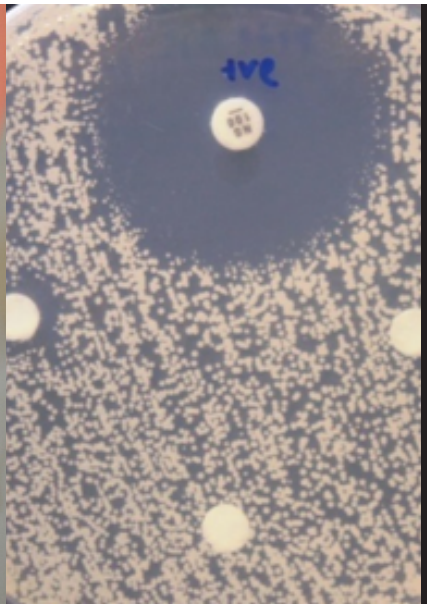

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