

### Important points:-

- ✚ RNAi (RNA interference) is triggered by double stranded RNA in a wide variety of organisms including animals, plants and fungi. It involves silencing of a specific mRNA and therefore the expression of a gene by formation of a dsRNA molecule. The dsRNA is formed by binding of a complementary RNA (anti-sense RNA) molecule to original mRNA thereby preventing translation of the original mRNA.
- ✚ Golden rice is a form of rice with biosynthesis of beta-carotene (a form of vitamin A) which gives its golden or yellow colouring. It is considered a type of genetically modified rice (GMO) and a fortified food that is produced to combat a vitamin A deficiency in areas where this vitamin is scarce.
- ✚ *Bacillus thuringiensis* (Bt) is a Gram positive, spore-forming bacterium that synthesises parasporal crystalline inclusions containing CryIA and CryIIAb proteins, some of which are toxic against a wide range of insect orders (for example, moth larva that attacks the fruiting bodies of certain crops), nematodes and human-cancer cells. These toxins are produced in inactive protoxins form but become activated when dissolved in the high alkaline pH of insect gut. Once ingested by insects, these crystals are solubilised in the midgut, the toxins are then proteolytically activated by midgut proteases and bind to specific receptors located in the insect cell membrane, leading to cell disruption and insect death.
- ✚ A genetically engineered crop for tolerating herbicides contains glyphosate because it interferes with many metabolic processes in plants and animals and disrupts the balance of gut bacteria, it damages DNA and leads to cancer. This genetic modification protects the desired crops from unwanted chemical herbicides.
- ✚ Bt-proteins require certain specific conditions for them to be active against the target insects. These include: The concerned Bt protein has to be ingested by the susceptible larvae as it has no contact effect. This is so because the native Bt protein is a 'protoxin' and has to be activated which occurs in the midgut of only the susceptible larvae.
- ✚ Monoclonal antibodies are identical molecules specific for one type of antigen. These are obtained by injecting the target antigen into a rat or mouse. Sometimes later, the spleen cells producing antibodies are isolated and fused with myeloma cells to produce monoclonal antibodies.