

NEW GUIDELINES FOR HEPATITIS C INFECTION

There has been a sea change in the management of Hepatitis C infection, and the WHO has released new guidelines for its treatment. The story of development of effective antivirals for hepatitis C is important as the discovery of antivirals has been agonizingly slow in comparison to antibacterial agents.

Why are antivirals so difficult to develop? The big stumbling block is that viruses exist intracellularly, and one needs an *in vitro* system of virus propagation to study them. For 26 years after Hepatitis C was discovered, chimpanzees were the only animals capable of being infected with the Hepatitis C virus. But not only were chimpanzees too big, the ethical issues in their use were bigger. Then the human hepatoma cell line (Huh 7) was developed that can propagate endlessly *in vitro*. Subsequently the subgenomic replicon cell culture system that grows in the Huh 7 allowed scientists to learn key steps in hepatitis C infection and potential antiviral drugs.

In another stroke of brilliance, immunodeficient mice with severe combined immunodeficiency were grafted with human hepatocytes to produce mouse-human chimera. This provided a small animal model to study immune response and drug responses.

In the 1980's and 1990's, interferon alpha, ribavirin and subsequently pegylated interferon became available for the treatment of hepatitis C. However, the response rates were mere 50% with high chances of relapse and adverse effects. In 2011, the discovery of specific, direct-acting antivirals (DAA) changed the landscape of therapy of Hepatitis C. The WHO has now recommended that all persons above 18 years with any genotype of Hepatitis C may be treated with DAA (*e.g.*, Sofosbuvir/Velpatasvir for 12 weeks). Between 12-17 years, the DAA regimens depend on the genotype. Children below 12 years are recommended to wait till 12 years of age before starting treatment.

About 55-85% of people infected with hepatitis C develop chronic infection and about 15-20% of them develop cirrhosis after 20 years. Each year 1-3% of them will progress to hepatocellular carcinoma. Therapy with DAA have shown sustained virological response in more than 90% of patients with chronic hepatitis C and a 75% reduction in all-cause mortality. (*The Lancet 28 July 2018*)

GENOME EDITING: TO DO OR NOT TO DO

Isaac Asimov is famous for the Laws of Robotics, which anteceded the development of robots by several decades. On similar lines, the two principles of genome editing have recently been propounded by the UK Nuffield Council of

Bioethics. Principle 1 states that genome editing technology may be used only to secure the welfare of the person who is to be born. Principle 2 states that the use of the technology must not exacerbate social division.

The advent of the CRISPR-Cas9 technology has placed in our hands a tool too powerful to imagine. This technology allows precise gene editing and will relieve the enormous burden on families with single gene defects. But it throws up larger questions of safety, ethics and long-term societal consequences.

The UK Nuffield Council of Bioethics has published a detailed report in July 2018 about the ethics of gene editing technologies and recommendations related to policy and practice. Overall the report suggests that ethically there is no reason not to use these technologies in certain well studied areas. They state that it is likely that CRISPR-Cas9 technologies will be clinically safe in the foreseeable future. There are moral reasons to continue with the research into these genome editing technologies in view of the enormous change they will bring into the lives of many people. (*The Lancet 28 July 2018*)

GAMING DE-ADDICTION CENTERS

Internet gaming disorder is now included in the appendix of the DSM-5 (Diagnostic and Statistical Model for Mental Disorders). Within the 'Internet Addiction Phenomenon', there are five categories: cybersexual addiction, cyber-relational addiction (excessive formation of online relationships), net compulsions (gambling/shopping), information overload (excessive web surfing), and computer addiction (gaming *etc.*)

Diagnostic criteria for internet addiction include preoccupation, mood change on attempting to stop, need to use internet for increasing amounts of time, lying about internet usage, jeopardizing relationships and opportunities, and unsuccessful attempts to stop using the internet.

NIMHANS in Bangalore started an internet de-addiction centre called SHUT (Services for Healthy Use of Technology). They now see almost 6 persons aged between 14-20 years per week. Clinics have also sprung up in Delhi and Vadodara. Early exposure to the internet is a significant risk factor for internet addiction.

The word addict is derived from the latin root meaning slave. The nebulous world of cyber space is enslaving mankind in its tentacles and we need to sit up and take notice. (*The Times of India 21 June 2018*)

GOURI RAO PASSI
gouripassi@gmail.com