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Identification of material for development of indigenous HCV standard for qualitative nucleic acid amplification techniques, a make in India initiative

Manoj Kumar Rajput and **Praveen Gautam**
National Institute of Biologicals, India

Background: The WHO HCV NAT international standard is being used by manufacturers of molecular in vitro diagnostics (IVDs), blood transfusion units, quality evaluation authorities and diagnostic laboratories in the validation of HCV NAT assays and to calibrate secondary reference materials. First WHO HCV NAT international standard was established in 1997 and even after 18 years of its establishment, we do not see the availability of indigenous HCV NAT standard in India. All versions of HCV NAT international standard comprised of HCV genotype-1 as per its dominancy in western countries. The purpose of this study is to identify suitable material for development of indigenous HCV NAT standard consisting of HCV genotype-3, which is dominant in larger part of India.

Materials & Methods: Three HCV positive plasma bags were selected for this study. The viral load of these samples was determined. The genotypes were determined by nucleic acid sequencing. The stability studies of the material was done by incubating at different temperatures viz., 4° C, 25° C, 37° C and 42° C for a period of 90 hours.

Results: Out of three, two samples were found to contain genotype-3 and one sample genotype-1 of HCV. The nucleotide sequences had been submitted to Genbank under accession no. LN681374, LN681375 and LN681380. The stability studies of these samples have been done by incubating at different temperatures viz., 4° C, 25° C, 37° C and 42° C for a period of 90 hours. After every incubation, the reduction in viral load was observed for all samples and viral load of two samples except accession no. LN681375, reduced to negligible.

Conclusion: The accession no. LN681375 representing genotype-3 of HCV may considered for development for indigenous HCV standard for qualitative nucleic acid techniques, because even after incubation at 42° C for 90 hours, the viral load remained 196 IU/mL. Therefore, this may prove to be an indigenous affordable standard and can be transported in any area of India without cold chain.

mkrajput@nib.gov.in

Preparation and characterization of a semi synthetic cryogel matrix for tissue engineering applications

Mathew Peter and **Prakriti Tayalia**
Indian Institute of Technology Bombay, India

Cell migration is an integrated molecular process dependent on both biochemical (ligand density) and biophysical (mechanical properties) cues arising from the surrounding extracellular matrix (ECM). Porosity of the matrix also influences ability of the cells to migrate within the matrix. We have developed a semi-synthetic hydrogel matrix based on blending of a synthetic and a naturally occurring polymer to form macroporous cryogels. Polyethylene glycol diacrylate (PEGDA) is a synthetic polymer which is inert to protein adsorption and cell adhesion while gelatin methacrylate (GelMA) is a modified form of gelatin which contains ligand sites that promote cell adhesion. Macroporous cryogels can be prepared by cross-linking polymers at very low temperature resulting in phase separation between polymer and water. The water phase forms ice crystals at low temperatures and this result in a porous network upon thawing of gels. Blended hydrogels were characterized for their pore size, mechanical properties and swelling ratio. We also found that the blending of PEGDA with GelMA improved cell adhesion and viability of cells seeded on the porous scaffolds. This cryogel system can be used for tissue engineering applications.

mathewpeter@iitb.ac.in