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Cell therapy vs drugs

04 February 2011 | News

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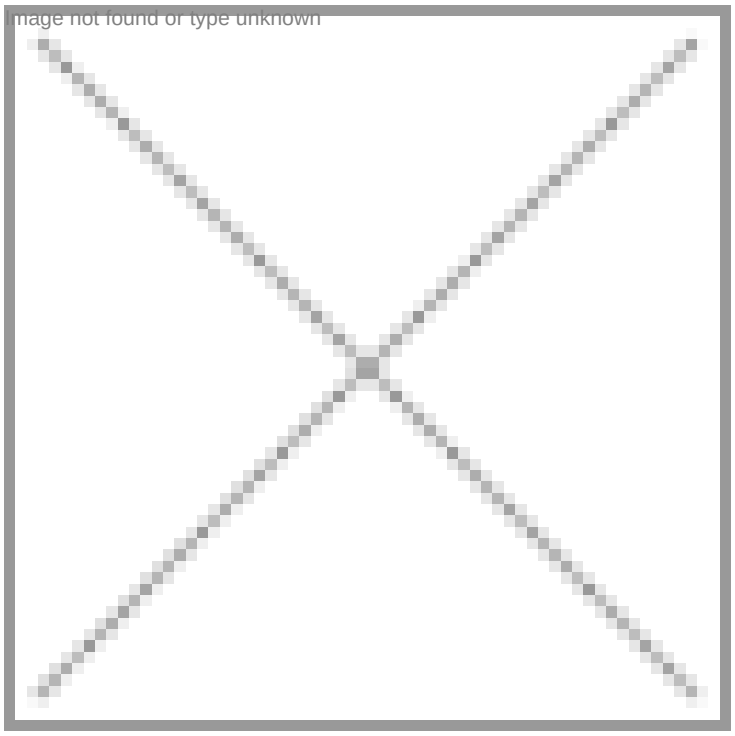

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Dr Samuel JK Abraham,
Director, Nichi-In Centre for Regenerative Medicine

research in stem cells besides clinical cardiac surgery work with institutes in Japan under the Nichi-In Japan in 2000, which started the Nichi-In Centre for Regenerative Medicine (NCRM) in India (2005) centers overseas through technological collaboration. He is also technical advisor to Niscell and ia.

the Division of pediatric cardiac surgery, Yamanashi University-Faculty of Medicine, Japan. He is essor at the Dr MGR Medical University in Tamil Nadu.

Diseases can be basically congenital or acquired. Among the acquired diseases, those acquired due to invasion by foreign organisms such as bacteria and viruses have been dealt greatly by drugs, which are chemical compounds that act to either curtail or totally destroy the pathogens. However in case of cellular dysfunctions which occur due to altered cellular function(s) or its environment due to physical or ch are multifactorial, the management-approach has to be multipronged.

Drug vs cell therapy

If I take spinal cord injury as an example, where a physical damage to the spinal cord leads to neural and vascular compromise, resulting in damage to the spinal cord leading to paraplegia, its repair using stem cells act through multiple mechanisms such as (i) paracrine action; i.e., secretion of neurotrophic factors that activates the neural orvascular cells in the damaged area to form new cells, (ii) trans-differentiation of the stem cells into neural cells and (iii) fusion of the stem cells to form new neural cells, which is a multipronged approach. The stem cells injected in the area of damage, produce neurotrophic factors, transdifferentiate or undergo fusion depending upon the signals in the â€œnicheâ€?. All these occur if

there is an adequate blood supply available for the cells to survive, the signals are appropriate for their optimal action and the quantity of stem cells applied is proportional to the extent of the damage. In contrast, a drug, which is a chemical compound such as a neurotrophic factor, will yield a particular concentration of the factor at the given site, irrelevant to whether the factor is necessary, or the dosage is appropriate or whether signals in the niche are appropriate to accomplish the repair or whether the other cascade of activities that help in the mechanism of repair are intact.

Therefore, I shall say that in these kind of multi-pronged reparative process, a cell-based therapy would be ideal as â€œcell is a wholesome wonderâ€? which can act appropriately to the need of the environment but a drug will be a â€œsingle-point-acting catalystâ€?, which of course can provide support to the cell-based therapies wherever necessary within their limitations.

The chemical compound derived drug-based approach has its own advantages and limitations with adverse reactions andthe cell-based therapies have their own advantages and limitations too. An ideal approach to treatment of primary organ failure will be the one in which when these two are appropriately combined to produce optimal results.

Stem cell and cells: can they be classified as a drug?

In my personal opinion, the evolving stem cell-based therapies for primary organ failures should be classified under a separate category of â€œCell-based therapiesâ€? and considered as clinical procedures similar to the cell-based therapies in bone marrow transplants and corneal repairs in practice for more than three decades and the immune cells such as NK cells in use for more than two decades in treating cancer, rather than drugs. Because, the cells vary from drugs in their characteristics depending upon their source, age and culture conditions, act differently based on the â€œnicheâ€? where they are implanted and their actions are more than simply delivering a particular concentration of a chemical compound. Above all, drugs may have a specific anti-dote; whereas cells or stem cells may not have an equivalent to a specific anti-dote which makes them similar to a clinical procedure.