

# The relationship between the xenotransplantation limitations and Charles Darwin theory on human evolution

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To the Editor,

The need for an alternative source of donor organs, together with the expansion of scientific data in this field, has focused attention on xenotransplantation as a possible alternative to allotransplantation in the treatment of patients with end-stage disease of vital organs (1). The fundamental property called ‘evolution’ was not discovered in the study of living matter by Darwin (2), but in the study of the foundations of the Logic of Nature, i.e. in first level Galilean Science. The work of Darwin was aiming at the discovery of the origin of the human species (2) and the property of living matter called ‘evolution’ was intended to prove what the origin was of the human species. Galilei teaches that Science has three levels. *The first level* of Galilean Science is that which entails: (1) logical rigour in the formulation of a problem, (2) the invention of an instrument capable of carrying out the key experiment for giving an answer to the problem, and (3) the reproducibility of the result obtained. The reproducible result is one of the basic foundations of Galilean Science. *The second level* of Galilean Science is that in which it is impossible to keep the experimental test under control. There is mathematical rigour in the formulation of the problem and there is the invention of new instruments for observing the effects searched for, but there is no direct intervention. *The third level* of Science refers to phenomena that occur only once. At first glance it could seem that the third level contradicts the notion of ‘experimental reproducibility’ (3). In this letter to editor we present our opinion about the relationship between

the xenotransplantation limitations and Charles Darwin theory on Human evolution. *The Descent of Man, and Selection in Relation to Sex* is a book by Charles Darwin, first published in 1871, which applies evolutionary theory to human evolution, Darwin’s primary rhetorical strategy was to argue by analogy. Baboons, dogs, and “savages” provided his chief evidence for human evolution (4). If the Darwin evolutionism of the human species were a first level Galilean science, they would have already found the ideal animal species for organs and tissues donation on humans. In xenotransplantation not only are the immunological barriers to the acceptance of xenogeneic tissue more powerful than those seen in allotransplantation, but the potential for the transmission of xenograft-associated zoonoses to the human host at the time of transplantation is also present. In addition, data on the physiological performance of the xenograft in the human environment are lacking, although a few functioning xenografts have been shown to be capable of supporting human life. Although progress has been made in clarifying some of the barriers to xenotransplantation and in defining appropriate therapeutic interventions, including interventions aimed at the removal of natural antibody and at the limitation of complement activation, xenotransplantation is not yet a viable alternative to allotransplantation in the clinical setting (1).

**Conflicts of interest:** Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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