Animal models of human nutritional diseases: a short overview

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The long history of animal experimentation describes the use of a series of methods that not only include the use of whole animals but isolated organs, isolated tissues, tissue cultures, isolated cells, subcellular components, modeling and structure-activity relationships. Data from government reports, from medical research council reports and from scientific publications point to the extent to which these methods are used. A study of the revolution of therapeutics and of the recent decline in drug innovation, raises the question as to whether the trend away from experimentation on the whole organism may have gone too far[1].

Several factors were very important in the discovery of essential nutrients including the recognition that certain diseases are directly associated to diet. Subsequently, the development of suitable animal models investigated animals that have specific requirements for the nutrient in question, the use of bioassay procedures to first produce and then ameliorate one or more of the symptoms related to deficiency and the development of defined purified diets that could be made singly deficient in a nutritional entity. Generally, the diet-disease association preceded both isolation of the nutrient per se as well as the establishment of nutrient function[2,3].

The STZ-diabetes model is widely used to investigate diabetic peripheral neuropathies by transmission electron microscopy (TEM). Morphological alterations of the vestibulocochlear nerve in experimental diabetes are being described for the first time and such information corroborates to a better understanding of the changes in hearing observed in diabetic patients[4]. The nutritional status of animals can change these results, as can the cellular composition and emerging inflammatory reactions. Leukocyte counts can easily be studied by TEM and with the advancing age of mice the results may be different. There are several forms of causing undernourishment in animals with the most common being protein malnutrition caused by the ingestion of small quantities of milk protein - casein (about 8%), as described in the original article by Viana et al. published in this issue of the *Revista Brasileira de Hematologia e Hemoterapia*[5].

This scientific paper shows the importance of physical training on the physiological adaptation of leukocytes in situations of neonatal malnutrition. Currently many experiments are underway to try to reconcile animal research to effectively and ethically extrapolate the results to humans.

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