From human health findings to the pre-clinical development of new therapeutic strategies

The linear drug discovery pipeline is often unrepresentative of the full process which leads to the development of new drugs. In line with this consideration, the IFT secondary location of Cagliari (IFT-CA) has recently extended its skills, so to include backward research loops that, starting from clinical findings, bring to the early phases of preclinical drug development. With this purpose in mind, psychometric distortion and scale rate compression issues have been addressed [1], so to increase the transferability of clinical trial findings at pre-clinical level. Awareness plans directed to adult citizens, also based on properly designed software applications, have been implemented/developed in order to collect information on people approach to pharmaceuticals use, to emphasize critical issues/needs and to encourage communication [2,3]. Such information and ongoing collaborations with patient family associations is also considered a valuable strategy for identifying patient needs’ priorities. A further contribute for increasing the manageability of clinical findings at pre-clinical level is supported by IFT-CA expertise in the chemical characterization of drugs under development or marketed. Contextually, systematic analyses of the international scientific literature are also used in an attempt to monitor the pattern of the clinical research depending on patent expiration date [4].

Starting from the variegate information coming from the clinical practice, IFT-CA has strongly reinforced and reorganized its modeling strategies in the effort to identify experimental tools which are highly informative of human pharmacological response and that, contextually, can be ethically responsible. Classical and well-established approaches for modeling drug dissolution profiles have been set up [5]. Moreover, the use of murine models has largely been substituted with more sustainable in-vitro and in-vivo models. Innovative 2D and 3D cell culture experimental constructs have been developed [6,7], in order to properly mimicking human conditions in neuroinflammation, but also focusing on neurologic/psychiatric disease. Moreover, new drosophila melanogaster models are under exam for modeling neurodegenerative syndromes such as Parkinson’s disease [8,9], as well as psychiatric mania status. Finally, an approach that favor automatization, transferability and remote control has been preferred and implemented in IFT-CA when developing new research instruments [7]. Nevertheless, classical techniques are used and optimized for evaluating the pharmacological properties of chemical compounds (e.g. cannabinoids [10], opioids [11,12] and antipsychotics), natural extracts and derivatives (e.g. Withania somnifera etc. [6, 13-16]), as well as diagnostic tools (e.g. salivary alpha-sinucleine test) to be used into clinical practice. All these activities represent the effort of IFT-CA for partially renewing its skill portfolio. The scientific production is also the result of reliable collaborations which have been established with other CNR Institutes, the University of Cagliari, Sardegna Ricerche. Outsourcing to private companies has been used when technical skills were not available in IFT-CA or among collaborators.


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