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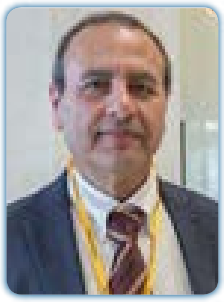

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Recombinant proteins: From bench to clinics

Recombinant proteins from the use of DNA technology are found in essentially every western pharmacy, medical testing laboratory, and biological research laboratory. One major issue regarding the clinical use of many peptides is their short half-life due to the rapid clearance from the circulation. To overcome this problem, we succeeded to ligate the signal sequence of O-linked oligosaccharides to the coding sequence of the hormones. The cassette gene that has been used contains the sequence of the carboxyl-terminal peptide (CTP) of human chorionic gonadotropin β (hCGβ) subunit. The CTP contains 28 amino acids with four O-linked oligosaccharide recognition sites. It was postulated that O-linked oligosaccharides add flexibility, hydrophilicity, and stability to the protein. On the other hand, it was suggested that the four O-linked oligosaccharides play an important role in preventing plasma clearance and thus increasing the half-life of the protein in circulation. Using this strategy we succeeded to ligate the CTP to the coding sequence of follitropin (FSH), thyrotropin (TSH), erythropoietin (EPO) growth hormone (GH) and thus to increase the longevity and bioactivity of these proteins in-vivo. Interestingly, the new analogs of FSH and GH were found not immunogenic in human and it is already passed successfully clinical trials phase III and phase II respectively. Moreover, FSH long-acting was approved by the European Commission (EC) for treatment of fertility. In addition, our results indicated that long-acting GH is not toxic in monkeys and the results from the clinical trials phase I and phase II seem to be promising. Designing long-acting peptides will diminish the cost of these drugs and perhaps reduce the number of injections in the clinical protocols.

Biography

Fuad Fares have completed his MSc and DSc studies at the Faculty of Medicine, Technion-Israel Institute of Technology, and postdoctoral studies at the Department of Molecular Biology and Pharmacology, School of Medicine, Washington University, St. Louis Missouri, USA. He developed the Molecular Genetic Laboratory at Carmel Medical Center, Haifa, Israel. Now he is the head of Molecular Genetic Laboratory at the Department of Human Biology, University of Haifa, Israel. He published more than 100 manuscripts in reputed journals and 12 patents. He served as a member of the Israel Council for Higher Education last 15 years. Moreover, he is the founder and the inventor of PROLOR Biotech Company for "designing long-acting recombinant proteins". PROLOR had an exit to OPKO Health Company in the USA. He developed long-acting FSH in the USA and this hormone (ELONVA) is marketed since 2010 by Merck Germany.

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