The importance of chemistry in pharmacovigilance

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Pharmacovigilance in Brazil has been increased and regulated since the 1960's. A lot of efforts have been made to monitor and control the quality of medicines as well as effectiveness and to report the effects in the human being, especially in the group of children, pregnant and elders. Researchers have reported that this group is more vulnerable to the medicines, especially because of the sensibility to the side effects of them. But what is the relationship between chemistry and it? What are the main mechanisms that could decrease or increase the medicine effects in the human body? Let's begin from the start; chemistry is one of the sciences that help pharmacovigilance to achieve its objective and to answer to some valuable questions: What is the decay time of the active substance in the body? What are the reactions that take place when you use another medicine at the same time (medicines interactions)? What is the transport phenomenon that allows the substance to flow in and out of the organisms? Pharmacokinetics and pharmacodynamics for sure will help to answer those questions, as well as the chemistry that involves the reactions rates, thermodynamic equilibrium, and adsorption and desorption processes, diffusion rates and so on. The result of those complex reactions (pharmacokinetics) and transport phenomena (pharmacodynamics) inside the body will show the effectiveness of the drug, the adverse reactions and events caused by the drug quality, the un-appropriated therapy, unusual purposes, intoxications and so on.

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Tumor-penetrating peptide fused EGFR single-domain antibody enhances cancer drug penetration into 3D multicellular spheroids and facilitates effective gastric cancer therapy

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Human tumors, including gastric cancer, frequently express high levels of epidermal growth factor receptors (EGFRs), which are associated with a poor prognosis. Targeted delivery of anticancer drugs to cancerous tissues shows potential in sparing unaffected tissues. However, it has been a major challenge for drug penetration in solid tumor tissues due to the complicated tumor microenvironment. We have constructed a recombinant protein named anti-EGFR-iRGD consisting of an anti-EGFR VHH (the variable domain from the heavy chain of the antibody) fused to iRGD, a tumor-specific binding peptide with high permeability. Anti-EGFR-iRGD, which targets EGFR and αvβ3, spreads extensively throughout both the multicellular spheroids and the tumor mass. The recombinant protein anti-EGFR-iRGD also exhibited antitumor activity in tumor cell lines, multicellular spheroids, and mice. Moreover, anti-EGFR-iRGD could improve anticancer drugs, such as doxorubicin (DOX), bevacizumab, nanoparticle permeability and efficacy in multicellular spheroids. This study draws attention to the importance of iRGD peptide in the therapeutic approach of anti-EGFR-iRGD. As a consequence, anti-EGFR-iRGD could be a drug candidate for cancer treatment and a useful adjunct of other anticancer drugs.

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