Monoclonal antibody for drug delivery and targeting

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Antibody drug conjugates (ADCs) are a broad class of molecules obtained by coupling a potent cytotoxic agent to a monoclonal antibody (MAb). They have the advantage of selective targeting highly potent cytotoxic agents towards cells overexpressing specific tumor antigens. The targeted delivery allows a toxicity reduction of free antitumor drugs and improves their therapeutic index. The main challenges for the development of ADCs are related to the chemistry of drug conjugation, the drug/MAb ratio and the site of drug conjugation (mainly involving MAb's Lys(s) or Cys(s)). The last two points heavily affect the homogeneity of an ADC, thus complicating its path towards the clinic. The approach of chemical coupling between the anticancer drug and the MAb yields a new chemical entity, which obliges the developer to setup a complex set of characterizations for the specific ADC. Here, it is presented a platform for the targeted delivery of anticancer drugs by using the desired MAb without the need of a chemical conjugation. Specific proteins binding the Fc moiety of a MAb have been screened, for their binding properties, and modified to deliver anticancer drugs. The aim is to prepare non-covalently linked ADCs, termed antibody drug systems (ADSs). The advantages of this approach are the great versatility (the platform can be used with different MAbs depending on the targeted tumor) and the simplified characterization with respect to ADCs. MAbs are also extremely important for developing targeted drug delivery systems, like liposomes. Strategies for surface modification of liposomes with antibodies will be presented.