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EDITORIAL

# For dentists and doctors: The neglected concepts about the factors influencing the effects of drugs

The study or the evaluation of the effects of not only an active compound, mainly drugs but also a toxic compound (Ghanemi, 2014a,b,c,d), always takes into consideration well-known influencing factors such as the drug concentration, drug–drug interactions (Ritter, 2009; Hamoud et al., 2014; Tischer and Fontana, 2014; Yeh et al., 2014) or the type of excipient or solvent used during the drug administration. However, some factors can significantly influence the activity a drug or a compound can have on cells (Ghanemi, 2014a,b,c,d), tissues or organisms.

Drug interactions with food (Lin et al., 2008; Wang and Sweet, 2012) and some natural products may significantly influence the efficacy of a drug. Indeed, since food or natural products used either as nutriments or as herbal preparations such as tea may contain active compounds including flavonoids, alkaloids and others, this could have the same consequence as the drug–drug interactions between the drug and the active compounds contained within the food and the natural compounds that may inhibit for example intestinal metabolism and transport (Won et al., 2012).

Such concepts are extremely important mainly in therapeutics especially that it is largely believed that "natural products" are safe and without any possible negative impact on health, which is not always correct. In fact, modern pharmacology has pointed out divers active compounds derived from natural products such as Traditional Chinese Medicines (Boubertakh et al., 2013; Ghanemi and Boubertakh, 2014) that are potential candidates for drug development showing strong biological activity and thus the potential interaction they may have with drugs if taken simultaneously.

Chemical environment that may result from the ingested food is also an important influencing factor. Indeed, elements such as the stomach pH and the type of molecules taken or administrated simultaneously with the drug might influence the pharmacokinetics mainly by modifying the drug ionic status and by creating competitiveness between the drug and the other molecules used as transporters during the absorption into the circulation or into the site of drug action. Within this context the chemical environment may also modify some properties of drug receptors such as the reported data about the factor the G protein coupled receptor (Ghanemi et al., 2013) that represents probably the most important therapeutic target in the modern pharmacology (Ghanemi, 2013a,b; Ghanemi, 2014a,b,c,d) which shows how "chemistry" can change drugs the drug receptor or cells properties (Ghanemi, 2014a,b,c,d) and thus, modifies drug activity.

Physical conditions such as temperature may have an impact as well. For instance, temperature may influence the chemistry of the drug or the molecules of the compounds with which the drug interacts. Furthermore, the temperature may lead to a modification to some pharmacokinetic-related parameters such as vasoconstrictions which influence both drug absorption and drug elimination.

Drug metabolism parameters (Cheikh Rouhou et al., 2013; Yang et al., 2013; Cheikh Rouhou and Haddad, 2014), in addition to the physiological or the pathological status of the cells, the tissue or the patients represent other elements that should be considered as well. Indeed, a slow or an active metabolism (due to genetic factors (Zanger and Schwab, 2013) or alcohol abuse for example) will influence drug elimination and, importantly, the metabolism will be more obvious when the drug is used to treat metabolic diseases. Physiological or pathological situations might exert influence at different levels including both pharmacodynamics and pharmacokinetics. For example a pregnant woman will produce steroid hormones that may have the same blood transporters as steroids drugs, an athlete would have a better drug metabolism than a sedentary patient and a diabetic patient would respond less to antihyperlipidemic agents compared to non-diabetic patients if they are given to both patients in the same dosage.

These factors should be considered by both clinicians while prescribing therapies and researchers working on experimental pharmacology to develop pharmacology toward optimized laboratory conditions and more efficient clinical applications.

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### Conflict of interest

The author declares that there is no conflict of interest.

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