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Editorial

Structure Activity Relationship (SAR)

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INTRODUCTION

Structure Activity Relationship explains the relation between the structure of the molecule and its biological activity. SAR studies are useful to identify the groups that are responsible for the particular activity in a molecule. It is very helpful in synthesizing as new drugs as we can overcome the drawbacks of the classic drugs and insert more ideal group in place of that in order to increase the efficacy of the drug molecule. It is used to identify the desirable and undesirable groups in the molecule with regard to the activity that it shows.

The relationship between the structure and the activity of the drug is explained by the three dimensional structure of the drug molecule and its interaction with the target site as the groups in the molecule change the three dimensional structure of the drug also changes and hence the pharmacological activity exhibited also changes. The modification in the structure of the drug is done to increase the activity and reduce the toxic effects of the drug. The activity of the drug sometimes even changes from a person to another because of the physical and genetical makeup of an individual is different from a person to person.

SAR studies of the molecule are important to know the pharmacokinetic behavior of the drug which includes absorption, distribution, metabolism, elimination. For a drug to elicit its action it first needs to be absorbed and distributed properly. For a drug to get absorbed it needs to have the lipophilic nature so that it can easily cross the membrane as get absorbed but when we consider distribution the drug needs to hydrophilic in order to get easily mixed up with blood where water is the major component and then needs to undergo distribution in order to reach its target site and exhibit its pharmacological action. Thus the drug needs to have both polar and non –polar groups in a balances manner to show the required action.

The target organ has a receptor site where the drug attaches and forms a complex and then the biological activity is shown, thus the structure of the drug plays a very crucial role, sometimes even the isomers of the same compound does not show the same kind of action or shows the same action with different kind of intensities. Examples of such drugs are Levomethorphan is a potent opoid analgesic whereas dextromethorphan is used as cough suppressant, L- sotalol is alpha blocker whereas d-sotalol is an antiarrythmic drug and R-Naproxen is used in management of anthralgic pain, S- Naproxen is known to cause teratogenic affects.

In few cases the toxicity of the drug is because of function group present in it, in such cases inorder to reduce the toxicity these group are substitutes with an alternative groups, later proper studies are done with the new compound and then released into the market for sale. So based on these studies new drugs are formulated in order to increase the efficacy, bioavailability and decrease the unwanted effects like toxicity, teratogenicity etc.

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