Definitions of Physiological and Medicinal Properties

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High molecular weight may impact bioavailability and penetration of biological barriers [13]. Molecular packing, which affects drug stability and solubility, is impacted by volume. It can affect the transport of the drug via biological membranes [12, 14]. The molecule's capacity to create hydrogen bonds, which is essential for interactions with biological targets and solubility in water, is influenced by the number of hydrogen atom donors (nHD) and acceptors (nHA) in the molecule [10, 14]. The number of rotatable bonds (nRot) affects the flexibility of the molecule and how it interacts with target proteins. Drug metabolism may be impacted by an excess of rotatable bonds [14]. Total Polar Surface Area (TPSA) offers information about the polarity of a molecule, which influences how well it interacts with proteins and can pass through biological membranes [1, 14]. The likelihood of a drug dissolving in water is indicated by the logarithm of solubility, or logS. Bioavailability depends on solubility because poorly soluble medicines may have poor absorption [2, 10]. The partition coefficient, or logP, measures a molecule's lipophilicity and how well it can pass across cell membranes. It is necessary to predict the distribution of drugs in tissues [4]. The Quantitative Estimate of Drug-likeness, or QED, predicts how closely a molecule's characteristics match those of successfully used drug molecules [3]. The Synthetic accessibility score(SAS) is a metric that quantifies how easily a given molecular structure can be synthesized[1]. Lipinski's rule states that a drug-like molecule should have no more than five hydrogen bond donors (the total number of nitrogen–hydrogen and oxygen–hydrogen bonds), no more than ten hydrogen bond acceptors (all nitrogen or oxygen atoms), molecular mass should be less than 500 daltons, log P should be less than five [10]. Pfizer Rule states that a drug-like molecule should have logP greater than 3 and TPSA less than 75 [8]. GSK Rule states that a drug-like molecule should have molecular weight $\leq$ 400 and logP $\leq$ 4 [7]. Golden Triangle Rule states that a drug-like molecule should have 200 $\leq$ molecular weight $\leq$ 50; -2 $\leq$ logD $\leq$ 5 [9]. After that, we used swissADME[1] to find a leadlike molecule that satisfies drug-likeliness properties(Lipinski rule, Ghose filter, Veber rule, Egen rule, Muegge rule) and that has no problematic fragment in its structure. We have found these problematic fragments using PAINS (for pan assay interference compounds) and the Structural Alert Method[1]. Ghose Filter states that a leadlike molecule should

have a molecular weight between 160 and 480 daltons, LogP between -0.4 and +5.6, Number of atoms between 20 and 70, molar refractivity between 40 and 130 [6]. Veber Rule states that a leadlike molecule should have No more than 10 rotatable bonds, No more than 140 $Å^2$ polar surface area [14]. Egan Rule suggests that a compound is likely to be orally active if it has logP between 1 and 3, a molecular weight between 150 and 500 daltons [5]. Muegge Rule suggests that a leadlike molecule should have No more than 5 hydrogen bond donors, No more than 10 hydrogen bond acceptors, No more than 10 rotatable bonds, A polar surface area of less than 140-angstrom square. [11].

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