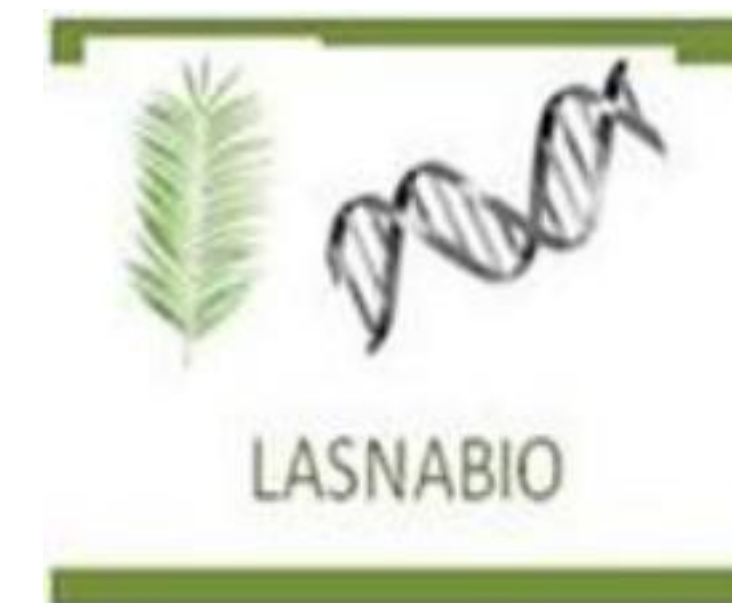




Experimental and theoretical studies: Biochemical properties of honey on type 2 diabetes

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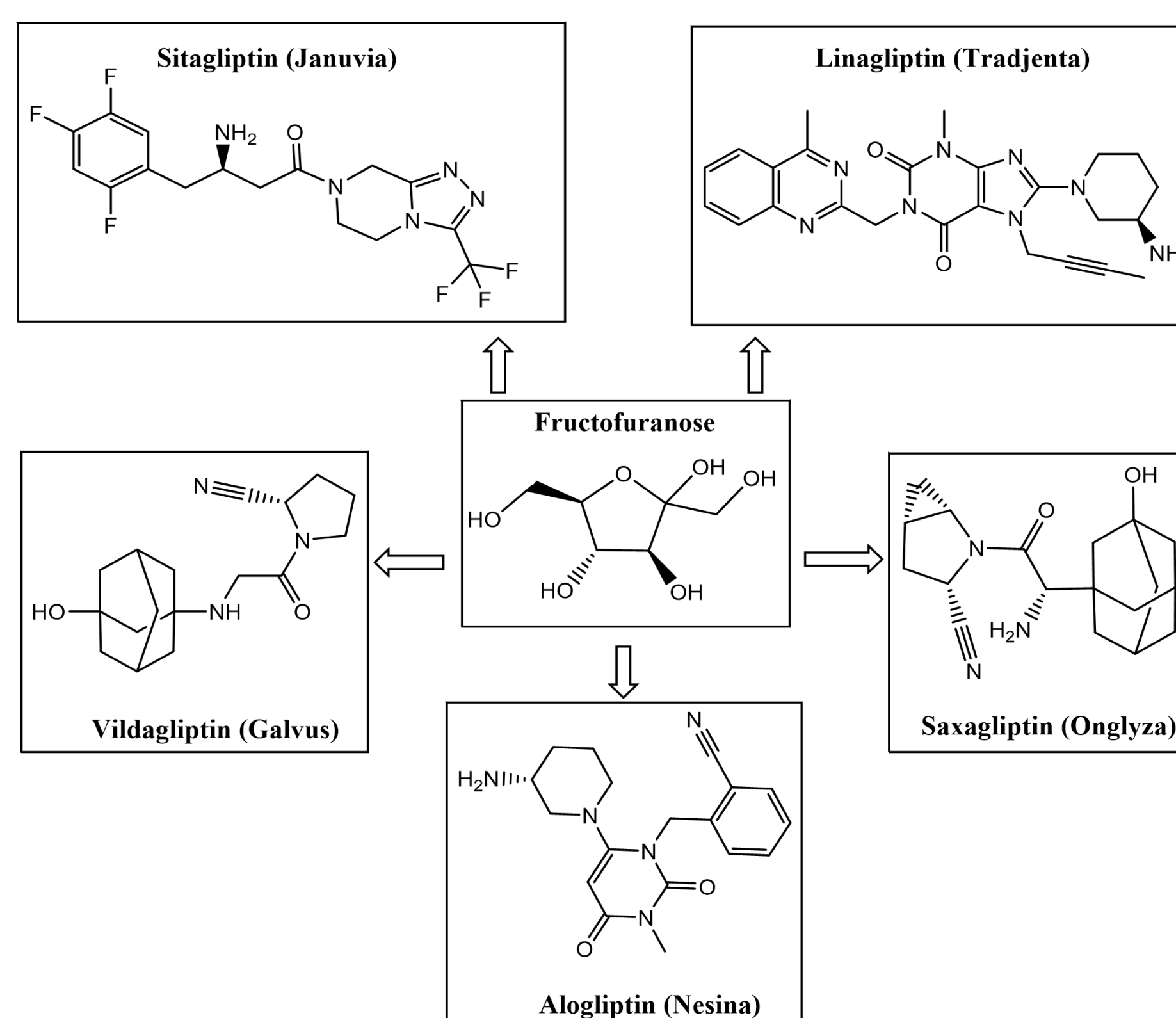


Overview

Honey is primarily composed of sugars: glucose and fructose. Depending honey, it's either fructose or glucose predominates. The concentration of fructose in food influences the glycemic index of the person who consumes it, that is to say, his blood sugar. More the fructose concentration and the less the glycemic index (GI) is high (**Diabetes Care, 2005 - J Clin Nutr 2010**). Thus, changes in the insulin response shows a decrease of the amount of insulin secreted at an increased fructose honey. Honey is also a compound that can reduce the lipid in blood. Several studies on animals, but which remain to be checked in humans, have shown that the honey can have interesting effects when combined with other molecules: associated with metformin (a medicine taken by diabetics), it shows the benefits and effects of diabetes preserves the tissue (**Reprod Med 2013.**); associated ginger, it increases the antioxidant activity and thus avoids neurologic complications, neuropathic or macrovascular (**BioMed Research International, 2014**). Although natural and full of virtues, honey should not be considered a panacea for people with diabetes. It is not forbidden, but should be consumed in moderation and be included in the daily account of carbohydrates. It is more interesting than white sugar by its fructose concentration which limits the increase in blood sugar.

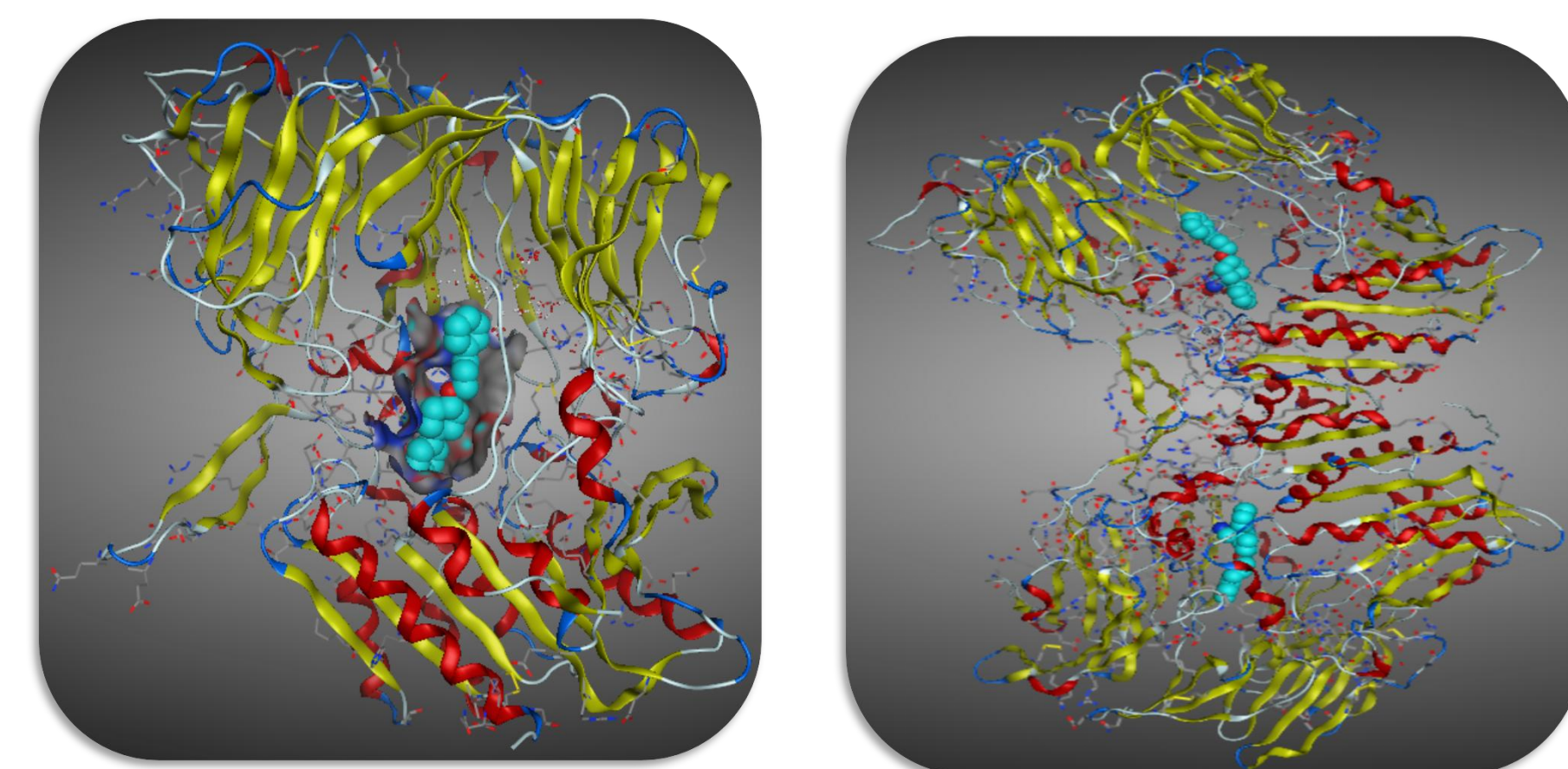
Methods:

Several inhibitors have already been identified. High-affinity inhibitors of DPP-4 such as linagliptin (Tradjenta), sitagliptin (Januvia), vildagliptin (Galvus), saxagliptin (Onglyza) alogliptin (Nesina) and Metformin (Glucophage) are used in the treatment of type 2 diabetes. It is for this purpose that molecular modeling techniques grouped under the "molecular docking" were developed. It is this new approach to treatment of type 2 diabetes by inhibiting DPP-4 that we are interested in this work. The DPP-4 inhibitors are small molecules that selectively inhibit DPP-4 contributing significantly to normalize blood sugar with very few side effects. A Wistar rat study was initiated in our laboratory with a well-studied protocol; Metformin (Glucophage) that are involved in the disease management of type 2 diabetes and added to honey. after sacrifice according to international standards and respect for the animal.



Docking protocol :

Molecular modeling techniques are widely used in chemistry, biology and the pharmaceutical industry. Most of the currently existing drugs target enzymes. This theoretical approach predicts the mode of interaction of a ligand with its target. Inhibition of DPP-4 is an important approach in the treatment of type 2 diabetes. We have chosen for the inhibition of DPP-4 the following molecules: Linagliptin (Tradjenta), Sitagliptin (Januvia, a medicine taken by diabetics), Vildagliptin, Saxagliptin and alogliptin that are involved in the disease management of type 2 diabetes and added to honey. For this, we used MOE (Molecular Operating Environment) software



Conclusion:

The results obtained in this work, show the inhibition of DPP-4 by molecular modeling methods. The introduction of bulky groups causes a conformational rearrangement in the pocket of the active site that will probably be strengthened by complementarily and therefore enhance activity. The results obtained in this study, by the methods of molecular modeling have been elucidated, allowing us to conclude that linagliptin (Tradjenta) added to honey has better inhibition of DPP-4. The organs especially the kidneys of Wistar shows that the parameters to renal function let us conclude that damages caused by diabetes are slightly perceptible than those observed without the addition of a high concentration of fructose honey

Support: The authors thank the LASNABIO for its financial support.