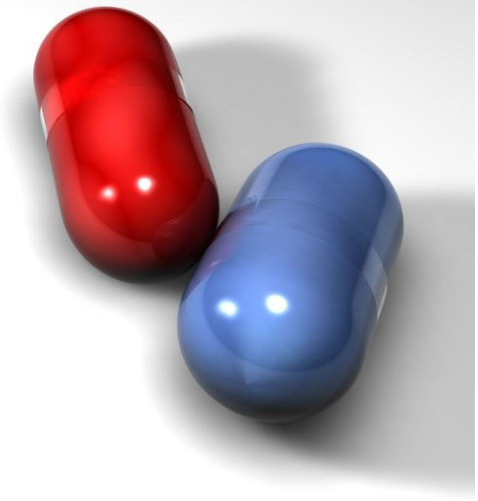
Bangladesh Pharmacological Society



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Letter to the Editor

In silico and *in vivo* based evaluation of traditional antidiabetic herb *Hodgsonia heteroclita*

Sir,

Even after a lot of development in the area of medical therapeutics, diabetes remains to be the most prevalent health ailment and economic burden throughout the globe. Abnormal metabolism, insulin resistance and insufficient secretion of insulin characterize the nature of this disease.

The prevalence of evidenced based complementary and alternative medicines (cCAM) is significantly increasing, since they are proven safe, effective and also helps in improving overall health (Balamurugan et al., 2012; Middha et al., 2013; Usha et al., 2013).

Plants including *Pistacia lentiscus* (Rehman et al., 2015), *Punica granatum* (Middha et al., 2014) have been reported for their antidiabetic effects using animal model. In addition, molecular docking studies were also used as an alternative for animal models (Balamurugan et al., 2012).

One such alternative medicine used by the *Bodos* of North-East India to efficiently manage diabetes mellitus is the fruit pulp of *Hodgsonia heteroclita*. It is also commonly known as "Hagrani jwgwnar" among the *Bodos* (The Wealth of India, 1959; Narzary et al., 2015). In this letter, in an effort to gain first evidence for the antidiabetic activity of the functional food *H. heteroclita*, we present an *in silico* docking approach for the identification of compounds inhibiting glycogen synthase kinase3 (GSK-3β). Examination of 3D structures of GSK-3β from PDB reveals two types of structures based on the presence of Phe67 and Arg141 residue in its active site and can be named as 1R0E and 1Q4L type (Kim et al., 2009).

We used "Discovery studio 3.5" for analysing GSK-3β inhibitory action of the various compounds detected in *H. heteroclita* by LC-MS. So far, there are no reports indicating the type of GSK-3β inhibition of *H. heteroclita*.

The results imply that several compounds competetively inhibit GSK-3β. Caffeic acid exhibited interactions with 1ROE at Val70, Lys85, Asp133, Val135, Asp200 and with 1Q4L at Ile62, Ala83, Tyr134, Arg141, Val170 (Figure 1).

Preclinical validation of antidiabetic activity of *H. heteroclita* with two doses (40 and 80 mg/kg/mL) using alloxan-induced diabetic rat model was carried out. There was a significant reduction in blood glucose level i.e. 21 and 31% at 40 and 80 mg/kg/mL dosages respectively when compared to control diabetic rats (Table I).

Table I

Final day diabetic level in experimental animals

Group	Glucose level (mg/dL)
Normal control	100 ± 2.9
Diabetic control	398 ± 9.1
Extract of H. heteroclita (40 mg/kg)	315 ± 9.0
Extract of H. heteroclita (80 mg/kg)	280 ± 3.5

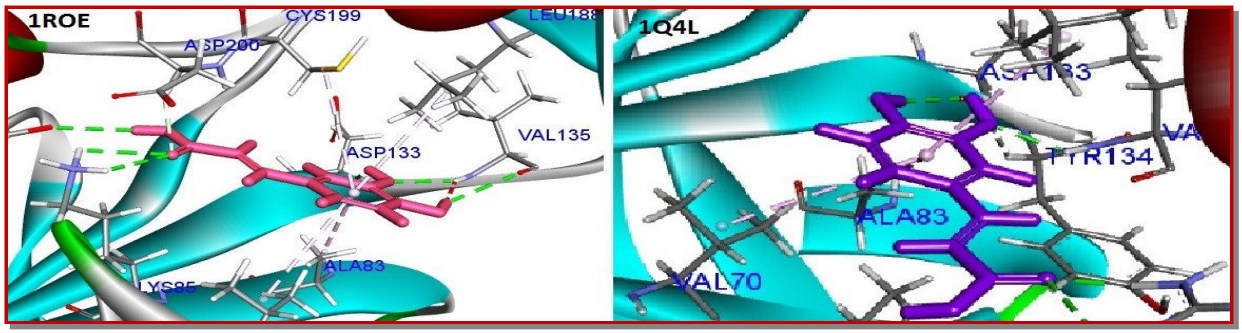

Figure 1: Docked molecule with GSK-3β structures (1R0E-like and 1Q4L-like)

To conclude, *H. heteroclita* has antidiabetic potential and further studies can be carried out to understand the mechanism of action in detail.

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