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TABIIY FANLAR

RUTIN MOLEKULASINING 6ELR OQSILI BILAN MOLEKULYAR DOCKINGI

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ANNOTATSIYA

Ushbu tadqiqotda tabiiy flavonoid hisoblangan rutin molekulasining Janus kinaza 1 oqsilining 6ELR kristall strukturasi bilan o'zaro ta'siri molekulyar docking yordamida baholandi. Oqsil strukturasi Protein Data Bank ma'lumotlar bazasidan olinib, BIOVIA Discovery Studio Visualizer dasturida docking hisob-kitoblariga tayyorlandi. Ligand sifatida rutin molekulasi PubChem bazasidan yuklab olinib, Avogadro dasturida MMFF94 kuch maydoni yordamida geometriyasi optimallashtirildi. Docking hisob-kitoblari AutoDock Vina 1.2 dasturida bajarildi. Natijalar rutinning JAK1 oqsiliga −10,6 kcal/mol bog'lanish energiyasi bilan yuqori affinitet namoyon etganini ko'rsatdi. Kompleks barqarorligi ko'plab vodorod bog'lari, elektrostatik va gidrofob o'zaro ta'sirlar orqali ta'minlandi. Olingan natijalar rutinning JAK1 ingibitori sifatida istiqbolli tabiiy ligand bo'lishi mumkinligini ko'rsatadi.

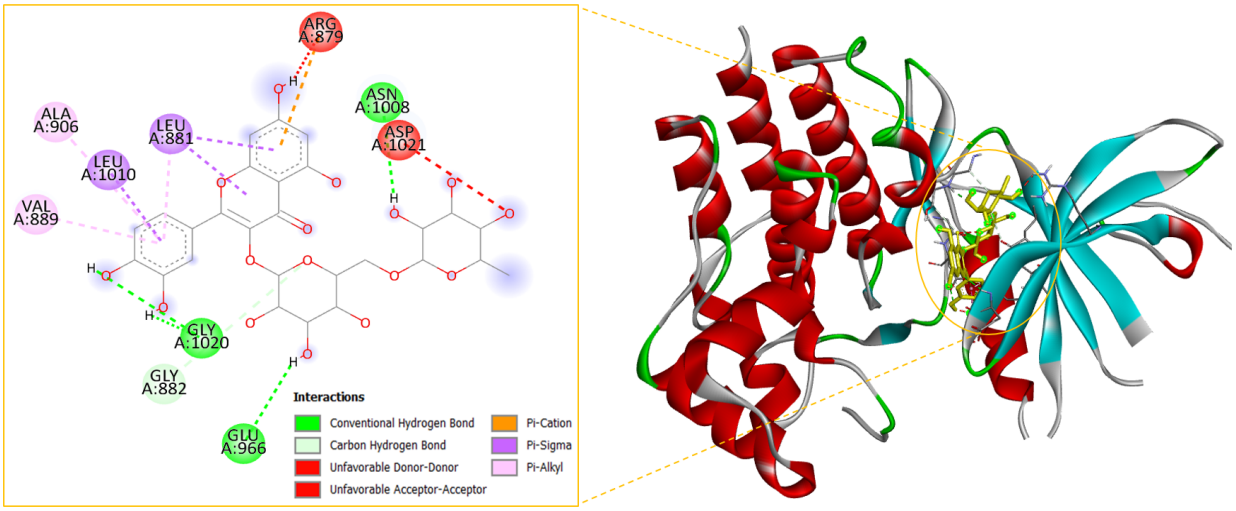
Kalit so'zlar

JAK1, rutin, molekulyar docking, AutoDock Vina, 6ELR

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KIRISH

Janus kinaza 1 hujayra ichidagi JAK–STAT signal uzatish yo'lining asosiy fermentlaridan biri bo'lib, immun javob, yallig'lanish va hujayra proliferatsiyasini boshqarishda muhim rol o'ynaydi. JAK1 ning ortiqcha faollashuvi revmatoid artrit, psoriaz, yallig'lanishli ichak kasalliklari hamda ayrim onkologik kasalliklar bilan bog'liq [1-2]. Shu sababli ushbu fermentni selektiv ingibitsiya qiluvchi yangi biologik faol birikmalarni izlash zamonaviy farmatsevtika va tibbiy kimyoning dolzarb yo'nalishlaridan biri hisoblanadi [3-4]. Mazkur ishda JAK1 oqsilining 6ELR kristall strukturasi Protein Data Bank ma'lumotlar bazasidan olinib, BIOVIA Discovery Studio Visualizer dasturida docking uchun tayyorlandi. Kristallanish jarayonidagi suv molekulalari va geteroatomlar olib tashlandi hamda qutbli vodorod atomlari qo'shildi. Rutin molekulasi PubChem bazasidan olinib, Avogadro dasturida geometriyasi optimallashtirildi va AutoDock Vina 1.2 yordamida molekulyar docking hisob-kitoblari amalga oshirildi [5]. Hosil bo'lgan oqsil–ligand komplekslari BIOVIA Discovery Studio Visualizer dasturida tahlil qilindi. Docking natijalariga ko'ra, rutin molekulasi JAK1 oqsilining faol markazi bilan −10,6 kcal/mol bog'lanish energiyasini namoyon etdi. Ligand Arg879, Asn1008 va Asp1021 aminokislota qoldiqlari bilan vodorod bog'lari hosil qilgan. Bundan tashqari, Gly982 va Gly1020 bilan Carbon Hydrogen Bond, Glu986 bilan Attractive Charge hamda Leu881, Val889, Ala906 va Leu1017 bilan π-alkyl va π-sigma turidagi gidrofob o'zaro ta'sirlar kuzatildi. Ushbu nokovalent bog'lanishlar kompleksning termodinamik barqarorligini ta'minladi va rutinning JAK1 faol markaziga yuqori affinitet bilan bog'lanishini ko'rsatdi.



1-rasm. Rutin molekulasining JAK1 oqsilining 6ELR kristall strukturasi bilan hosil qilgan oqsil–ligand kompleksining 2D va 3D ko'rinishi.

XULOSA

Olingan natijalar rutinning JAK1 oqsiliga nisbatan istiqbolli tabiiy ligand ekanligini ko‘rsatadi. Biroq uning ingibitrlik faolligini to‘liq tasdiqlash uchun ferment faolligi bo‘yicha *In Vitro* va *In Vivo* tadqiqotlarni amalga oshirish zarur.

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