GIDROGELLARGA ASOSLANGAN DORI VOSITALARINI YARATISH HOLATINI O'RGANISH

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Annotatsiya: ushbu maqolada bugungi kunda dori vositalari tayyorlashda qo`llaniladigan moddalar haqida ma`lumot keltirilgan. Ayniqsa, bugungi kunda keng rivojlanib borayotgan tibbiyot sohasida gidrogellarning qo`llanilishi batafsil yoritilgan.

Kalit so`zlar: dori, gidrogel, kollagen, jelatin, xitozan, alginat, dekstrin, gialuron kislota, akril, metakril kislota, metakrilat hosilalari, pirrolidon, polimerlanish, gellanish.

RESEARCH ON THE STATE OF CREATION OF MEDICINES BASED ON HYDROGELS

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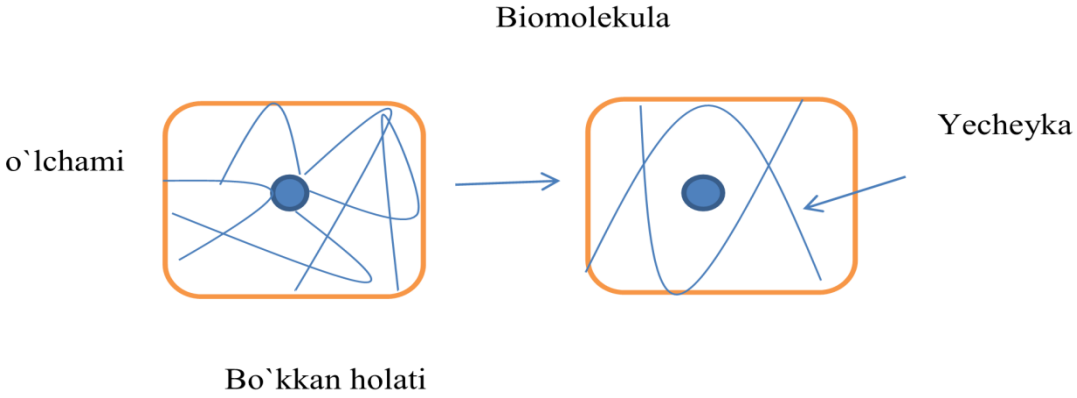
Abstract: this article contains information about the substances that are currently used in the preparation of medicines. Especially in the field of Medicine, which is developing widely today, the application of hydrogels is explained in detail.

Keywords: the drug, hydrogel, collagen, gelatin, chitosan, alginate, dextrin, hyaluronic acid, acrylic, methacrylic acid, methacrylate derivatives, pyrrolidone, polymerization, gel formation.

Gidrogellar dori vositalarini tashuvchilarining alohida guruhiga kirib, kimyoviy yoki fizikaviy o`zaro bog`lanish natijasida gidrofil polimer zanjirlardan suvda erimaydigan, ammo suvli muhitda bo`kish xususiyatiga ega uch o`lchamli to`r ko`rinishida bo`ladi. Bunday tuzilishga ega bo`lgan gidrogellar monomakromolekulalar xattoki supermolekulalarga kiradi [1].

Birinchi gidrogel 1954-yil O.Wichterle i D.Lim tomonidan sintezlangan bo‘lib, shu davrdan boshlab tibbiyotda qo`llaniladi, ayniqsa dori vositalarini tashish tizimlarini yaratish uchun foydalaniladi. Kam miqdorda (umumiy gidrogelning

hajmidan 10% miqdorda) suv yutish xususiyatiga ega gidrofob polimerlardan farqli, gidrofil polimerlar ko`p miqdorda suvni kuchli absorbsiya qilish (gidrogelning umumiy hajmidan 95% miqdorda) va bo`kish xususiyatiga ega. Gidrogellarning noyob xususiyatlari – ularning elastikligi va bo`kishdan avval va keyin o`z shaklini saqlab qolish xususiyatidir, ya‘ni bo`kish jarayoni kattaligini (o`lchamini) o`zgarishga olib keladi, ammo shakli o`zgarmaydi. Gidrogellar biomos tabiiy (kollagen, jelatin, xitozan, alginat, dekstrin, gialuron kislota) yoki sintetik (akril, metakril kislota va metakrilat hosilalari, pirrolidon va polimerlardan tayyorlanadi. Bunda sintetik polimerlar boshqarilishi mumkin bo`lgan xususiyatlarni ta‘minlaydi [2,10,11].



Organizmdagi gidrogel ta‘sirining chizmasi.

Gidrogelning bo`kishi va dori vositalarining ajralib chiqishini ta‘minlovchi ichki yacheykalarning kattalashishi. Gidrogellarni dori vositalarining tashuvchilari sifatida qollanilishi ikkta muhim vazifani yechib beradi: past biosamaradorlikka ega bo`lgan dori vositalarining (masalan, makromolekulalar) yetkazilishini ta‘minlaydi va dori vositasining degradatsiyalanishidan himoyalaydi (masalan, peptid tabiatga ega bo`lgan moddalarning proteolitik degradatsiyadan himoylaydi); bundan tashqari gidrogellar dori vositalarining ajralib chiqish tezligi (bolyusli yoki sekinlashtirilgan trigerli) va joyini modullaydi, bu esa dori vositalarining maqsadli yo`naltirilgan yetkazilishida qo`llaniladi.

Bugungi kunda dori vositalarining gidrogellardan ajralib chiqishining uchta yo`li mavjud: diffuziya natijasida, gidrogelning bo`kishi natijasida, kimyoviy o`zaro ta‘sir natijasida. Gidrogellardan dori moddalari molekulalari ajralib chiqishi asosida diffuziya hodisasi yotadi. Gidrogelning bo`kishi jarayoni polimer yacheykalarining kattaligi dori vositalari molekulalarining kattaligiga teng yoki katta bo`lgandagina dori moddalari molekulalarining diffuziya jarayoni boshlanadi. Polimerni yacheykalarining kattaligi katta farq qilishi mumkin, (5dan 100 EM) va bu uning fizik-kimyoviy xususiyatlariga bog`liq [12,13]. Shu sababli, dori vositalarining diffuziyasi dori moddalari molekulalarining kattaligiga ham bog`liq. Agar dori moddalarining diffuziya tezligi gidrogelning bo`kish tezligidan kattaroq bo`lsa (masalan, molekulalar kattaligi kichik bo`lgan dori moddalari uchun), dori

vositalarining ajralib chiqishi bo`kish jarayoni bilan nazorat qilinishi mumkin: gidrogelning bo`kish tezligini o`zgartirgan holda dori moddasining ajralib chiqish tezligini o`zgartirish mumkin va buning teskarisi, dori moddasini makromolekulalarini ajralib chiqishi polimer yacheykalarining kattaligi va bo`kish tezligiga bog`liq [3-5,15].

Dori moddasini molekulalari va polimer zanjirlari orasidagi o`zaro ta‘sir natijasida ham dori moddasi gidrogeldan ajralib chiqishi mumkin. Gidrogellar turli yo`l bilan kiritiladigan (implantatsiya qilinadigan, peroral, transfermal, ko`z, burun orqali va b) har xil yetkazish tizimlarini yaratishda ishlatiladi [6]. Gidrogellar degradatsiya boladigan va degradatsiya bo`lmaydigan bo`lishi mumkin; gidrogellar dori moddasining yangi miqdori bn takroriy implantatsiya qilinishi lozim bo`lmagan holda to`ldirib turadigan implantatsiya qilinadigan yetkazish tizimlarida qo`llanish mumkin, uning degradatsiya tezligi dori vositasining kerak bo`lgan ajralib chiqish tezligiga bog`liq bo`lgan holda o`zgarishi mumkin. Stealth – effektni tashkil qilish maqsadida polietilenglikolni tashqi qobiq ko`rinishida qo`shilishi natijasida gidrogellarning xususiyatlarini modulyatsiya qilish mumkin.

Bunda yetkazib berish tizimining ta‘sir etish vaqti oshishi va ular eliminatsiyasining immun tizimlarini bartaraf etish mumkin. Stealth – gidrogellar tumor spetsifik yetkazish tizimlarini yaratish uchun qo`llaniladi. Gidrogel polimerlarini fizik-kimyoviy xususiyatlarini o`zgartirish ularni pH yoki harorat kabi turli stimullarga ta‘sirchan qilishda yordam beradi. pHga ta‘sirchanligini o`zgartirishga polimerning ionizatsiyasini o`zgartirish bilan erishiladi: anion guruhlarni qo`shish gidrogelni yuqori pH ko`rsatkichida bo`kishiga olib keladi, kationli guruhlarni borligida esa – ushbu jarayon (bo`kish) pHning past ko`rsatkichlarida amalga oshadi. pH ta‘sirchan gidrogellar peroral dori shakllarini yaratishda qo`llaniladi, chunki oshqozon-ichak traktida pH ko`rsatkichlarining keng diapazonin mavjud bo`lib, pH ga nisbatan dori moddalarning yetkazib berish tizimlaridan ajralib chiqish joyi va xarakterini modulyatsiya qilish imkonini beradi.

Gidrogel polimerining harorat ta‘sirida bo`kish darajasini o`zgarishi uni erish haroratining kritik ko`rsatgichiga bog`liqdir: agar l okal harorat erish haroratidan yuqori bo`lsa, polimer suv bn bog`lanish xususiyatini yo`qotadi. Haroratga ta‘sirchan gidrogellar implantatsion va ko`zga yetkazib berish tizimlarida qo`llaniladi. Gidrogellar bo`kishga bo`lgan xususiyatini spetsifik fermentlar ta‘sirida (enzimga ta‘sirchan) o`zgartira oladi, masalan yogon ichak fermentlari (azoreduktazalar) ta‘sirida, bu esa aynan yogon ichakda ajralib chiqishi kerak bo`lgan dori vositalarining maqsadli yo`naltirilgan tizimlarini yaratishda qo`llaniladi.

Qondagi glyukoza miqdorini o`zgarishiga ta‘sirchan gidrogellar ishlab chiqilmoqda, ulardan pulsatsiya usuli bilann insulinni ajratuvchi tizimlarni ajratib chiqishda foydalaniladi. Xitozan yoki akril kislotasidan tayyorlangan gidrogellar

qo`shimcha bioadgeziv xususiyatlarga ega bo`ladi, ulardan peroral va bukkal bioadgeziv hamda ko`z dori turlarini yaratishda qo`llaniliadi. Bo`kish jarayoni juda sekin amalga oshganligi sababli gidrogellarni dori moddalarining ajralib chiqish sekinalshgan dori shaklari yaratishda qo`llash mumkin [7-9,14].

Keltirilgan ma`lumotlardan xulosa qilish mumkinki, gidrogellardan foydalanish, ayniqsa tabiiy moddalar va hozirda tibbiyotda qo'llanilib kelinayotgan dori moddalaring samaradorligini oshirishda ajoyib imkoniyatlar yaratadi. Bu esa sintetik va sun'iy polimerlarning yangi avlodini yaratishda muhim omil bo'ladi.

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