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VPLIV RAZPOREDITVE RAZLIČNO STABILNIH DIMERIZACIJSKIH SEGMENTOV V ENOVERIŽNI DNA NA UČINKOVITOST ZVITJA V ŠTIRISTRANO PIRAMIDNO NANOSTRUKTURO

Poglavitna funkcijska vloga molekule DNA je medgeneracijski prenos informacij v živih sistemih, vendar ima DNA tudi lastnosti t.i. pametnih materialov, ki so uporabne za poceni in enostavno pripravo dvo- in tridimenzionalnih nanostruktur. Predvidljivo parjenje Watson-Crickovih baznih parov ter enostavna struktura (tipično antiparalelna dvojna vijačnica tipa B) omogočata, da z ustreznim načrtovanjem zaporedja baz informacijo o zvitju zakodiramo v polinukleotidno verigo. Večina pristopov v strukturni DNA nanotehnologiji temelji na optimizaciji stabilnosti tarčne strukture ter specifičnosti zaporedij, manj poročil pa obstaja o usmerjanju zvitja, ki je pomembno za pripravo topološko kompleksnih struktur. Podobno kot v vsakdanjem življenju pri zvijanju vozlov, si lahko tudi pri zvitju nanostruktur, ki vsebujejo vozle, predstavljamo potrebo po definiranem sosledju dogodkov. Pokazali smo, da se izmed sedmih načrtovanih enoverižnih DNA piramid zaporedje načrtovano v skladu s pravilom »prostega konca« pri počasnem ohlajanju najučinkoviteje zvije v tarčno strukturo (P1). Nasprotno pa neučinkovitost zvitja ostalih zaporedij narašča s številom neugodnih korakov v predvideni poti zvitja. P1 smo uspešno zvil tudi s hitrim ohlajanjem v tekočem dušiku ter celo pri sobni temperaturi z redčenjem v pufer brez denaturanta. Tak pristop bi lahko pripomogel k optimizaciji zvijanja modularnih nanostruktur tudi v primeru rabe bioloških polimerov, kot so npr. RNA in polipeptidna zaporedja.

THE EFFECT OF ALLOCATION OF DIFFERENT STABLE DIMERISATION SEGMENTS IN ONE RING DNA ON THE EFFECTIVENESS OF THE FOLDING IN A QUADRILATERAL PYRAMID NANOSTRUCTURE

In addition to encoding hereditary information DNA, the blueprint of life, possesses remarkable properties that make it ideal for construction of nanometer-sized objects. Nowadays two-dimensional and three-dimensional objects of different shapes and sizes can be affordably and easily prepared. Due to the predictable Watson-Crick base pairing and simple structural features (typically antiparallel B-form double helix), DNA is a highly programmable material that can be instructed on how to fold by carefully designing the sequence of bases. To date, however, little attention has been paid to directing the folding, which is important when folding topologically complex structures. Like tying a knot in everyday life, folding of knotted DNA polyhedra at the molecular level should follow certain rules. We demonstrate that only the single-chain DNA pyramid designed according to our »free-end« rule folds efficiently into the target structure upon denaturation and subsequent slow cooling, while designs with increasingly higher numbers of unfavorable steps fold with increasingly higher inefficiency. We also demonstrated an unprecedented ability of such a complex structure to fold via snap cooling with liquid nitrogen and even isothermally upon dilution from a denaturant. This strategy could be used to design folding of other knotted programmable polymers like RNA or proteins.

Ana Vrtovec Beno

ETNOLOGIJA IN (LJUDSKO) GLEDALIŠČE

Etnologija, veda o vsakdanjem načinu življenja in kulturi različnih etničnih in družbenih skupin, posega po različnih tematikah v Sloveniji in tujini. S posebno t.i. etnografsko metodo etnologi na terenu med drugim beležijo pojave šeg, navad in ritualov, kulinarike ali turizma; raziskujejo vidike medsebojnih odnosov, strukturo različnih skupin in dejavnosti; med drugim tudi različne aspekte ljudske ustvarjalnosti. Asist. Ana Vrtovec Beno, mlada raziskovalka na Oddelku za etnologijo in kulturno antropologijo, Filozofske fakultete Univerze v Ljubljani se ukvarja z raziskovanjem posebne oblike gledališča, t.j. ljudskim gledališčem. Gre za ljubiteljsko gledališko dejavnost, ki, z vključevanjem različnih sestavin kulturne dediščine in tradicije lokalnih skupnosti, igra pomembno vlogo pri vzpostavljanje (lokalne) identitete in razvijanju turizma. V svoji predstavitvi bo predstavila glavne etnološke metode dela, pristope raziskovanja ljudske uprizoritvene umetnosti, kaj je ljudsko gledališče ter kakšno vlogo igra v sodobni družbi.

ETHNOLOGY AND (FOLK) THEATRE

Ethnology is the branch that compares and analyzes the characteristics of different peoples and the relationship between them. Ethnologists try also to understand the cultural heritage as a whole and so, by using so-called ethnographic methods, they research the phenomena of customs, habits and rituals, the aspect of interpersonal relationships, tourism; as well as various aspects of folk creativity. Assist. Ana Vrtovec Beno, a young researcher at the Department of Ethnology and Cultural Anthropology, Faculty of Arts, University of Ljubljana, explores specific forms of theatre, which is known as folk theatre or folk drama. Folk theatre is an amateur theatre activity which, by integrating the various components of the cultural heritage and traditions of the local community, plays an important role in the establishment of (local) identity and the development of tourism. In her presentation she will first present main ethnological methods and research approaches, than will say a little about what folk theatre is and in conclusion she will show the importance the folk theatre plays in modern society.

Aljaž Gaber

VLOGA TARČNIH MOLEKUL V ODKRIVANJU IN ZDRAVLJENJU RAKAVIH OBOLENIJ

Rakava obolenja so za kardiovaskularnimi in nalezljivimi boleznimi tretji najpogostejši vzrok smrti na svetu. Kljub velikemu napredku na področju zgodnjega odkrivanja in sodobnim strategijam zdravljenja, rakava obolenja ljudje še vedno povezujejo z neizogibno smrtjo. K temu veliko pripomorejo izkušnje z rakavimi obolenji, ki so bila odkrita v zadnjih stadijih, ko se je bolezen že začela širiti po telesu. Operativno zdravljenje takrat ni več najbolj učinkovito, saj nikoli ne vemo, kje vse se rakaste celice v telesu nahajajo. Pa vendar je tudi na to vprašanje mogoče dobiti odgovor, če poznamo tarče molekule, ki so značilne za dano vrsto raka. Še več, s pomočjo tarčnih molekul je mogoče razviti tudi protitumorske terapije, ki specifično uničujejo rakaste celice z bistveno manj stranskimi učinki od običajnih kemoterapij. Kaj sploh so tarčne molekule, kakšno vlogo imajo v diagnostiki in razvoju novih protitumorskih terapij, kako jih preučujemo in več bom predstavil na primeru Epitelijske celične adhezijske molekule (EpCAM), ki je ena izmed glavnih tarčnih molekul pri številnih vrstah epitelijskih rakov – karcinomov.

THE ROLE OF TARGET MOLECULES IN CANCER DETECTION AND TREATMENT.

Cancer is the third most common cause of death in the world, surpassed only by the death toll of cardiovascular and infectious diseases. Despite many breakthroughs in the field of early detection and novel treatment strategies, many people still see cancer diagnosis as inevitable death. This is, at least to some extent, related to people's experience with cancer in later stages, when it has already spread around the body. At that point, surgery might not be an efficient way to treat the disease, since it is really hard to tell where has the cancer already spread. This problem can be solved if we know what kinds of target molecules does the given cancer have. Even more, these target molecules can be exploited to deliver drugs with greater specificity and less side effects than normal chemotherapy. What are the target molecules, what role do they have in diagnostics and development of novel antitumor therapies, how do we study them and more will be discussed on the case of Epithelial cell adhesion molecule (EpCAM), one of the key target molecules in many epithelial cancers – carcinomas.