ZNANSTVENO IZDAVAŠTVO

U KONTEKSTU OTVORENOSTI, KORISNOSTI I UPOTREBLJIVOSTI

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INTERNET U STVARNOM VREMENOU ILI KOJOM SE BRZNOM GENERIRAJU PODACI
"That it may be the more evident to you that the humanities and science are not yet banished from among us by the clash of arms, I am writing to tell you that a certain most ingenious person here, named Leewenhoeck, has devised microscopes which far surpass those which we have hitherto seen, manufactured by Eustachio Divini and others. The enclosed letter from him, wherein he describes certain things which he has observed more accurately than previous authors, will afford you a sample of his work: and if it please you, and you would test the skill of this most diligent man and give him encouragement, then pray send him a letter containing your suggestions, and proposing to him more difficult problems of the same kind".
To be left with Mr. Martini Stationer at No. 7, Soho, near Duck's Chantry, or Robert Young, Carr, London.

Feb. 10, 1770

[Seal]
Protein structure and function at low temperatures†

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Proteins represent the major components of the living cell that provide the whole repertoire of constituents of cellular organization and metabolism. In the process of evolution, adaptation to extreme conditions mainly referred to temperature, pH and low water activity. With respect to life at low temperatures, effects on protein structure, protein stability and protein folding need consideration.

The sequences and topologies of proteins from psychrophilic, mesophilic and thermophilic organisms are found to be highly homologous. Commonly, adaptive changes refer to multiple alterations of the amino acid sequence, which presently cannot be correlated with specific changes of structure and stability; so far it has not been possible to attribute specific increments in the free energy of stabilization to well-defined amino-acid exchanges in an unambiguous way.

The stability of proteins is limited at high and low temperatures. Their expression and self-organization may be accomplished under conditions strongly deviating from optimum growth conditions. Molecular adaptation to extremes of temperature seems to be accompanied by a flattening of the temperature profile of the free energy of stabilization. In principle, the free energy of stabilization of proteins is small compared to the total molecular energy. As a consequence, molecular adaptation to extremes of physical conditions only requires marginal alterations of the intermolecular interactions and packing density. Careful statistical and structural analyses indicate that altering the number of ion pairs and hydrophobic interactions allows the flexibility of proteins to be adjusted so that full catalytic function is maintained at varying temperatures.

1. INTRODUCTION

Proteins as the major components of the living cell provide the basic elements of cellular organization and metabolism. Their structure-function relation is generally assumed to be optimized with respect to the physical conditions characteristic for the natural biotope.

Adaptation to extreme conditions during evolution mainly refers to temperature, pH and low water activity [Jaenicke 1981]. Low water activity and extremes of pH do not necessarily require molecular adaptation of the cellular inventory as avoidance may take the place of adaptation; for example high salinity or a pH value less than 1 or greater than 11 may be compensated by compatible solutes or proton pumps. In the case of temperature, it is evident that cells are more or less isoenthalpic with respect to their environment. As a consequence, both psychrophiles and thermophiles have to adjust their cell inventory to their respective set of conditions. Strategies promoting thermal stability of proteins have been investigated for many years. The outcome is that in the native state of functional proteins, stabilizing and destabilizing interactions more or less balance each other so that no general mechanism of temperature adaptation can be put forward. Adaptation at the protein level may be

† Dedicated to Professor Hans Neurath on the occasion of his eightieth birthday.

The Triumph over the Most Terrible of the 1 Death

4D, and Pere Domingo, MD

s ago, Edward Jenner performed on the foundation for the eradication of smallpox mankind's fight against disfigured mankind as in no other disease once and diffusion were without par

ought down at least three empires. Helplessly as their children su

rc or were disfigured or blinded by it, a to contain smallpox by isolating its

my using variation with varying de

vers, the definitive solution was not

work was done at the end of the 18th

who had developed cowpox from

cows inoculated Jenner that they were

unen form of the disease; he listened

and raised it to the status of scientific

discerning. Molecular biology, however

to this technique offered a reliable

op. It was also a reliable defense

, such as poxviruses, measles, and

hough this was not known in Jenner's

able at http://www.aphotino.org.

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HISTORY OF MEDICINE

Smallpox greatly affected the development of western civilization. The first stages of the decline of the Roman Empire, around AD 180, coincided with a large-scale epidemic: the plague of Antoneine, which killed between 3.5 and 7 million persons (9, 10). The Arab expansion, the Crusades, and the discovery of the West Indies all contributed to the spread of the illness. Unknown in the New World, smallpox was introduced by Spanish and Portuguese conquistadors. It decimated the local population and was instrumental in the fall of the empires of the Aztecs and the Incas. When the Spanish arrived in 1518, Mexico had about 25 million inhabitants; by 1620, this number had diminished to 1.6 million (11). A similar decline occurred on the eastern coast of what became the United States, where the advent of smallpox had disastrous consequences for the native population (12), and the disease continued to be spread through the relentless process of European colonization (13). The devastating effect of smallpox gave rise to one of the first examples of biological warfare. In a letter written to Colonel Henry Bouquet in 1763, Sir Jeffrey Amherst, com-
PHILOSOPHICAL
TRANSACTIONS:
GIVING SOME
ACCOMPT
OF THE PRESENT
Undertakings, Studies, and Labours
OF THE
INGENIOUS
IN MANY
CONSIDERABLE PARTS
OF THE
WORLD

Vol I.
For Anno 1665, and 1666.

In the SAVORY,
Printed by T. N. for John Martyn at the Bell, a little without Temple-Bar, and James Allestry in Duck-Lane,
Printers to the Royal Society.
Male Circumcision and the Epidemic Emergence of HIV-2 in West Africa
João Dinis Sousa, Marina Padrão Temudo, [ ... ], Anne-Mieke Vandamme

Cheetah Reunion – The Challenge of Finding Your Friends Again
Tatjana Y. Hubel, Justine Shotton, [ ... ], Alan M. Wilson

Deforestation Impacts on Bat Functional Diversity in Tropical Landscapes
Rodrigo García-Morales, Claudia E. Moreno, [ ... ], Eva S. Ávila-Gómez

Ear Structures of the Naked Mole-Rat, Heterocephalus glaber, and Its Relatives (Rodentia: Bathyergidae)
Matthew J. Mason, Hannah L. Cornwall, Ewan St. J. Smith
Znanost danas

- 1.900 milijardi USD (2016 Global R&D Funding Forecast)
- 2 milijuna radova godišnje
- 80% svih znanstvenih istraživanja financira se javnim sredstvima
- Većina znanstvenih radova šalje se u časopise velikih komercijalnih izdavača
- 15%-80% ne bude nikada citirano
  - "Only" 12% of medicine articles are not cited, compared to about 82% (!) for the humanities. It’s 27% for natural sciences and 32% for social sciences" (cite)
- 50%-80% NE MOŽE SE REPRODUCIRATI!

Postotak radova koji objavljuje 5 najvećih izdavačkih kuća
Istraživački podaci nedostupni

- samo 25% istraživačkih podataka je donekle zbrinuto i dostupno

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[Diagram showing data pyramid with various classifications such as publications with data, processed data and data representations, data collections and structured databases, and data on disks and in drawers.]


Znanstveno izdavaštvo danas

- nije više samo tekst
- pristup nije više najvažniji problem, već nemogućnost korištenja
- brza mreža snažnih računala čini naša očekivanja puno većim
PDF?

- kao ispis na papiru
- statičan, smrznut
- bez valjanih metapodataka
- ne može se nerijetko pretražiti

- još uvijek smo u tiskanom dobu...
- ...a živimo u digitalnom
Otvorenost

- otvaranje svih faza istraživačkog ciklusa može voditi značajnim promjenama i napretku znanosti kroz dijeljenje i suradnju

- polako otvaramo pristup sadržaju i istraživačke procese: otvoreni pristup (publikacijama), otvoreni podaci, otvorena recenzija, otvoreno autorstvo, otvoreni formati, otvorena prosudba...

- dostupnost za korištenje: publikacije, podatci, modeli, izvorni kodovi, izvori, transparentne metode, standardi, formati, identifikatori, api-ji, licencije, izobrazba, politike...

otvaranje = promjena
Otvoreni formati

- PDF – portabilan i jednostavan za korištenje – ali velika ograničenja
- PDF/A – neka poboljšanja
- ne podržava multimediju, interaktivnost, interoperabilnost, reproducibilnost...

- različite discipline – različiti softveri i formati
- HTML
- Teχ /Lateχ

- XML (eXtensible Markup Language)
Influence of synoptic patterns on surface ozone variability over the eastern United States from 1980 to 2012

L. Shen et al.

Download
- Final revised paper (published on 01 Oct 2015)
- Supplement to the final revised paper
- Discussion paper (published on 05 May 2015)
- Supplement to the discussion paper

Interactive discussion
AC: Author comment | RC: Referee comment | SC: Short comment | EC: Editor comment

RC C3294: 'Review comments', Anonymous Referee #1, 07 Jun 2015
AC C5473: 'Response to the comments from Reviewer 1', Lu Shen, 30 Jul 2015
RC C3313: 'Review of Shen et al.', Anonymous Referee #2, 07 Jun 2015
AC C5474: 'Response to the comments from Reviewer 2', Lu Shen, 30 Jul 2015

Peer review completion
AR: Author's response | RR: Referee report | ED: Editor decision

AR by Lu Shen on behalf of the Authors (30 Jul 2015) → Author's response → Manuscript

ED: Referee Nomination & Report Request started (02 Aug 2015) by Steven Brown
Što mogu biti/sadržavati publikacije?

- **Animacija i virtualna stvarnost** – uz pomoć animirane grafike autor može pokazati razlike između opaženih fenomena i modela
- Autor može zabilježiti svoja razmišljanja kao dio publikacije – audio, video
- **Istraživački podaci** (datasets) – kao dio publikacije ili zasebno
  - „živa matematika“ i numerički kodovi, 2D i 3D grafičke prezentacije, interaktivnost
- Buduće reference, povezani radovi
- Slike, interaktivni dijagrami
- Algoritmi koje je moguće pokrenuti na zahtjev u stvarnom vremenu
- Interaktivna kontrola nad provedbom udaljenih programa
- Društvene mreže povezanih istraživača
- Ranije verzije radova s komentarima
- Metapodaci (verzije, provjera citata...)
• publikacije uglavnom statične

• raskorak između dinamičnog razvoja znanosti i njene reprezentacije putem tradicionalnih kanala

"We define the term semantic publication to include anything that enhances the meaning of a published journal article, facilitates its automated discovery, enables its linking to semantically related articles, provides access to data within the article in actionable form, or facilitates integration of data between articles.” (Shotton at al, 2009)
NASTOJANJA

• pomak prema digitalnom, umreženom, virtualnom okruženju
• od linearnih tiskanih publikacija prema neometanom i trajnom protoku znanstvenih informacija
  • odmak od PDF-a
  • unaprjeđivanje uređivačkih politika, etička pitanja
  • eksperimentiranje
• praćenje uspješnosti časopisa
• praćenje kriterija kojima se vode znanstvenici/autori
  • prepoznavanje njihovih potreba
Prednosti otvorene znanosti

unapređivanje učinkovitosti istraživanja - minimalizacija dupliranja
ubrzavanje tempa novih otkrića
omogućavanje i poticanje interdisciplinarnih istraživanja
promoviranje znanstvene strogosti i reproducibilnosti
unapređivanje kvalitete
poboljšanje suradnje
promocija znanstvenih aktivnosti i poticanje „znanstvene pismenosti“
javnosti
povećanje ekonomskog i društvenog utjecaja znanstvenih istraživanja
osiguravanje novih mogućnosti za inovacije
Dobrobiti za sve sudionike

Znanstvenici:
• veća vidljivost njihovog znanstvenog rada, veći utjecaj, veća citiranost, mogućnosti suradnje; veća i lakša dostupnost znanstvenih informacija

Ustanove:
• veća vidljivost znanstvene aktivnosti ustanove; promocija ustanove u znanstvenom svijetu, ali i u javnosti

Javnost:
• pristup znanstvenim informacijama, rezultatima znanstvenih istraživanja koja su financirana javnim novcem; potencijalno poboljšanje kvalitete života; smanjivanje razlike između siromašnih i bogatih zemalja svijeta u mogućnosti pristupa relevantnim znanstvenim informacijama

Gospodarstvo:
• pristup najnovijim znanstvenim informacijama; mogućnost primjene znanstvenih otkrića; povezivanje gospodarstva sa znanošću

Znanost općenito:
• ubrzan protok znanstvenih informacija; brži napredak znanosti
Budućnost

- otvorenost svih faza znanstvenih istraživanja
- dinamički, višeslojni, interaktivni, multimedijalni sadržaji
  - „mašinski čitljivi“ radovi
- RDF, povezani podaci (linked data)
- istraživački podaci zbrinuti i dostupni
  - različiti formati (pored PDF-a)
  - identifikacija autora (ORCID)
  - identifikacija publikacije (DOI?)
  - ...
- sve je u otvorenom pristupu i raspoloživo za korištenje
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