



A Biologist's view of 'Alice in Wonderland'

As a child I used to listen to the stories of Alice in Wonderland by Lewis Carroll with rapt attention. It appealed to me then primarily as a fairytale. Long afterwards I read the story again, this time in company with my growing son. On this occasion, the story appeared to take a new dimension beyond a simple fairytale, which renewed my interest. Oddly enough it did not conform any more to the mere characteristics of a fairytale as for example the story of Cinderella marrying a prince. Finally in 2004, my brief visit to Oxford rekindled some of the thoughts, which were hovering in my mind for sometime now. I had the great pleasure of having a bird's eye view of the places in Oxford campus and also the house of Lewis Carroll. Lewis Carroll, as may be known to many, is the pseudonym of the English writer and mathematician Charles Lutwidge Dodgson famous for the books "Alice's Adventures in Wonderland" and "Through the Looking Glass". He graduated from Christ Church College, Oxford in 1854. He was afflicted with stammer, which perhaps led him to nurture his other interests. The fiction was written

during a relatively placid period of British history. Alice Liddell, daughter of the Dean of Christ Church, was the model for the fictional Alice. Dodgson apparently first met her in 1856, when she was barely four years old. Alice's Adventures in Wonderland is the most celebrated children's book of all times. The book has succeeded in delighting children of all ages. Once Ralph Waldo Emerson, American essayist and poet, wrote to his friend and disciple Henry David Thoreau, an essayist and naturalist, on the occasion of a party: "And all children from six to sixty may come to Carroll's parties". Certainly the book can cater children of all ages from six to sixty. But more than that, it is often cited by evolutionary biologists, neurobiologists, immunologists, psychoanalysts and also philosophers.

As the story unfolds, the seven year old Alice, after plunging down a rabbit hole, grows first too large and then too small. Neurologists use the word "Alice in Wonderland Syndrome (AIWB)" or micropsia to describe a disorienting neurological condition, which afflicts human visual perception [*The Lancet*



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(1998) 351: 1934]. Subjects perceive humans, parts of humans, animals and inanimate objects as substantially smaller than in reality. This leads to another name for the condition, namely, Lilliput sight or Lilliputian hallucinations, named after the dwarfs in Jonathan Swift's Gulliver's Travels. The condition is in terms of perception only, the brain's interpretation of information passed from the eyes. Small children usually between the ages of five to ten suffer from spontaneous temporary micropsia. Micropsia tends to occur during darkness, when brain lacks visual size reference. The disorder is named after Lewis Carroll's "Alice's Adventures in Wonderland", where the little character experienced many situations similar to those of micropsia and macropsia (objects appear larger than normal). Alice morphed from tall to short or small to big, but always maintained her psychological and biological age. She was slowly growing familiar with the ways of Wonderland.

"Through the Looking-Glass" is a sequel to "Alice's Adventures in Wonderland". Here Alice passes through a mirror to the land beyond where everything happens back to front. Hence she meets more memorable characters. Humpty Dumpty also makes an appearance with remarks like "When I use a word it means just what I choose it to mean-neither more nor less". In recent time pharmacologists are trying to find a quick road to the discovery of newer agonists. In this context engineering Epidermal

Growth Factors for enhanced mitogenic potency deserves special mention, as it represents a novel approach to ligand design based on potency. Armed with an understanding of ligand/receptor trafficking dynamics, the goal of greater potency may be more readily achieved. Thus one needs to design molecules of exacting standard neither more nor less as Humpty Dumpty pointed out [*Nature Biotech* (1996) 14: 1652].

Alice also encounters the Red Queen who comments that "It takes all the running you can do to keep in the same place". It may sound enigmatic, but has surprisingly been used by evolutionary biologists to describe the role of active individual engagement in ensuing species survival and evolution. Similarly immunologists also use the same sentence to define how the immune repertoire is maintained in the adult life. The immune system retains its potential to respond to virtually all new foreign substances throughout life, but the origin of naïve T-cells in adults has been unclear. As the thymus undergoes atrophy during puberty, how can the naïve T-cell pool be maintained throughout the life of the organism? The immune system needs to deal with pathogens that it encounters frequently and at the same time to keep a reservoir of diverse elements to face new unexpected antigenic challenges [*Science* (1997) 277: 1950]. In other words, it runs but keeps in the same place!

In the early 80's, when growth factors to drive



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lymphocytes were discovered, so many names were assigned to the same factor as its molecular identity was unknown. One is again reminded of "Alice in Wonderland". "The question is," said Alice, "whether you can make words mean so many different things." Whether this young girl's doubts inspired immunologists or not may not be known to us, but it is interesting to note that in the Second International Lymphokine Workshop held in 1979, this system of introducing interleukins was discontinued and the IL based nomenclatures were introduced. Alice's Adventures in Wonderland is a child's struggle to survive in the world of adults. (Perhaps this has a parallel in the interplay between the authors' scientific manuscripts and the reviewers. We send out manuscripts for publications, often to find that the reviewers' logic does not match ours and we cannot accept the authority of the reviewers). The conflict between the child and the adult gives direction to Alice's adventures. The underlying message of Alice's Adventures in Wonderland is a rejection of adult authority. Its dream like world is the product of a child's imagination and is therefore susceptible to interpretation along the lines of psychological insights on the world of dream. According to the psychoanalytical theories of Sigmund Freud, the mind of the dreamer creates an alternate reality in order to fulfil wishes that cannot be achieved by other means. Psychoanalysts have analysed

'Alice's Adventures in Wonderland' since the early 1900's. It is used to help understand the science of subconscious or psychoanalysis. It has also proven very effective in clinical psychology in uncovering subliminal motives of dreams, art and literature. Lewis Carroll was doing with words what the surrealists in the early 20th century were doing with paintings. Surrealist painters are also known for including absurd elements in their works. Famous examples include The Persistence of Memory and many other works by Salvador Dali and others. This invites the reader to diverse interpretations of Alice's personality and wishes. As Alice matured through her physical and emotional journey towards the adult life, she realized her existence. This subtly conveyed the existential philosophy, though the term existentialism was later coined by Jean-Paul Sartre to define the existence of man, emphasizing the freedom of choice. But that is a different story for a different time altogether.

Syamal Roy



Indian Institute of Chemical Biology organized the 'International Symposium on Chemical Biology' during 7th to 9th March 2007 to commemorate its Golden Jubilee under the Council of Scientific & Industrial Research, New Delhi (1956-2006). Prof. Siddhartha Roy, Director welcomed all the delegates and explained the purpose and importance of the symposium at this time. Prof. M. Vijayan, Distinguished Scientist, Indian Institute of Science Bangalore, inaugurated the symposium.

Indian Institute of Chemical Biology, which has its main research focus on the human diseases both infectious and non-infectious, is dedicated to the understanding of biology through chemistry and the symposium on Chemical Biology was conceived based on this understanding.

In the three days, the symposium covered scientific areas such as (i) infectious diseases, (ii) synthetic and natural product chemistry, (iii) structural biology and systems

biology, (iv) glycomics and proteomics and (v) genomics and metabolomics, in ten scientific sessions. Four hundred and eighty delegates including seventeen scientists from abroad attended the symposium. There were altogether 32 lectures of 30-35 minutes duration. Additionally, 56 young researchers from all over the country presented their work in the form of posters. The symposium achieved very high standards of deliberations as the speakers spoke on the causes and possible cures of various human diseases/disorders. At the end of the symposium, Prof. Sankar Mitra spoke about the high quality of work presented by various speakers during the three days of deliberations and concluded that the knowledge exchange will be highly beneficial for all scientists and students who participated in the symposium.

T. K. Dhar

Prof. R N Chakravarti passes away:

Prof. R N Chakravarti, who was at the helm of affairs of the institute during 1968-1976, breathed his last in Kolkata on 31st May, 2007 after a brief illness. He had an excellent academic grooming and was the gold medalist in M.Sc. (Chemistry) of Calcutta University in 1939. Then he worked in the laboratory of the renowned chemist Prof. J C Bardhan culminating in the D.Sc. degree (C.U.) which was conferred on him in 1945. His post-doctoral research career was notable for his association with two of the doyens of organic chemistry-Prof. R.



Prof. R. N. Chakravarti receiving Padmabhusan award from the President of India

Robinson (later to become a Nobel Laureate) at the Dyson Perrins Laboratory, University of Oxford (1945-47) and Prof. L.F. Fieser at the Converse Memorial Laboratory, Harvard University (1947-48). Returning to the country, he joined the Calcutta School of Tropical Medicine to serve for two decades (1948-68) as the Professor of Chemistry and also Deputy Director. This was perhaps the most productive years of his life. He made many notable contributions to the chemistry of natural products. But for his discovery of new sources of diosgenin, a steroid intermediate, the steroid drug industry of this country might not have developed as much.

In 1968, he shifted his base to IICB (known at that time as the Indian Institute of Experimental Medicine) to become its Director. Prior to his joining, the progress of the Institute was seriously hampered for several years due to the frequent changes at the top of the organization. Even after he took up the charge, the period of unrest in the city and its surroundings was threatening to pose a new problem. If I remember correctly, Prof. Chakravarti himself once aptly described the situation by quoting a stanza from Tennyson's 'The Charge of the Light Brigade' "Cannon to the right of them/Cannon to the left of them/Cannon in front of them/Volley'd and thunder'd" - even inserting a line to add a new dimension to the hardships he faced! It is to his credit that he could

maintain a period of comparative tranquility in the institute through his managerial skills. He then started the construction of the unfinished part of the institute's building- the first floor of the main laboratory block and a portion of the second floor of the main building. It is worth recalling that the present auditorium of the institute was also built during his period, besides two seminar rooms. In research activities, he tried to reorient the programmes with increasing emphasis on work of applied or industrial value, with his personal interest in establishing alternative sources of intermediates

for the steroid drug industry. New areas of research initiated during this period included neurobiology, neuropharmacology and biophysics. At the same time, the infrastructure was suitably adjusted and augmented to prepare the institute for the next phase of research activities to begin soon, on biochemical engineering.

Even after his retirement from this institute, he remained active as the Director of Research and Development of Dey's Medical (Mfg.) Ltd., Kolkata (1978-2007). He also found more time to nurture the activities of the Institution of Chemists, perhaps his first love, which he gradually built up with tireless efforts. For his remarkable contribution particularly for the spread of chemical education, he was deservedly honored by the state with the Padmabhusan award in 1972.

In his personal life, Prof. Chakravarti was a witty person with wide interests. He had a special penchant for writing and his articles in the Proceedings of the Institution of Chemists reflect his knowledge and active interest specially in the areas of health and science.

He is survived by his wife, Prof. (Mrs.) D. Chakravarti, and their son Debnarayan, presently a Professor of Applied Life Sciences at Claremont, California.

B. Achari



Upcoming events:

Film on IICB

As a part of the Golden Jubilee Celebration of IICB a new documentary film is being produced sculpting the activities of IICB and its standing in the context of contemporary science. It is a pleasure to announce that the noted Film Director Mr. Gautam Ghose has kindly agreed to take up the project. The film is expected to be completed by the end of the current year.

New Installation

Installation of a new Protein Micro array System is in progress. This would pave the way to study macro molecular interactions in minute details.

Deputation:

1. Dr Kunal Ray and Dr. Susanta Roy Chaudhuri visited Montreal, Canada to attend HUGO-2007 meeting from 21-24 May 2007. The trip was funded by CSIR.
2. Dr Syamal Roy visited Germany during June 25-26, 2007 to attend the "Round table meeting on prophylactic vaccine against leishmaniasis". The trip was supported by the organization "Drug for Neglected Diseases Initiative (DNDI)" - a Geneva based organization.

Information regarding Recruitment & Retirement upto 31st July, 2007

Retirement

1. Shri P.K. Chakraborty, SO(G). Vol.Retired on 1.2.2007
2. Shri Sanjoy Basu, Sct.IV(5) retired on 28.02.2007
3. Dr. Salil C Dutta, Sct.,IV(5) retired on 28.02.2007
4. Dr. Anup Bhattacharjee, Sct.IV(5) retired on 30.04.2007
5. Shri Ramdas Ravidas, Helper, Gr.I(4) retired on 31.07.2007

Recruitment

1. Dr. M.K. Ghosh, Sct.IV(3) joined on 20.02.2007
2. Dr. Arindam Banerjee, Sct.,Gr.IV(3) joined on 15.03.2007

Joined on transfer

1. Mrs. Shampoo Sengupta, SO(G) joined on 1.3.2007

Released on transfer

1. Shri Rajib Ray, Asstt.(SP),Gr.II released on 31.3.2007
2. Mrs. Rubai Ray, SO(SP), released on 28.06.2007

**Publication:**

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2. Bandyopadhyaya A, Sarkar M and Chaudhuri K (2007) Human intestinal epithelial cell cytokine mRNA responses mediated by NF-kappa B are modulated by the motility and adhesion process of *Vibrio cholerae*. *Int. J. Biochem. Cell Biol.* (in press)..
3. Sengupta S, Chakrabati S, Roy A, Panda C K and Roychoudhury S (2007) Inactivation of hMLH1 and hMSH2 in HNSCC tumors and leukoplakia by promoter hypermethylation and its relation with MIN Phenotype. *Cancer* 109: 703-712.
4. Mondal G, Sengupta S, Panda C K, Gollin S M, Saunders W S and Roychoudhury S (2007) Overexpression of Cdc20 leads to impairment of the spindle assembly checkpoint and aneuploidization in oral cancer. *Carcinogenesis* 28: 81-92.
5. Banerjee M, Sarkar J, Das J K, Mukherjee A, Sarkar A K, Mondal L K and Giri A K (2007) Polymorphism in the ERCC2 codon 751 is associated with arsenic-induced premalignant hyperkeratosis and significant chromosomal aberrations. *Carcinogenesis* 28: 672-676.
6. Ray S, Chaki M and Sengupta M (2007): Tyrosinase and ocular diseases: some novel thoughts on the molecular basis of oculocutaneous albinism type I. *Prog. Ref. Res. & Eye Res.* 26: 323-358.
7. Mukherjee S, Basu, S Home, P, Dhar, G and Adhya, S (2007) Necessary and sufficient factors for the impart of transfer of RNA into the kinetoplast mitochondrion. *EMBO Rep.* 8:589-95.
8. Majhi TP, Achari B, Chattopadhyay P. Advances in the synthesis and biological perspectives of benzannulated medium ring heterocycles. *heterocycles* 71:1011-1052.
9. Dey S, Nandi D, Pradhan PK, Giri VS, Jaisankar P. Indium trichloride catalyzed efficient one-pot synthesis of highly substituted furans. *Tetrahedron Letters* 48: 2573- 2575.
10. Roy BG, Jana PK, Achari B, Mandal SB. A short and efficient synthesis of 5-hydroxymethylcyclopent-2-enol from (D)-glucose and its elaboration to the carbanucleoside (-)-carbovir. *Tetrahedron Letters* 48:1563-1566.
11. Saha D, Acharya D, Roy D, Shrestha D, Dhar TK. Simultaneous enzyme immunoassay for the screening of aflatoxin B-1 and ochratoxin A in chili samples *Analytica Chemica Acta* : 584(2), 343-349.
12. Dolai S, Yadav RK, Datta AK, Adak S. Effect of thiocyanate on the peroxidase and pseudocatalase activities of *Leishmania major* ascorbate peroxidase. *Biochimica et Biophysica acta-general subjects* 1770: 247-256.
13. Mukherjee D, Sarkar SK, Chowdhury US, Taneja SC. A rapid stereoselective C-glycosidation of indoles and pyrrole via indium trichloride promoted reactions of glycosyl halides. *Tetrahedron Letters* 48: 663-667.
14. Kumar A, Chattopadhyay, S. DNA damage protecting activity and antioxidant potential of pudina extract. *Food Chemistry* 100: 1377-1384.