Molecular Structure of Nucleic Acids

A Structure for Deoxyribose Nucleic Acid

We wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has novel features which are of considerable biological interest.

A structure for nucleic acid has already been proposed by Pauling and Corey. They kindly made their drawings available to us in advance of publication. The two sugar-phosphate backbones are on the outside of the molecule, linked by hydrogen bonds. This structure was described as being achiral, and for this reason we shall not comment on it.

We wish to put forward a radically different structure for the salt of deoxyribose nucleic acid. This structure has two important points in common with the previous proposal:

1. The bases on one chain are related by a dyad perpendicular to the fiber axis. Both chains have right-handed helices, but owing to the dyad the sequences of bases in the two chains run in opposite directions. Each base is on the inside of the helix, and the phosphenes on the outside. The configuration of the sugar and the atoms near it is close to Furberg’s ‘standard configuration’, the sugar being roughly at 20° to the plane of the base.

2. The sequence of bases on one chain is related by a dyad to the sequence on the other chain, so that the bases on each chain are regularly disposed about a helix.

Another feature is that the two sugar-phosphate backbones are regularly disposed about a helix.

We shall not dwell on this possibility, for it is only part of a story that we hope to present elsewhere. If the dyad is really present in any nucleic acid, then the sequence of bases on one chain is determined by the sequence on the other chain. In other words, the ‘riddle of the bases’, to quote Pauling and Corey, is not completely an open one, but solutions of these are given in the following communications. We are not aware of the details of the results presented there when we devised our structure, which rests mainly through our published experimental data and stereo-chemical arguments.

It has not escaped our notice that the specific pairing we have postulated immediately suggests a possible copying mechanism for the genetic material.

Full details of the structure, including the conditions assumed in building it, together with a set of co-ordinates for the atoms, will be published elsewhere.

We are much indebted to Dr. J. E. Donohue for constant advice and criticism, especially in the atomic distances. We have also been stimulated by a knowledge of the general nature of the unpublished experimental work and ideas of Dr. F. H. C. Crick and Dr. J. B. S. Haldane and their co-workers at Cambridge.

Prepared by:
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30 September 2010
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Publications 2009-2010

Faculty Member, Post-Doctoral Research Fellow, Resident

Books


Peer Review Publications

Journal Articles


*Citation format – Uniform requirements for manuscripts submitted to biomedical journals: International Committee of Medical Journal Editors


Zahnd WE, Scaife SL, **Francis ML**. Health literacy skills in rural and urban populations. Am J Health Behav. 2009;33:550-7.
Abstracts


Ragland P; Vega N; Fester A; Vasquez D; Alhamad T; Connery S; Madero F; Alfaro R; Dahu J; Payan F; Chauvet M; Tarwater P; Hernandez GT. The Association Between Health Literacy And Glycemic Control Among Mexican American Diabetics With Chronic Kidney Disease: A Preliminary Report From The Paso Del Norte Kidney Disease Study (PNKDS). Ethnicity & Disease 2009;19(Autumn), S23.


Published Case Reports

Abdelfattah A, Alhamad T, Figueroa J. The association of unusual site of an idiopathic deep vein thrombosis and chylothorax in an adult. The Internet Journal of Internal Medicine 2010 Volume 8 Number 2


Book Chapters


Multimedia and Other Online Publications


**Resident Research Activity**

(IM Resident **Bold**, Faculty Sponsor / Mentor)

**Journal Articles**


**Abstracts**

Ragland P; Vega N; Fester A; Vasquez D; **Alhamad T;** Connery SM; Madero F; **Alfaro R;** Dahu J; Payan F; Chauvet M; Tarwater P; **Hernandez GT.** The Association Between Health Literacy And Glycemic Control Among Mexican American Diabetics With Chronic Kidney Disease: A Preliminary Report From The Paso Del Norte Kidney Disease Study (PNKDS) Ethnicity & Disease 2009;19(Autumn), S23.


**Published Case Reports**

Abdelfattah A, **Alhamad T, Figueroa J.** The association of unusual site of an idiopathic deep vein thrombosis and chylothorax in an adult. The Internet Journal of Internal Medicine 2010 Volume 8 Number 2


OPEN, ACTIVE, ONGOING RESEARCH
Investigator Initiated Research Studies
GRANT FUNDED FY10

- New Diagnosis and Treatment Approaches for Patients with Gastroparesis.
  a. Gastroparesis Registry (GpR) - Gastroparesis Clinical Research Consortium
  b. Nortriptyline for Idiopathic Gastroparesis: A Multicenter, Randomized, Double-
     Masked, Placebo-Controlled Trial (NORIG)
  $186,199

- Development of a reliable marker for Mycobacterium paratuberculosis bowel diseases.
  PI- William Chamberlin, MD & Rod Chiodini, PhD. Lizanell and Colbert Coldwell Foundation
  January 1, 2010 – December 31, 2011. $68,745

- Development of reliable markers for Mycobacterium paratuberculosis associated bowel
  disease. PI – William Chamberlin, MD & Rod Chiodini, PhD. Paul L Foster, SOM Seed Grant
  1 October 2009 – 30 Sept 2010. $18,079

- Are Kidneys Causing Coronary Calcification and Heart Disease? PI- Ramin Tolouian,
  MD. Lizanell and Colbert Coldwell Foundation January 1 2010 – December 31 2011. $37,140

- Administrative Supplement (ARRA) to New Diagnosis and Treatment Approaches for
  Patients with Gastroparesis. PI – Richard McCallum, MD NIH/NIDDK April 01 2010 –
  March 31 2010 $149,358

- Student Administrative Supplement (ARRA) to New Diagnosis and Treatment
  Approaches for Patients with Gastroparesis. PI – Richard McCallum, MD NIH/NIDDK April
  01 2010 – March 31 2010 $45,603

- Pilot Study of the Safety, Feasibility and Potential Efficacy of Continuous Glucose
  Monitoring and Insulin Pump Therapy in Diabetic Gastroparesis (GLUMIT-DG) PI –
  Richard McCallum, MD NIH/NIDDK October 01, 2009 – March 31 2011 $90,178
Investigator Initiated Research Studies

Unfunded

- Descriptive Epidemiology and Ethnic (Hispanic versus non-Hispanic) Comparison of Gastric Cancer Incidence in the State of Texas and El Paso County for the Period 1995 through 2006 – Zuber Mulla, PhD and Javier Corral, MD

- The determination of liver and cardiac iron in patients on chronic hemodialysis by Magnetic Resonance Imaging (MRI) – Ramin Tolouian, MD

- A randomized, prospective, double-blind, placebo controlled, dose ranging evaluation of urine pH after 24 hr treatment with proton pump inhibitor – Ramin Tolouian, MD

- Streptococcus bovis and gastrointestinal disease in a U.S.- Mexico border city. – Marc Zuckerman, MD

- Changing patterns of Microbe Resistance in a Public Hospital (Robert Ewing Thomason Hospital) – Armando Meza, MD

- Optimizing the Continuity Clinic Experience for Internal Medicine Residents and their Patients – M Francis, MD

- Urine PH in patients taking Proton Pump Inhibitors (PPIs) – Ramin Tolouian, MD

- Epidemiological profile of coccidioidomycosis infection in a predominantly Hispanic population – Armando Meza, MD

- PEEP titration in Acute Lung Injury – Juan Figueroa-Casas, MD

- Case Control Study Of West Nile Virus Encephalitis in a border town Hospital – Armando Meza, MD

- Comparing Individual Teaching of Geriatrics versus Self Study for Residents In Internal Medicine – Paul Casner, MD, PhD

- The Relationship Between Restorative Impact of Rabeprazole on Salivary and Gastric Mucus and Mucin Production Impairment during Naproxen Administration and Salivary and Gastric Epidermal Growth Factor (EGF) Secretion and EGF Gene Polymorphism: Its Potential Clinical Significance. – Jerzy Sarosiek, MD, PhD

- Review of a series of renal biopsies presenting crescentic glomerulonephritis in a hispanic based population at the US - Mexico border. – German Hernandez, MD

- HLA Antigen frequencies in Mexican-American and Caucasian populations – Ramin Tolouian, MD

- Application of Appropriateness Criteria to Single-Photon Emission Computed Tomography (SPECT) Myocardial perfusion imaging in a University Medical Center – Omosalewa Lalude, M.D.
Risk of Pulmonary Embolism in Specific Subgroups of Patients with Distal Deep Vein Thrombosis – Harold Hughes, MD

Retrospective surveillance of the Incidence, clinical features and complications of Clostridium Difficile Associated Disease (CDAD) in a predominant Hispanic population review during the period of 2006-2008. A Texas Tech University Health Science Center - El Paso Campus- and Thomason General Hospital Study – Armando Meza, MD

Evaluation of correlation between hyponatremia and prevalence of falls and fractures – Ramin Tolouian, MD.

Prospective study to compare demographic characteristics, signs and symptoms of influenza and influenza-like illness, and outcomes of patients of all ages presenting with influenza-like conditions for the development of diagnostic and prognostic tools – Todd Bell, MD and Rhonda Fleming, MD
Pharmaceutically Sponsored Clinical Research Studies

Open, Active Clinical Trials (As of August 2010)


- A Phase 3b Multicenter, Single-Blind Trial to Evaluate the Efficacy of Dexlansoprazole MR 30 mg in Maintaining Control of Gastroesophageal Reflux Disease Symptoms in Subjects on Prior Twice Daily Proton Pump Inhibitor Therapy. Marc Zuckerman, MD. Takeda Global Research and Development Center, Inc. March 2009 - Current

- A Multicenter, Randomized, Double-Blind, Placebo-Controlled, Parallel-Group, Phase 2 Evaluation of the Safety and Efficacy of Once-Daily Administrations of TZP 102 for the Treatment of Symptomatic Gastroparesis in Patients with Diabetes Mellitus – Marc Zuckerman, MD. Tranzyme Inc. March 2009 - Current

- A Phase 3, Randomized, Double-blind, Placebo-controlled, Parallel-group Trial of Linaclotide Administered Orally for 26 Weeks in Patients with Irritable Bowel Syndrome with Constipation – Marc Zuckerman, MD. Ironwood Pharmaceuticals. July 2009 - Current

- A Phase IIb, Double-blind, Randomised, Placebo-controlled, Multi centre, Dose-finding Efficacy and Safety Study of a Range of Doses of A3309 in Patients with Chronic Idiopathic Constipation - Marc Zuckerman, MD. Albireo AB. November 2009 - current

- A 6-Month, Phase 3, Randomized, Double-Blind, Parallel-Group, Controlled, Multi-Center Study to Evaluate the Incidence of Gastric Ulcers Following Administration of Either PA32540 or Enteric Coated Aspirin 325 mg in Subjects Who Are at Risk for Developing Aspirin-Associated Ulcers. Marc Zuckerman, MD. POZEN, Inc. December 2009 - current

- A 12-Week, Randomized, Double-Blind, Placebo-Controlled Study of Asimadoline in Subjects With Diarrhea-Predominant Irritable Bowel Syndrome - Marc Zuckerman, MD. Tioga Pharmaceuticals, Inc. February 2010 – current

- MGAWN1 A Phase 2, Stratified, Randomized, Double-Blind Placebo-Controlled Study to Evaluate the Safety and Efficacy of MGAWN1 in Subjects with Laboratory-documented West Nile Fever or Suspected Central Nervous System Infection Due to West Nile Virus - Armando Meza, MD. Macrogenics, Inc. July 2009 - Current

- Therapies for Resistant Focal Segmental Glomerulosclerosis (FSGS) A Phase II Clinical Trial - German Hernandez, MD, NIH/NIDDK. March 2009 – Current

- Focal segmental glomerulosclerosis (FSGS) Clinical Trial (FSGS-CT): Bridge to Cohort Long Term Follow Up Study – German Hernandez, MD, NIH Sponsored, Aug 2010 - Current
Pharmaceutically Sponsored Clinical Research Studies

Completed Clinical Trials

(close date between 1 Sept 2009 – 31 Aug 2010)

- A 26-week randomised, controlled, open label, multicentre, multinational trial comparing efficacy and safety of SIBA with sitagliptin as add on to current oral antidiabetic treatment in insulin-naïve subjects with type 2 diabetes mellitus inadequately controlled with 1-2 oral antidiabetic drugs (metformin, sulphonylurea, glinides or pioglitazone). Short Title: A trial comparing efficacy and safety of NN1250 with sitagliptin in insulin naïve subjects with type 2 diabetes. Tamis Bright, MD  Novo Nordisk  Nov 2009 – Aug 2010

- A Phase II, Double Blind, Randomized, Placebo-Controlled Study of the Safety, Tolerance and Activity of HE3286 When Administered Orally for 12 Weeks to Adult Patients with Type 2 Diabetes Mellitus – Tamis Bright, MD   Hollis-Eden Pharmaceuticals, Sept 2008 – Oct 2009


- A Randomised, Double-Blind, Placebo Controlled, Parallel-Group, Multicenter Study To Evaluate The Efficacy and Safety of Two Doses of Ocrelizumab in Patients With WHO or ISN Class III or IV Nephritis Due To Systemic Lupus Erythematosus - German Hernandez, MD. Hoffman La Roche and Genentech Pharmaceuticals, March 2008 - July 2010

- A multi-center, randomized, double-blind, active-controlled clinical trial to evaluate the safety and tolerability of 24 weeks treatment with vildagliptin (50 mg qd) versus sitagliptin (25 mg qd) in patients with type 2 diabetes and severe renal insufficiency . Dinorah Nutis, M.D. (initially German Hernandez, MD) Novartis Pharmaceuticals, Oct 2007 – Jan 2010