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BIOGRAPHY

Gary L. Johanning, MS, PhD, is an Associate Professor of Comparative Medicine at the Michale E. Keeling Center for Comparative Medicine and Research with the University of Texas MD Anderson Cancer Center at Bastrop TX. He received his B.S., M.S. and PhD in Biochemistry from the University of Missouri at Columbia and completed a postdoctoral fellowship in the Biochemistry Department at Case Western Reserve University. He is an Editorial Board Member of Cancer Management and Research and The Open Lung Cancer Journal, and is Associate Editor of Nutrition and Dietary Supplements. He has been awarded grants from the National Institutes of Health, the Department of Defense and several foundations. He is a member of the Executive Committee of The Nutritional Sciences Council. His primary research interests include micronutrients and their effect on chemotherapy efficacy, nutrition and cancer, endogenous retroviruses, and cancer prevention and immunotherapy.

RESEARCH INTREST

- A major goal of the research in Dr. Johanning's laboratory is to determine the role of the vitamin folic acid (foliate) in carcinogenesis, cancer prevention, and immune response. An important aspect of this research is evaluating the influence of folic acid on the development of resistance to cisplatin and other chemotherapeutic agents. Cancer cells can become resistant to the cytotoxic action of chemotherapeutic agents either at the outset (intrinsic resistance) or after the agents are administered for a period of time (acquired resistance). Resistance to cisplatin and other agents is an important problem in cancer therapy, and the mechanism by which resistance develops is not clear. Dr. Johanning has obtained data indicating that folic acid can prevent the development of both intrinsic and acquired resistance to cisplatin in lung and ovarian cancer cell lines.

PUBLICATIONS

- **Human endogenous retrovirus type K antibodies and mRNA as serum biomarkers of early-stage breast cancer.**
- Feng Wang-Johanning, Ming Li, Francisco J Esteva, Kenneth R Hess, Bingnan Yin, Kiera Rycaj, Joshua B Plummer, Jeremy G Garza, Stefan Ambs, Gary L Johanning Int. J. Cancer
- Int J Cancer 2014 Feb 13;134(3):587-95. Epub 2013 Sep 13.
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- **A lower degree of PBMC L1 methylation is associated with excess body weight and higher HOMA-IR in the presence of lower concentrations of plasma folate.**
- Chandrika J Piyathilake, Suguna Badiga, Ronald D Alvarez, Edward E Partridge, Gary L Johanning PLoS ONE
- PLoS One 2013 24;8(1):e54544. Epub 2013 Jan 24.
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- **A dietary pattern associated with LINE-1 methylation alters the risk of developing cervical intraepithelial neoplasia.**
- Chandrika J Piyathilake, Suguna Badiga, Edmond K Kabagambe, Andres Azuero, Ronald D Alvarez, Gary L Johanning,Edward E Partridge Cancer Prev Res (Phila)Cancer Prev Res (Phila) 2012 Mar 18;5(3):385-92. Epub 2012 Jan 18.
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- **Sheep stromal-epithelial cell interactions and ovarian tumor progression.**
- Feng Wang-Johanning, Miao Huang, Jinsong Liu, Kiera Rycaj, Joshua B Plummer, Kirstin F Barnhart, William C Satterfield,Gary L Johanning Int. J. CancerInt J Cancer 2007 Nov;121(10):2346-54
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FOLIC ACID

- What is folic acid?
- B vitamin essential for healthy development of unborn baby's spine, brain and skull
- can help reduce risk of birth defects such as spina bifida by as much as 70% B vitamin plays a role in:
- Building proteins in the body
- Producing DNA
- Helping to form red blood cells

What is folic acid defieciency

- Folic acid deficiency means that there is a lower than normal amount of folic acid in your blood. Folic acid is a water-soluble B vitamin, which means it cannot be stored in the body.

- neural tube defects (NTDs) are birth defects that occur early in pregnancy
  - often before a woman knows she is pregnant
- neural tube grows to become baby's spinal cord, spine, brain and skull

SOURCES OF FOLIC ACID

foods high in folic acid

- asparagus, broccoli, corn, spinach, orange juice, sunflower seeds, peanut butter, beans

foods fortified with folic acid

- white flour, enriched pasta, enriched cornmeal

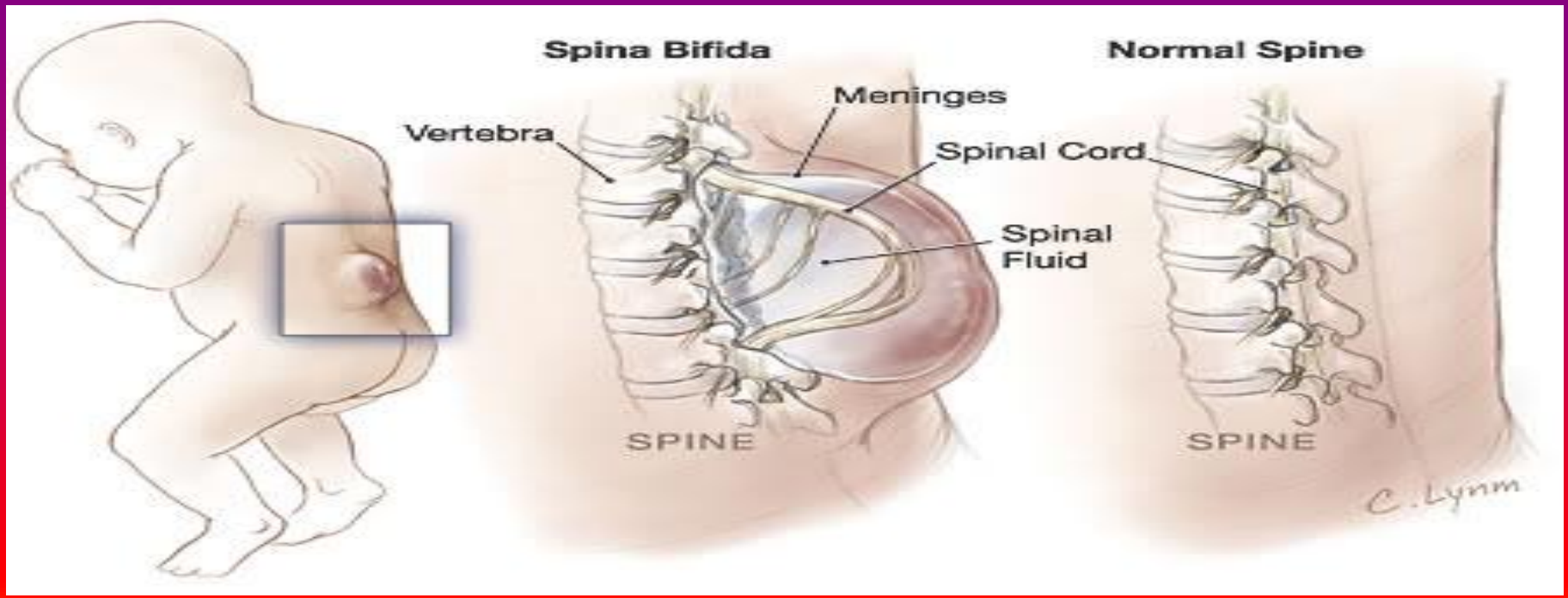
symptoms

- Fatigue
- Poor appetite
- Headache
- Pallor (pale skin)
- Grey hair
- Red, irritated, swollen, and sometimes shiny tongue
- Mouth ulcers
- Shortness of breath and lightheadedness
- Change in bowel patterns, usually diarrhea

WHO IS AT HIGHER RISK

- women who...
  - have a previous pregnancy affected by an NTD
  - have a family history of NTDs
  - use certain anti-seizure medication
  - have insulin-dependent diabetes
  - been diagnosed as clinically obese
  - abuse alcohol
  - are of Celtic, Northern Chinese, Cree and Sikh heritage

- Spina Bifida a condition that results when the lower part of the neural tube fails to develop properly



- Anencephaly
  - a fatal condition in which the upper end of the neural tube fails to close

What if I'm in high risk

- consult a health professional
  - to determine correct dosage of folic acid
  - to determine best multivitamin
- may require up to 5 mg of folic acid daily

PREVENTION

It is possible to consume enough folic acid by eating a balanced, varied diet including rich sources of folate, the food form of folic acid. The recommended dietary allowance (RDA) for folic acid is 400 micrograms per day for most adults.

To get enough folate, consume plenty of the following foods:

Fortified grains, cereals, and bread products

Dried beans and legumes

Poultry, pork, liver, and shellfish

A variety of fresh fruits and vegetables, especially dark, leafy green vegetables, and citrus fruits and juices

TREATMENT

- Folic acid deficiency is usually treated with 1,000 micrograms of supplemental folic acid, given once a day until folic acid levels are replenished. The anemia usually is corrected within two months. Few drugs are used to treat the folic acid defiecency are Deplin,Duleek, Zervalx, FA-8, Folacin-800

DIAGNOSIS

- A physical exam will be done. A blood test can help confirm a diagnosis of low folate levels and megaloblastic anemia.
- It is difficult to distinguish between folic acid deficiency and vitamin B12 deficiency . However, folic acid deficiency is confirmed only by measuring red blood cell (RBC) folate levels in the blood.
- It is especially important to confirm a diagnosis of folic acid deficiency before treatment with supplemental folic acid begins. Mistreating an actual vitamin B12 deficiency with supplemental folic acid will mask the vitamin B12 deficiency, meaning the anemia will be corrected, but the neurological damage associated with vitamin B12 deficiency will progress.

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