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Dr. Arnold Advincula Named Chief of Gynecology at NewYork-Presbyterian/Columbia

An internationally recognized leader in minimally invasive, laparoscopic, and robotic gynecological surgery, Arnold P. Advincula, MD, has been appointed Chief of Gynecology at Sloane Hospital for Women at NewYork-Presbyterian/Columbia University Medical Center, and Vice Chair of Women's Health in the Department of Obstetrics and Gynecology at Columbia University Medical Center. "Dr. Advincula's arrival marks exciting opportunities not only to build on our existing strengths in patient care and research, but also to advance our surgical education and training program," says Mary E. D'Alton, MD, Director, Ob/Gyn Services, NewYork-Presbyterian/Sloane Hospital for Women. "He will be an invaluable asset as we continue to provide the most innovative and comprehensive care for women."

> "Dr. Advincula's arrival marks exciting opportunities not only to build on our existing strengths in patient care and research, but also to advance our surgical education and training program."
> – Dr. Mary E. D'Alton

Dr. Advincula brings extensive experience in treating complex and challenging cases of endometriosis, uterine fibroids, and pelvic masses. He joins NewYork-Presbyterian/Columbia from Florida Hospital Celebration Health, where he assumed a number of leadership positions, including Medical Director of both the Center for Specialized Gynecology and the Gynecologic Robotic Surgery Program. He is a leader in minimally invasive gynecologic surgery and a pioneer in the use of state-of-the-art robotic technology for advanced pelvic surgery.

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Preterm Birth: Investigating the Infection Connection

Preterm birth – delivery before 37 weeks gestation – is the major unresolved problem in obstetrics and the major cause of neonatal morbidity and mortality. According to the Centers for Disease Control and Prevention, preterm birth affects nearly 500,000 infants. "It is estimated that more than 50 percent of preterm births result from infections caused by bacteria originating in the vagina, which under specific conditions become increasingly able to traverse the cervix. The earlier in gestation is the delivery the more likely that infection is the cause," says Steven S. Witkin, PhD, Director of the Division of Immunology and Infectious Diseases in the Department of Obstetrics and Gynecology at Weill Cornell Medical College.

Dominant bacteria in the vaginal ecosytem of reproductive age women are usually species of Lactobacilli

Dr. Witkin and his colleagues at Weill Cornell are at the forefront of research in several areas of women's health, with a major focus on genetic, immune, and infectious aspects of disorders affecting pregnant and non-pregnant women. Dr. Witkin was recently named the William J. Ledger

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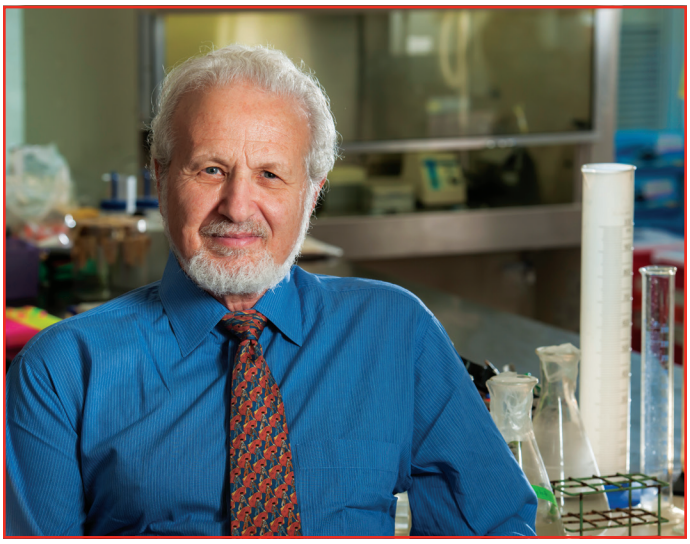
Preterm Birth: Investigating the Infection Connection *(continued from page 1)*



Dr. Steven S. Witkin

Distinguished Professor of Infection and Immunology in Obstetrics and Gynecology, continuing the pioneering work of Dr. Ledger who is world-renowned for his breakthrough research in the diagnosis and treatment of gynecologic infections. Drs. Ledger and Witkin are long-term collaborators, having published many peer-reviewed articles in the field, and co-authored the textbook, *Vulvovaginal Infections,* published in 2007, which to this day offers state-of-the-art guidance on understanding and managing these often challenging conditions.

Elucidating the Mechanism of Infection in Preterm Births

"Most frequently an infectious cause of preterm birth involves the migration of bacteria from the vagina, through the cervix, and into the pregnant uterus, where it triggers a sequence of events culminating in premature uterine contractions and delivery," explains Dr. Witkin. "The mechanisms that prevent or, conversely, increase the likelihood of bacterial migration from the lower to the upper genital tract are largely unknown and are a focus of our research."

> **"It is estimated that more than 50 percent of preterm births result from infections caused by bacteria originating in the vagina, which under specific conditions become increasingly able to traverse the cervix."**
>
> **— Dr. Steven S. Witkin**

Current studies by Dr. Witkin's research team concentrate on the properties and interactions of epithelial cells and bacteria in the vagina. The cross-talk between bacteria and human cells is critical for the production of compounds that promote the dominance of *Lactobacilli* bacterial species, the prevention of colonization and growth of pathogenic bacteria, and for minimizing the ability of bacteria to ascend from the vagina to the upper genital tract and cause a serious infection. The combination of an acidic vaginal pH, the preferential growth of *Lactobacilli*, and the release of immune defense mechanisms by vaginal epithelial cells fosters optimal vaginal health.

Dr. Witkin emphasizes that "the vaginal environment of human females differs from that of other species." Unlike rat, mouse, and rabbit animal models that are typically studied in the laboratory whose vaginal pH hovers around neutrality, the pH of vaginal fluid in reproductive-age women is typically 4.5 or less. Unlike these laboratory animals and even nonhuman primates the dominant vaginal bacteria only in women are species of *Lactobacilli.* This evolutionary divergence in vaginal pH and vaginal bacteria from all other species most likely offers select advantages for maintaining reproductive health under conditions that are unique to human beings. Uncovering the specific mechanisms related to these evolutionary changes is one of the main challenges of the Witkin laboratory.

Examples of pH Values

Solution	pH
Gastric acid	1.5 - 2.0
Vinegar	2.9
Orange juice	3.5
Beer	4.5
Vaginal fluid (in reproductive age women)	4.5
Skin surface moisture	4.0 - 5.5
Milk	6.5
Pure water	7.0
Saliva	6.5 - 7.4
Semen	7.2 - 8.0
Blood	7.3 - 7.5
Seawater	7.7 - 8.3
Sodium bicarbonate	8.4
Hand soap solution	9.0 - 10.0
Bleach	12.5

Source: Vaginal pH and *Lactobacilli. American Journal of Obstetrics & Gynecology.* 2011.

As reported in the February 2011 issue of the *American Journal of Obstetrics & Gynecology*, Dr. Witkin and colleagues from the University of Sao Paulo Medical School, Hospital das Clinicas in Brazil; University of Utah School of Medicine; the Iowa Center for Translational and Clinical Research, Des Moines University and Mercy Medical Center; and the State University of Campinas School of Medical Sciences in Campinas, Brazil, posit that "in settings in which vaginal microscopic examination or microbial culture is not available, vaginal pH determinations may be especially valuable in the initial assessment of possible causes of clinical symptoms. An elevation in vaginal pH during pregnancy may indicate bacterial vaginosis or a trichomonas infection – risk factors for preterm birth."

Dr. Witkin and the Weill Cornell team recently reported that some *Lactobacilli* produce two different forms of lactic acid, called

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Dr. Arnold Advincula Named Chief of Gynecology at NewYork-Presbyterian/Columbia *(continued from page 1)*

Dr. Arnold P. Advincula

Dr. Advincula helped launch the first women's institute in Central Florida. He also served as Director of the surgical program at the Nicholson Center for Surgical Advancement and held an academic appointment as Clinical Professor of Obstetrics and Gynecology at the University of Central Florida College of Medicine. He has received a patent for an energy-based surgical device designed to minimize tissue damage in gynecological surgery, and also helped develop a uterine manipulator, the Advincula Arch.

After receiving his medical degree with honors from Temple University, Dr. Advincula completed a residency and fellowship in minimally invasive gynecologic surgery at the University of North Carolina Hospitals in Chapel Hill. He then spent 10 years on the faculty of the University of Michigan, where he quickly rose to the rank of Clinical Professor. He is board certified in obstetrics and gynecology and is a Center of Excellence in Minimally Invasive Gynecology-designated physician.

Dr. Advincula is currently President-elect of AAGL, formerly known as the American Association of Gynecologic Laparoscopists, an internationally recognized surgical association of some 7,500 members from more than 110 countries. He also is serving as the 2014 Scientific Program Chair at AAGL's 43rd Global Congress on Minimally Invasive Gynecology in Vancouver, BC, this November, at which time he will assume the role of President of the organization.

Dr. Advincula serves on the editorial boards of the *Journal of Minimally Invasive Gynecology, International Journal of Gynecology & Obstetrics, Journal of Robotic Surgery,* and *OBG Management.* He is the author of numerous book chapters and more than 100 publications.

In his new role at NewYork-Presbyterian/Columbia, Dr. Advincula will further distinguish the department as a leader in minimally invasive gynecologic procedures, including robotics. As Chief of Gynecology, he plans to expand research and clinical services in a number of key areas to include the Center for Endometriosis Treatment and Research and the Center for Women's Specialized Gynecologic Surgery at Sloane Hospital, and to further enhance the Hospital's gynecologic surgical education and training.

"It is an honor to be joining an institution with such a rich history of innovation and excellence in patient care," says Dr. Advincula. "I am eager to continue my work with advanced minimally invasive gynecologic surgery and to help train the next generation of doctors in the latest procedures. With the resources available at NewYork-Presbyterian/Columbia University Medical Center, we will expand access to state-of-the-art gynecological care on a local as well as national level."

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D-lactic acid and L-lactic acid. "We demonstrated that L-lactic acid induces protective immune responses by epithelial cells in the vagina and, thereby, further protects against the growth of harmful bacteria. In addition, the ratio of L- to D-lactic acid in the vagina determines the relative rate of production of compounds that influences the strength of the cervical barrier that prevents bacteria from migrating into the uterus," says Dr. Witkin. In some women whose vagina was not dominated by *Lactobacilli*, the researchers demonstrated an elevated vaginal pH and the presence of an altered L- to D-lactic acid ratio that was less protective of the cervical barrier, thereby increasing susceptibility to bacterial migration into the uterus and the risk of infection-related preterm birth.

"We are now seeking to characterize the vaginal microbiota of pregnant women seen at our hospital, determine the relationship between the bacterial composition and the vaginal concentration of L- and D-lactic acid and other compounds that influence the strength of the cervical barrier, and ascertain if we can predict which women will undergo a preterm delivery," says Dr. Witkin. "The ability to predict early in gestation which women are at elevated risk for infection-related preterm birth will lead to the development of novel protocols to minimize or prevent this occurrence."

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