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→ INSIDE

Vasectomy: Procedure poses minimal prostate cancer risk. 112

Ovarian cancer: Guidance advises against screening. 113

Syphilis: Put 'Talk. Test. Treat.' into motion. 115

Preeclampsia: Screening emphasized to cut numbers . . 116

Contraceptive research: New frontiers explored 118

Research Finds Many Women Who Receive IUD for Emergency Contraception Continue Use

Sixty-seven percent of women offered long-acting option were using it at one year

While placement of an intrauterine device (IUD) is the

most effective form of emergency contraception (EC), how many women continue to use their IUD on a long-term basis? In a new study, a collaboration between the University of Utah Department of Obstetrics and Gynecology's Family Planning Program and the Planned Parenthood Association of Utah, of 176 women receiving either a levonorgestrel or copper T IUD for EC, 147 (67%) were using the method at one year.¹ Women participating in

the study selected either the copper T380A IUD or a combination of

52 mg levonorgestrel IUD and 1.5 mg oral levonorgestrel for emergency contraception.

The study found that three of the women receiving IUDs became pregnant in the course of the first year.¹ The three unintended pregnancies occurred in women receiving the levonorgestrel IUD, for a 12-month pregnancy rate of 1.7% (95% confidence interval [CI], 0.3%-4.9%).

The first unintended pregnancy was classified as a luteal phase pregnancy that occurred in the

TWO-THIRDS OF THE WOMEN WHO CHOSE IUD PLACEMENT WHEN THEY CAME TO THE CLINIC REQUESTING EMERGENCY CONTRACEPTION SERVICES WERE CONTINUING TO USE THEIR DEVICE.

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index EC cycle, while the second unintended pregnancy was a result of an unrecognized IUD expulsion at 10 weeks post-insertion. The third unintended pregnancy occurred with an IUD in place at seven months post-insertion.¹ The rate of unintended pregnancy in the IUD users in the current study is lower than in earlier studies of oral EC users initiating routine contraceptive care, which ranges up to 12%.^{2,3}

There is little published data regarding one-year continuation rates when an IUD is initiated at the time of emergency contraception, the researchers note.¹ Rates range from 64% in a small U.S. study to 94% in a large Chinese sample.^{4,5}

Check the Data

To perform the current study, researchers enrolled 188 women who presented for emergency contraception at a single family planning clinic in Utah between June 2013 and September 2014. Women participating in the study selected either the copper T380A IUD or a combination of the 52 mg levonorgestrel IUD and 1.5 mg oral levonorgestrel for emergency contraception. Research personnel followed participants by phone, text, or email for 12 months, or until discontinuation occurred.

Why offer oral EC along with the IUD? In an earlier paper, the

same researchers reported that study participants seeking EC who desired an IUD preferentially chose the pills along with the levonorgestrel IUD over the copper IUD. Neither group had EC treatment failures. Including the option of pills with concomitant insertion of the levonorgestrel IUD in EC counseling may

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increase the number of emergency contraception users who opt to initiate long-acting reversible contraception, researchers note.⁶

The analysis in the current study indicates 176 women received IUDs; 66 (37%) chose the copper IUD, while 110 (63%) chose the levonorgestrel IUD plus oral EC. At one year, of 147 (84%) participants,

33 (22%) had requested removal, 13 (9%) had an expulsion and declined reinsertion, three (2%) had a pregnancy with their IUD in place, and 98 (67%) still were using their device. Two-thirds of women who chose IUD placement when they came to the clinic requesting emergency contraception services were continuing to use their device, data indicate. Women initiating either the copper IUD or the levonorgestrel IUD had similar one-year continuation rates: 60% of copper IUD users and 70% of levonorgestrel IUD plus levonorgestrel EC users still were using their device at 12 months (adjusted hazard ratio 0.72, 95% CI, 0.40-1.3).¹

EXECUTIVE SUMMARY

In a new study, a collaboration between the University of Utah Department of Obstetrics and Gynecology's Family Planning Program and the Planned Parenthood Association of Utah, of 176 women receiving either a levonorgestrel or copper T intrauterine device (IUD) for emergency contraception (EC), 147 (67%) were using the method at one year.

- Women participating in the study selected either the copper T380A IUD or a combination of the 52 mg levonorgestrel IUD and 1.5 mg oral levonorgestrel for emergency contraception.
- While levonorgestrel emergency contraception pills are more accessible in many clinics, they do not represent the most effective method of EC. On the other hand, the copper T IUD is the most effective form of emergency contraception.

Is the IUD Available for EC at Your Clinic?

While levonorgestrel emergency contraception pills are more accessible in many clinics, they do not represent the most effective method of EC. On the other hand, the copper T IUD is the most effective form of emergency contraception.

Where does your clinic stand when it comes to emergency contraceptive placement of IUDs? In a survey of 199 primary care, family planning, and obstetrician/gynecology clinics in nine U.S. cities, using a "mystery caller" assuming the role of a patient seeking the copper IUD for EC, less than half of family planning clinics offered an IUD as emergency contraceptive, compared to 13.8% of obstetrician/gynecology offices and 3.2% of primary care sites.⁷ On the other hand, in the same survey, researchers found that 87% of family planning clinics, all obstetrician/gynecology offices, and two-thirds (68%) of primary care clinics offered the copper IUD as a contraceptive.

When presenting the options for emergency contraception, clinicians may wish to use a patient education tool based on the tiered effectiveness

approach developed by the University of California, San Francisco Bixby Center for Global Reproductive Health and the Bedsider Internet reproductive health resource. (See *this chart at <http://bit.ly/2uOaWps>*. Also, look at another example of a tiered chart produced by Planned Parenthood at <http://bit.ly/2u9XCtH>.)

Each night, close to 800,000 to 1 million women who do not want to become pregnant have completely unprotected sex, notes **Robert Hatcher**, MD, MPH, professor emeritus of gynecology and obstetrics at Emory University School of Medicine in Atlanta. In the United States, 45% of all pregnancies are unintended, and 42% of those pregnancies are terminated by an abortion, he says. "If one of your goals is to increase the use of long-acting reversible methods, then the single intervention most likely to accomplish this would be the ready availability of copper IUDs and levonorgestrel IUDs as emergency contraceptives," says Hatcher. ■

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Vasectomy Poses Minimal Prostate Cancer Risk

A new systematic review and meta-analysis of three decades of evidence concludes that vasectomies are associated with minimal risk of prostate cancer.¹

Researchers involved in the review wanted to evaluate evidence surrounding vasectomy and prostate cancer risk because of the ongoing controversy despite decades of research on the topic, says lead author **Bimal Bhindi**, MD, CM, MSc, FRCSC, a clinical fellow in urologic oncology in the Rochester, MN-based Mayo Clinic's Department of Urology.

"Furthermore, several recent high-quality studies with diverging conclusions have been recently reported and have reignited the debate," notes Bhindi. "We hoped to synthesize the literature through a systematic review in order to potentially settle the debate."

Researchers looked at 53 studies: 16 cohort studies involving 2,563,519 men; 33 case-control studies involving 44,536 men; and four cross-sectional studies involving 12,098,221 men. Their analysis found

no association between vasectomy and high-grade, advanced-stage, or fatal prostate cancer. The analysis did determine a weak association between vasectomy and any prostate cancer that was closer to the null with increasingly robust study design.¹

While patients should be counseled appropriately about risks, concerns about the risk of prostate cancer should not stop clinicians from offering vasectomy to couples seeking long-term contraception, the researchers state in the paper.¹

Why the Debate?

Family planning clinicians recognize vasectomy as a highly effective form of permanent birth control. In the first year after the procedure, just 15 to 20 of every 10,000 couples will experience a pregnancy. Performed as a simple outpatient procedure under local anesthetic, it is less expensive and has a lower risk of complications compared with tubal ligation.^{2,3} While 43 million women worldwide rely on vasectomy for contraception,

the birth control option is underutilized in the United States.⁴ It is estimated that 8% to 12% of U.S. couples choose vasectomy for contraception.⁵

Findings from several reports published in the late 1980s and early 1990s suggested an epidemiologic association between vasectomy and the risk of prostate cancer.^{6,7,8} However, such data were not enough to impede acceptance of the method's safety and effectiveness, as noted in the 2012 guidance from the American Urological Association:

"Clinicians do not need to routinely discuss prostate cancer, coronary heart disease, stroke, hypertension, dementia or testicular cancer in pre-vasectomy counseling of patients because vasectomy is not a risk factor for these conditions."⁹

Several large, high-quality analyses published recently have demonstrated either an association or no association between vasectomy and prostate cancer, which has brought the issue to the forefront again.^{10,11} Such debate led the current research team to perform its review of the evidence.

Check American Cancer Society Data

A large study published in 2016 by the American Cancer Society added to the evidence that vasectomy does not meaningfully increase the risk for prostate cancer. Researchers looked at data from 1982-2012 collected from the Cancer Prevention Study II (CPS-II), a prospective mortality study of approximately 1.2 million Americans. They analyzed the association between vasectomy and prostate cancer deaths among 363,726 men

EXECUTIVE SUMMARY

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in the study, and also examined the association between vasectomy and prostate cancer incidence among 66,542 men in a subgroup called the CPS-II Nutrition Cohort.

The data suggest no evidence that vasectomy increases the risk of prostate cancer, the researchers report. Vasectomy also did not increase the risk of high-grade prostate cancer, the kind more likely to be lethal. Findings also suggest that vasectomy did not increase the risk of dying from prostate cancer.¹² ■

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Task Force Issues Draft Guidance on Ovarian Screening

The U.S. Preventive Services Task Force (USPSTF) has issued a draft recommendation statement on ovarian screening, finding that the potential harms of screening outweigh the benefits.¹ The draft guidance recommends that women who have no signs or symptoms should not be screened for ovarian cancer. The new guidance falls in line with the USPSTF's 2012 guidance, which also recommended against screening women at average risk.²

Ovarian cancer is the fifth leading cause of cancer death among women in the United States.³ The Centers for Disease Control and Prevention (CDC) reports that 21,161 women in the United States were diagnosed with

ovarian cancer in 2014, and 14,195 women died from the disease.⁴ Although the disease causes more deaths than any other affecting the female reproductive system, it only accounts for 3% of all cancers in women, the CDC estimates.³

“The Task Force found that screening women without signs or symptoms for ovarian cancer does not decrease the number of deaths from the disease and may lead to unnecessary surgeries,” said Task Force member **Maureen Phipps**, MD, MPH, department chair and Chace-Joukowsky professor of obstetrics and gynecology and assistant dean for teaching and research on women's health at the Warren Alpert Medical School of

Brown University in Providence, RI, in a release accompanying the draft guidance. “Therefore, the Task Force recommends against screening for ovarian cancer in women who have no signs or symptoms and who are not at high risk for ovarian cancer.”

Check Accuracy of Tests

Evidence indicates that current screening tests for ovarian cancer are not very accurate, with false-positive results leading to unnecessary surgeries. Cancer antigen-125, used as a tumor marker in epithelial ovarian cancer, has a low sensitivity and specificity. It is only raised in approximately 50% of the first stage of epithelial ovarian cancers, and

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in 75% to 90% of patients with advanced disease.⁵

“The current screening tests do not do a good job identifying whether a woman does or does not have ovarian cancer,” said Task Force chair and Seattle pediatrician **David Grossman**, MD, MPH, in a press statement. “The Task Force hopes that in the future, better screening tests for ovarian cancer will be developed.”

What Can You Do?

Clinicians need to do all that they can to prevent ovarian cancer, says **Anita Nelson**, MD, professor and chair of the obstetrics and gynecology department at Western University of Health Sciences in Pomona, CA.

Letting women know that combined oral contraceptives reduce this cancer risk may lessen their reluctance to use hormonal contraception, Nelson says.

The efficacy of oral contraceptives in ovarian cancer chemoprophylaxis makes them an important strategy for selected high-risk women who have not completed childbearing.^{6,7} (Contraceptive Technology Update reported on the research; see “Research Affirms Protective Benefit of Oral Contraceptives,” June 2017, available

at <http://bit.ly/2eWephY>.)

A new approach in reducing the most serious epithelial ovarian cancer is to encourage salpingectomy at the time of hysterectomy, and perhaps in place of tubal interruption or occlusion, says Nelson. This practice, known as opportunistic bilateral salpingectomy, is gaining momentum as a potential strategy for preventing epithelial ovarian cancer.⁸ Data suggest this practice has been associated with a 40% to 65% decrease in the incidence of epithelial ovarian cancer when performed at the time of benign hysterectomy in patients at risk for the disease.⁸

A 2015 Committee Opinion by the American College of Obstetricians and Gynecologists notes that prophylactic salpingectomy may offer clinicians the opportunity to prevent ovarian cancer in their patients; however, randomized, controlled trials are needed to support its impact in reducing the incidence of ovarian cancer.⁹ ■

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'Talk. Test. Treat.' Aimed at Syphilis

There are more reported cases of primary and secondary syphilis in the United States now than there have been in more than 20 years.¹ The Centers for Disease Control and Prevention (CDC) has issued a call to action to reverse the trend.

One troubling finding is a surge in congenital syphilis rates, say CDC officials. Concerns rise as a result of the consequences of untreated maternal syphilis infection, which range from preterm birth to fetal death, as well as congenital infection in some surviving infants. This infection can result in both physical and mental developmental disabilities.²

The CDC's current data show a 25% rise in syphilis rates among pregnant women from 2012 to 2014.¹ After showing a decline from 2008 to 2012, statistics indicate a sharp increase, with the number of congenital syphilis cases in 2015 the highest since 2001.¹ In 2015, there were 487 reported cases of congenital syphilis, for a national rate of 12.4 cases per 100,000 live births. (Contraceptive Technology Update *reported on the numbers; see*

"Syphilis Makes Dangerous Resurgence," June 2016, available at <http://bit.ly/2w9oECU>.)

Research presented at the 2016 National STD Prevention Conference also indicates the growing risk of syphilis among gay and bisexual men. Data presented by CDC indicated a 15% increase in the number of syphilis infections in this population from 2013 to 2014 alone.³

The CDC plans to use both old and new prevention tools to protect the public from syphilis, said **Gail Bolan**, MD, director of CDC's Division of Sexually Transmitted Disease Prevention, in a public call to health providers.

"We will, for example, improve surveillance; make a syphilis specimen repository available for technological developments; and help develop novel diagnostic tools and better prevention tools," said Bolan. "At the same time, we will continue ongoing work to prevent all STDs, including syphilis."

Use 'Talk. Test. Treat.'

The CDC suggests that clinicians use the "Talk. Test. Treat." approach

with patients to help reduce syphilis rates.

- Talking includes the act of taking routine sexual histories if the patient is having sex.
- Testing includes screening patients for syphilis. The CDC recommends screening all sexually active men who have sex with men at least once a year, and more frequently if they are at higher risk for infection. All pregnant women should be tested at their first prenatal visit. Women at high risk for the disease should be rescreened early in their third trimester and again at delivery to prevent congenital syphilis. Other patients may need syphilis testing based on their sexual history.
- Treating patients calls for giving an injection of long-acting benzathine penicillin G if someone tests positive for syphilis. Also advise infected patients to tell their sex partners so they may be tested and treated as well. Clinicians should report all cases of syphilis and congenital syphilis promptly to the state or local health department, the CDC advises.

Task Force Calls for Screening

The U.S. Preventive Services Task Force issued guidance in 2016 stating that screening for syphilis infection in asymptomatic, nonpregnant persons at increased risk for infection provides substantial benefit.⁴ The guidance updated previous recommendations issued in 2004; the task force issued separate recommendations on testing in pregnant women in 2009.⁵ That guidance reaffirmed the call for screening all pregnant women for syphilis infection.

EXECUTIVE SUMMARY

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- There also is a growing risk of syphilis among gay and bisexual men. Data indicate a 15% increase in the number of syphilis infections from 2013 to 2014 in this population.

According to the evidence reviewed by the task force, those at highest risk for syphilis infection include men who have sex with men and people living with HIV. In 2014, men accounted for 91% of all primary and secondary syphilis cases, and men who have sex with men accounted for 61% of cases.⁶

“Clinicians should also consider other relevant factors — including local infection rates, the patient’s sexual network, and the patient’s sexual risk behaviors — when deciding whether to screen for syphilis,” said Task Force member **Ann Kurth**, PhD, CNM, MSN, MPH, dean of the Yale School of Nursing and an adjunct professor in the New York University College of Nursing and the College of Global

Public Health, as well as an affiliate faculty member in the University of Washington’s Department of Global Health and School of Nursing. ■

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Increased Focus on Preventing Preeclampsia

Cases of preeclampsia in the United States have increased since 1980 from 2.4% of all pregnancies to 3.8% in 2010. This increase is cause for concern: Preeclampsia accounts for more than \$2.18 billion of the healthcare

expenditure in the first 12 months after birth.¹

Although pregnant women can have other hypertensive conditions along with preeclampsia, the condition is defined as new-onset hypertension (or, in patients with

existing hypertension, worsening hypertension) occurring after 20 weeks of gestation, combined with either new-onset excess protein in the urine or other signs or symptoms involving multiple organ systems.² Adverse perinatal outcomes for the fetus and newborn may include intrauterine growth restriction, low birth weight, and stillbirth. Several complications associated with the condition lead to early labor induction or cesarean delivery and subsequent preterm birth.²

In a new study published in the *American Journal of Obstetrics and Gynecology*, researchers used epidemiological and econometric methods to assess the annual cost of preeclampsia in the United States. To conduct their analysis, they used a combination of population-based and administrative data sets, including the National Center for Health Statistics Vital Statistics on Births,

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- Adverse perinatal outcomes for the fetus and newborn may include intrauterine growth restriction, low birth weight, and stillbirth. Several complications associated with the condition lead to early labor induction or cesarean delivery and subsequent preterm birth.

the California Perinatal Quality Care Collaborative Databases, the U.S. Health Care Cost and Utilization Project database, and a commercial claims data set.

The data suggest that preeclampsia increased the probability of an adverse event from 4.6% to 10.1% for mothers, and from 7.8% to 15.4% for infants, while reducing gestational age by 1.7 weeks ($P < 0.001$). The analysis estimated the total cost burden of preeclampsia during the first 12 months after birth at \$1.03 billion for mothers and \$1.15 billion for infants. The researchers noted that cost burden per infant was dependent on gestational age, ranging from \$150,000 at 26 weeks gestational age to \$1,311 at 36 weeks gestational age.¹

“Rising rates of preeclampsia threaten the health and well-being of mothers and babies,” noted **William Callaghan**, MD, chief of the Maternal and Infant Health Branch at the Centers for Disease Control and Prevention, in an accompanying editorial.

“Although preeclampsia has affected pregnant women for millennia, there is still much we do not know,” wrote Callaghan. “This new research underscores the urgent need to continue research into its causes and to implement strategies that may help women manage this condition.”

Task Force Examines Evidence

Should clinicians screen for preeclampsia? The U.S. Preventive Services Task Force has just reviewed available evidence on the accuracy of screening and diagnostic tests for preeclampsia. It looked at the potential benefits and harms of screening, the effectiveness of risk

prediction tools, and the benefits and harms of treatment of screen-detected preeclampsia. The task force has issued a recommendation for preeclampsia in pregnant women with blood pressure measurements throughout pregnancy.² The final recommendation applies to pregnant women without a current diagnosis of preeclampsia and with no signs

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or symptoms of preeclampsia or hypertension.

“If a pregnant woman has high blood pressure during a clinical visit, she should receive further testing and evaluation,” said Task Force chair and Seattle pediatrician **David Grossman**, MD, MPH, in a press statement. “Several high blood pressure measurements are needed to diagnose preeclampsia.”

Search Is on for Test

Emerging scientific data indicate that preeclampsia is linked with the

abnormal presence in the urine of kidney cells known as podocytes.⁴ Available tests that can identify podocytes are expensive and time-consuming.

Results of a small study, which evaluated 42 pregnant women with preeclampsia and an equal number with normal blood pressure, suggest that a new method of detection can rapidly detect fragments of podocytes in the urine of women with preeclampsia.⁴ Researchers also found that fetal hemoglobin, normally present in pregnant women’s blood in small amounts, is found in higher amounts in preeclamptic women’s blood.⁴

“This increased amount of fetal hemoglobin in preeclampsia may be causing the release of podocyte fragments in the urine,” said study co-author **Vesna Garovic**, MD, a nephrologist at the Mayo Clinic in Rochester, MN, in a press statement. “We hope that this information will result in improved diagnostic procedures in women with preeclampsia; however, additional studies in larger numbers of patients and across different types of preeclampsia are needed.” ■

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Contraceptive Research: Science Heads to New Frontiers

What will contraceptive methods look like in the future? If current lines of research hold true, things may be radically different from the current options family planning clinicians now offer to male and female patients.

Funding recently has been awarded to scientists around the globe through the Grand Challenges Explorations program, an initiative funded by the Bill & Melinda Gates Foundation in Seattle. The program seeks to foster concepts for contraceptive discovery platforms that can contribute to the development of new methods suitable for women and men living in limited resource settings.

In its request for proposals, the program noted its desire for science aimed at developing new methods for long-term regular use in the form of injectables, implants, or regular oral contraception. Methods that looked to be variations of

injectable formulations or implants using existing agents were not to be included. Also excluded were methods that would be used on an intermittent “on-demand” or pericoital use, such as vaginal gels.

Identifying a New Target

Paula Cohen, PhD, professor of genetics in the College of Veterinary Medicine at Cornell University in Ithaca, NY, will use her program funding in her efforts to determine whether meiosis — the first stage of sperm formation — is a potential target for the development of effective male contraceptives.

Why meiosis? By aiming at this early stage, a potential method would be accessible to compounds in the circulation, and its effect on fertility would be rapid and reversible. To examine the molecular mechanisms regulating meiotic entry, Cohen’s team will develop a spermatogonial

stem cell culture system carrying fluorescent reporter proteins that signal cell state and meiotic entry. By using genome editing to mutate genes known to be involved in meiotic entry, and stem cell maintenance to test the system, scientists will attempt to switch one of the genes on and off on the spermatogonial stem cells. Once the system has been set up, scientists plan to screen for new genes involved in meiotic entry in an effort to identify potential candidates for the development of possible male contraceptives.

“The problem is, we know very little about meiosis, because it’s a very hard stage to target biologically or molecularly,” Cohen said in a press release. “Only recently have we started to gather the tools to be able to look at it.”

Focus on Female Fertility

In another potential approach, **Francisco Diaz**, PhD, associate professor of reproductive biology, and **Pak Kin Wong**, PhD, professor of biomedical engineering, both at Pennsylvania State University in University Park, will develop a high-throughput screening method to identify compounds able to block biological events essential for female fertility without affecting ovulation or hormone production. By blocking cumulus expansion (when cumulus cells release from the oocyte to enable it to enter the oviduct) and oocyte

EXECUTIVE SUMMARY

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- Projects were evaluated on their development of long-term methods in the form of injectables, implants, or regular oral contraception. Projects that were variations of injectable formulations or implants using existing agents were not considered. Also excluded were methods used on an intermittent “on-demand” or pericoital use, such as vaginal gels.

maturation (when the oocyte divides to produce the egg and a smaller polar body), Diaz's team hopes to identify new contraceptives with fewer side effects.

To look at these two events, scientists will extract cumulus oocyte complexes from primed female mice and apply them to a microwell array prototype containing 1,024 wells coated with different test compounds and connected by microfluidic channels. The oocytes in the wells will be stimulated to undergo cumulus expansion. When cumulus cells are removed, then oocyte maturation will occur. Researchers will employ automated inverted microscopy to assess the ability of each compound to inhibit each step. The platform will be optimized first using known inhibitors, then tested using a library of 1,200 molecules approved by the Food and Drug Administration. The microfluidics device, developed in Wong's laboratory, will analyze how test compounds influence polar body production. This device will help in developing a method to screen a large number of compounds for contraceptive activity by simultaneously assessing their effects on both cumulus expansion and oocyte maturation.

"Without cumulus expansion, transfer of the egg to the oviduct is prevented," Diaz said in a press statement. "So, blocking cumulus expansion and trapping the oocyte in the ovary could be an attractive and novel target for contraceptive development."

Zebrafish Under Investigation

Randall Peterson, PhD, L.S. Skaggs presidential endowed professor and dean of the College of Pharmacy

at the University of Utah in Salt Lake City, is developing a zebrafish model for high-throughput screens to identify compounds that inhibit the formation of gametes. Researchers hope such compounds could lead to male and female contraceptives that last for weeks or months after only a single dose.

Unlike conventional drug discovery programs that use simplified, in vitro assays, the Peterson lab screens use living zebrafish, ensuring that the drug candidates discovered are active in vivo. In the current contraceptive line of research, scientists will generate transgenic zebrafish lines to express a selection of four fluorescently labeled markers for different stages of gametogenesis. These markers can be quantified rapidly to measure the effects of candidate compounds on blocking gamete production.

Other Lines Explored

Aurelien Forget, PhD, adjunct research associate in the School of Pharmacy and Medical Sciences at the University of South Australia in Adelaide, is working on a three-dimensional bioprinted model of the fallopian tube. This model will be used as a screening platform to identify compounds that specifically block sperm activation in the search for a contraceptive that targets male sperm. Such a method might be used before or after intercourse, and should avoid the side effects associated with current hormonal contraceptives. Since sperm must be activated in the

oviduct before penetrating the cells and protein layer surrounding the egg for fertilization, scientists will isolate oviduct cell populations from mice to reproduce this process in vitro. Researchers will use a synthetic, printable extracellular matrix to build a three-dimensional oviduct that reproduces the four-layered structure. By assessing cell viability and function in their assembled oviduct, they hope to test the ability to capacitate mouse and human sperm.

Another Australian researcher, **Darryl Russell**, PhD, a research fellow at the University of Adelaide, is leading a scientific investigation of a scalable in vitro screening assay that can automatically evaluate adhesion in the cumulus-oocyte complex. By examining the adhesion process, which is required to release the oocyte from the ovary for fertilization, scientists hope to develop new contraceptives that would specifically block ovulation.

To achieve this target, researchers will isolate cumulus-oocyte complexes from mice, culture them with collagen, and test them in a 96-well plate format using an automated assay that measures electrical resistance. Scientists also will use short hairpin RNAs in mice cumulus-oocyte complexes to inhibit the genes that are activated when ovulation is stimulated. By analyzing the effect on adhesion using the quantitative assay, investigators hope to uncover the biochemical pathways required for ovulation that also may be a springboard for contraceptive development. ■

COMING IN FUTURE MONTHS

- Data confirm vaginal estrogen safety
- Include contraceptive counseling at teen visits
- What's the current status of condom use?
- Examining injectable, long-acting antiretroviral HIV therapy

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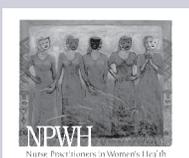
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CME/CE QUESTIONS

1. **How many couples out of 10,000 are estimated to experience a pregnancy in the first year after a vasectomy?**
 - a. 5 to 10
 - b. 15 to 20
 - c. 20 to 30
 - d. 30 to 40
2. **What is a potential approach in preventing the most serious forms of ovarian cancer?**
 - a. chemoprevention with tamoxifen and raloxifene
 - b. use of dutasteride
 - c. opportunistic bilateral salpingectomy
 - d. polypectomy
3. **What is the CDC-recommended treatment for syphilis?**
 - a. benzathine penicillin G
 - b. ofloxacin
 - c. levofloxacin
 - d. azithromycin
4. **What is the first stage of sperm formation?**
 - a. meiosis
 - b. spermiogenesis
 - c. spermatocytogenesis
 - d. mitosis

CE/CME OBJECTIVES

After reading *Contraceptive Technology Update*, the participant will be able to:

1. identify clinical, legal, or scientific issues related to development and provisions of contraceptive technology or other reproductive services;
2. describe how those issues affect services and patient care;
3. integrate practical solutions to problems and information into daily practices, according to advice from nationally recognized family planning experts;
4. provide practical information that is evidence-based to help clinicians deliver contraceptives sensitively and effectively.