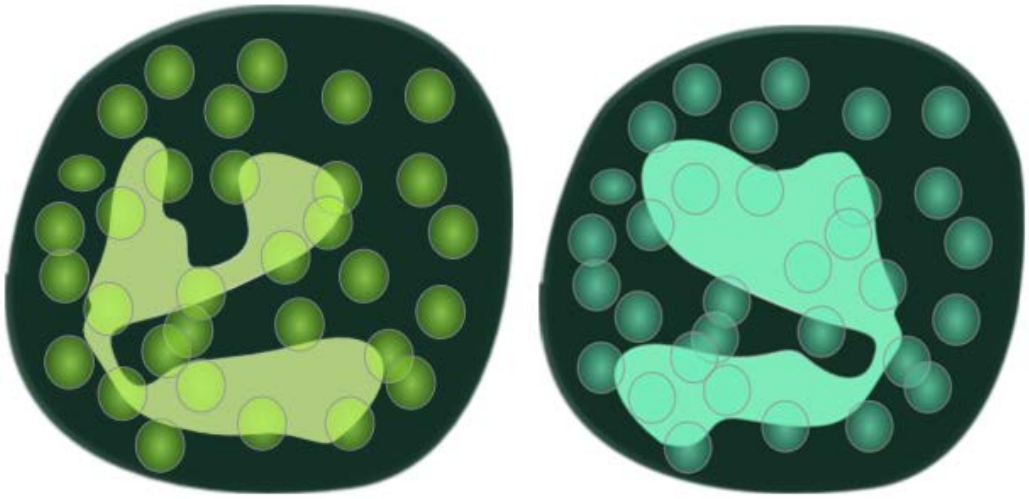
Science INSIGHTS®

The Official Journal of the Bonoi Academy of Science & Education

http://bonoi.org

25 August 2013, Volume 2, no. 2



base The Official Journal of BASE

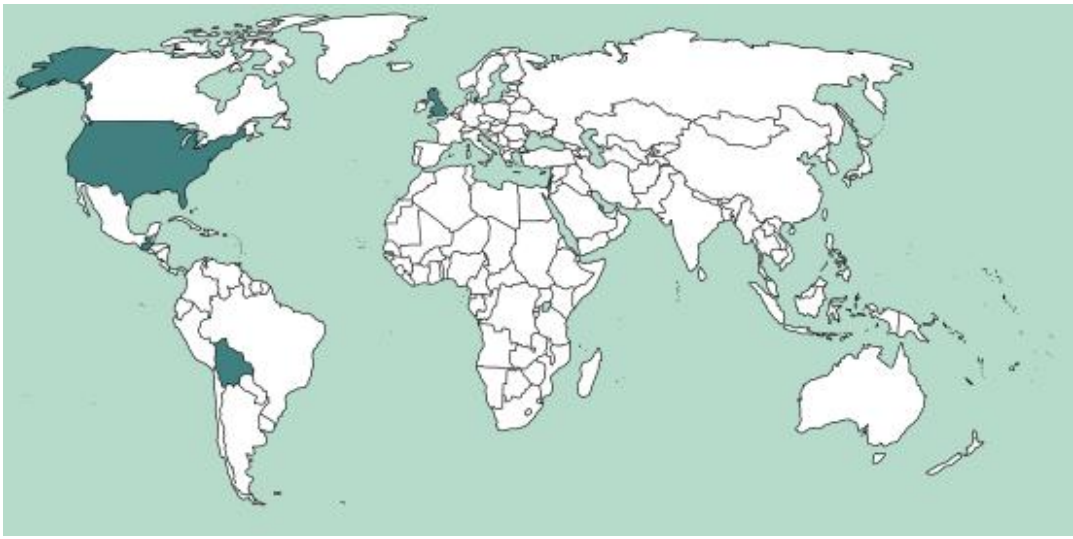
Science INSIGHTS®: the Real Journal of Science and Education

►**Mission: Let science reach the far corner by education**

Editors (*Alphabetically*)

Founding-Committee of the BASE

Science Tests Idea | Science Speaks Truth | Science Makes Difference
Education On Science | Education For Advancement | Education To Future



Burlington, USA

Ghost Glaciers in Greenland

Greenland's bedrock is already ancient. In central northwestern Greenland the island's ice sheet advanced and retreated many times in the past 800,000 years. But the local highlands were never scoured by ice as other areas were. Researcher

from the University of Vermont in Burlington said that the ghost glaciers came and went, and left very little evidence of their presence. Some clue indicated that these rocks have been exposed and buried for many Ice Age cycles. In the fjords (deep, glacier-carved canyons), the ground was about 11,300 years old. Scientists suspected that climate and elevation combined to prevent local glaciers or heavy snow from abrading the highlands. They have also found cold, protective glaciers in mountain ranges, including the Alps and the Andes. It is obviously a landscape that has experienced a much longer duration on the Earth's surface. It is a gorgeous landscape.■

Washington DC, USA

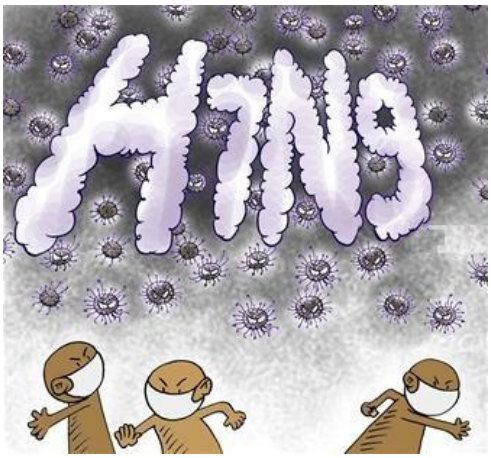
How Can the Kids Learn Today?

Do smartphones make smart babies? May be yes, may be no. A Boston-based group said that developers are trying to dupe parents into thinking apps are more educational than entertaining. The study showed that machines and screen media are a really ineffective way of teaching a baby language. What babies need for healthy brain development are active play, hands-on creative play and face-to-face interaction. What a thing. The screen machines in fact cannot teach your child everything, even may actually be harmful. Yes, apps can reinforce educational learning in kids at a certain age, but it is not a substitute for the parents, reading, and the things you do in

everyday life.■

London, UK

Person-to-Person H7N9 Transmission



Who can conquer the virus? It is hard to say. The case of a father and daughter in China who both became infected with H7N9 bird flu provides the strongest evidence that H7N9 virus can transmit from person to person. Limited human transmission of bird flu viruses has been seen in the past, but some animal studies also suggested that H7N9 can spread between mammals. Still, H7N9 is concerning. The virus does not cause symptoms in birds, so it can spread undetected within poultry populations.■

Guatemala City, GUATEMALA

New Mayan Frieze

Archaeologists have found a new Mayan frieze decorated with images

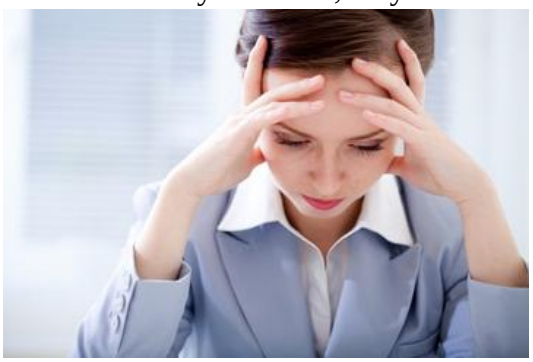
of deities and rulers and a long dedicatory inscription. The frieze was

discovered by Guatemalan archaeologist Francisco Estrada-Belli from Tulane University. The archaeologists were exploring a Mayan pyramid that dates to A.D. 600 in an area that is home to other classic ruin sites when they came upon the frieze. The frieze depicts the image of gods and godlike rulers and gives their names. ■

Ramat Gan, ISRAEL

Stressful Moms

Who is the weaker in our family? Moms or dads? Researchers said that it is moms. In the study, the authors found that contemplating family issues during the workday takes a greater toll on working mothers than fathers in the form of increased stress and negative emotions. The study was conducted by scientists from Bar-Ilan University in Israel, they used 500 Family consisting of 402 mothers and 291 fathers in dual-earner families. Since moms are the traditionally the ones who adjust their work schedule to meet family demands, they also feel

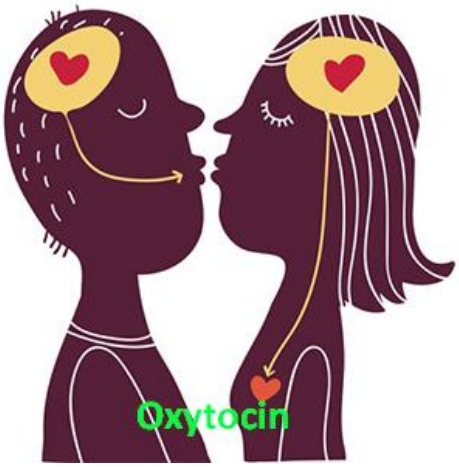


extra stress of how they're performing as an employee. The study suggested that fathers need to take a greater role in family care to make mental labor less stressful for working mothers and ease the double burden that they experience. Yes, we need care our family, care our moms. ■

Chicago, USA

Oxytocin: The Love Hormone

When you fall in love with someone, you start your journey that is driven by the love hormone – Oxytocin. New research finds that oxytocin could deepen emotional wounds. The hormone also plays a key role in triggering deep anxieties



and emotional conflict, leaving scars that can last for years. The study led by Jelena Radulovic of Northwestern University's Feinberg School of Medicine discovered that oxytocin strengthens the social anxieties we get from intense emotional pain. Previous studies have suggested that oxytocin can help diminish social fear, relieve stress, and make us more generous. Do you want to use oxytocin for more romantic and then deepen your lave hurt? ■

Frasquia, BOLIVIA

How Long Can We Live?

We ask ourselves and experts how long we can live, but who knows. What is the current life span of our human being? Is it associated with society and economy? A new report said that a native Aymara lives in a straw-roofed dirt-floor hut in an isolated hamlet almost near 123 years. He walks without a cane and doesn't wear glasses. It is a new record for the Guinness World Records because the oldest verified age was 122 years and 164 days: Jeanne Calment of France, who died in 1997. His wife died more than a decade ago. Of their three children only one is still alive. There are 40

grandchildren and 19 great-grandchildren. ■

SCIENCE INSIGHTS
ISSN: 2329-5856
www.bonoi.org

ANTHROPOLOGY

Social Monogamy in Primates

Although the origin of social monogamy in primates is best explained by long lactation periods caused by altriciality, making primate infants particularly vulnerable to infanticidal males, a new study led by Dr. Christopher Opie from University College London, United Kingdom, reported that biparental care shortens relative lactation length, thereby reducing infanticide risk and increasing reproductive rates. The authors used likelihood-based phylogenetic comparative methods in a Bayesian framework to examine the origin of social monogamy, testing for correlated evolution between mating systems and a key dichotomized marker trait for each hypothesis: paternal care, female ranging patterns, and male infanticide. Given previous disagreement about potential explanations for social monogamy, the researchers predicted that there would be evidence for correlated evolution between social monogamy and each of the putative markers; but their temporal discrete analyses identified the likely factors driving the switch to monogamy versus the responses following that switch. For discrete traits, they compared the fit of the dependent model of evolution between mating systems and these traits to a model in which the traits are constrained to evolve independently. In addition to correlated evolution, the researchers used ancestral-state reconstructions and model rate parameters to examine whether certain traits preceded monogamy and whether they tended to make the appearance of monogamy more likely. As concluded by the authors that their phylogenetic analyses support a key role for infanticide in the social evolution of primates, and potentially for us human beings. ■

PNAS 2013; 110(33):13328

HEALTH

The State of US Health

Did we make great progress in our health in the last decade? A new study released on August 14, 2013 in *The Journal of American Medical Association* by a combined study group including 61 institutes said that from 1990 to 2010, the US made substantial progress in improving health. Life expectancy at birth and healthy life expectancy increased, all-cause death rates at all ages decreased, and age-specific rates of years lived with disability remained stable. In this study, the researcher reported that morbidity and chronic disability now account for nearly half of the US health burden, and improvements in population health in the US have not kept pace with advances in population health in other wealthy nations. The United States as one of the world's major economies, the health reformation attracted much attention around the world. In their last statement, the researchers said that regular assessments of the local burden of disease and matching information on health expenditures for the same disease and injury categories could allow for a more direct assessment of how changes in health spending have affected or, indeed, not affected changes in the burden of disease and may provide insights into where the US health care system could most effectively invest its resources to obtain maximum benefits for the nation's population health. ■

JAMA 2013; 310(6):591

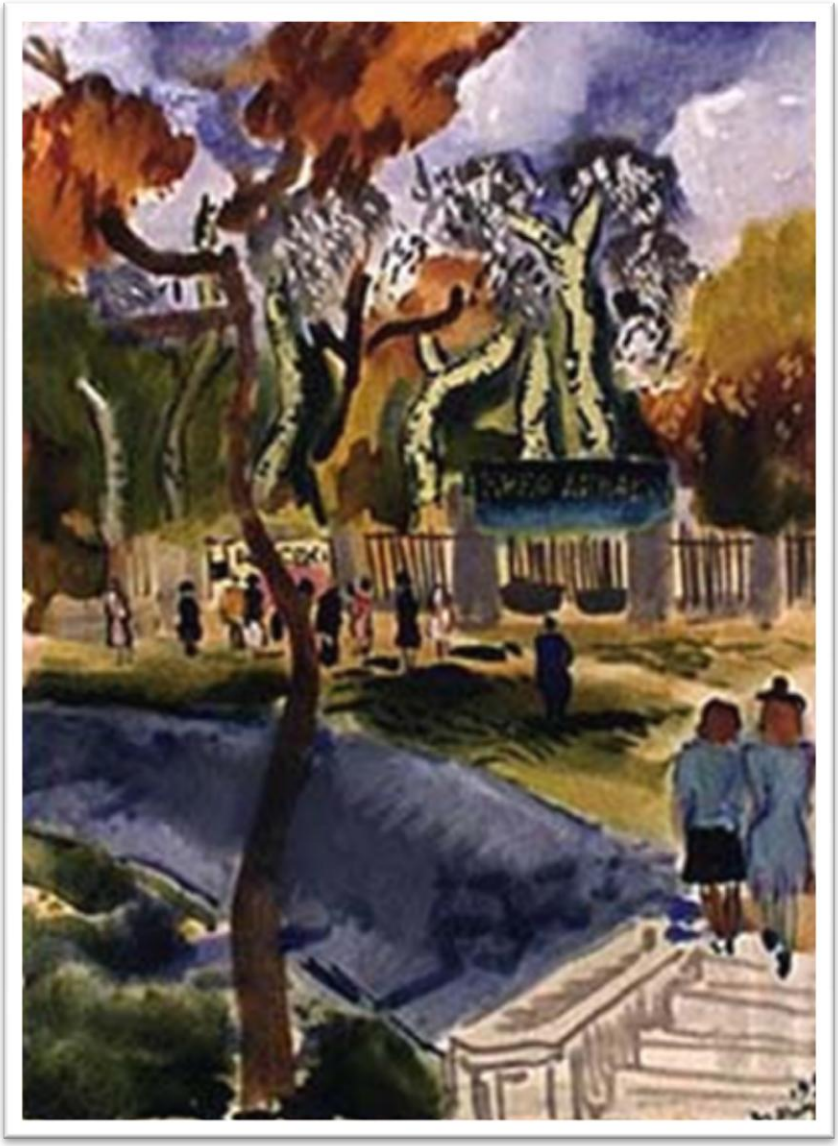
GENETICS

Female-Specific Hypertension Loci

Hypertension risk is defined by interaction of both environmental and genetic factors, and sex has historically been regarded as a covariate. Estrogen and the X chromosome are associated with lower blood pressure. A study headed by Dr. Carol Moreno from Medical College of Wisconsin reported that they identified a 614-kb region on rat chromosome 13 that contains 2 female-specific BP loci. Within these loci, the researchers identified 3 differentially expressed candidate genes (*Btg2*, *Fmod*, and *Prelp*) that are specific to female BP and offer potential therapeutic targets for treating female hypertension.so the authors prospectively declared that future studies should be done to test the functional roles of *Btg2*, *Fmod*, and *Prelp* in the kidney and potentially other tissues involved in the development of hypertension. ■

Hypertension 2013; 62:557

Moscow Landscape, 1938



By Tatyana Mavrina

Left part of the triptych, Watercolors, Gouache on paper, 35.9x25.9

SCIENCE INSIGHTS
ISSN: 2329-5856
www.bonoi.org

Granulocyte Therapy for Cancer

Wenying Wang * and Dong Wang † ‡ ∆

GRANULOCYTE THERAPY FOR CANCER is the first book ever published dealing with the origin and development of the Granulocyte Therapy for Cancer. Dr. Zheng Cui has been regarded as "the father of cancer resistance super-mice", made great contribution to the progress of Cancer Immunology and Immunotherapy. This book, based on his ten years' research, intends to present a comprehensive overview from the serendipity discovery of the cancer complete resistant/ spontaneous regression (CR/SR) mice to the relevant cancer target killing mechanism mediated by leukocytes, as well as how the innovative therapeutic approach, Leukocyte Infusion Therapy (LIFT) applicable to human cancer.

*: School of Foreign Languages, Yuxi Normal University, Yuxi 653100, P.R. China
†: Department of Biomaterials, College of Materials, Xiamen University, Xiamen 361005, P.R. China
‡: Department of Pathology -Tumor Biology, Wake Forest School of Medicine, Winston-Salem, NC 27157, USA
∆: Correspondence to: Dr Dong Wang , Tel: +1-513-442-6958, Fax: +1-336-716-7595
Email: dowang@wakehealth.edu
Received: July 15, 2013
In-House Reviewed: July 19, 2013
Accepted: July 22, 2013

SCIENCE INSIGHTS 2013; 2(2):43-4.

Keywords: Cancer – Granulocyte Therapy – Immunity – Mortality

IMMUNE SYSTEM is the most important defense system to protect the host from disease. Strong evidence showed that immune system also plays an important role in protecting against cancer. However, how the immune system works in defending and fighting against cancer and the underlying molecular mechanisms are still unknown.

Zheng Cui, M.D. Ph.D., is a biochemist and oncologist currently serving as an Associate Professor of Pathology (Tumor Biology) at Wake Forest University in Winston-Salem, USA. Based on several years' research on cancer resistance or CR/SR "super-mice" family and clinical trials, Dr. Cui has proposed a unique and still controversial idea that certain individuals naturally produce a special kind of granulocyte that contains an inherent resistance or super killing activity to cancer. These granulocytes could potentially be extracted from donors and given to cancer victims to fight against cancer. This novel experimental therapy, named Leukocyte Infusion Therapy (LIFT), has been approved by FDA to practice the phase I and phase II clinical study.■

Granulocyte Therapy for Cancer, which originated in a serendipity discovery of a cancer complete resistant/ spontaneous regression (CR/SR) "super-mouse", presents a comprehensive description of the ten-year research about the cancer killing mechanism in the "super-mice" family and the following clinical tests of the Leukocyte Infusion Therapy (LIFT) approach. The book contains eleven chapters that are sequentially organized into five topics including the overview of etiology, cytology and development of cancer treatment, historic perspective of cancer immune surveillance, the discovery and following research of the CR/SR "super-mice" family, bacterial infection and cancer regression and the LIFT clinical test on patient.

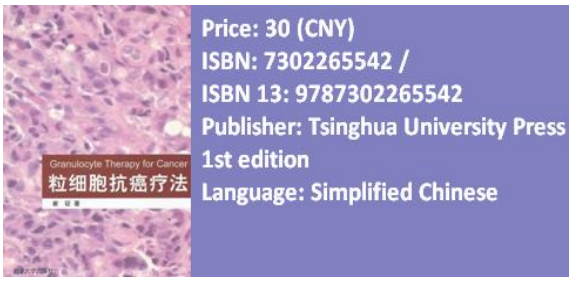
The book starts with an overview on cancer and the current methods of anticancer treatment. The author put emphasis on the causes of death from malignant tumor and liquid cancer, and different opinions on some controversial issues in cancer research field, such as the tumor stem cell, the treatment of cancer by inducing apoptosis etc were presented. Eight characteristics of cancer cells are concentrated on at the end of the chapter: extremely unstable genome, easier for the glucose uptake, greater ability to tolerate hypoxia and the anaerobic glycolysis, larger amount of lactic acid metabolite, a large number of negatively charges on cell surface, failure of or damaged function of mitochondria, dysfunction of fat metabolism, a big increase in the amount of protein degradation enzyme and RNA-degrading enzymes. From these, readers can reach the author's unique perspective on the current status of cancer research.

In the chapter 2, a brief historical overview and some typical events like the exploration of the relationship between the immune system and cancerous disease were presented. From the well-known "Coley's toxins" (the primary immunotherapy approach for cancer) to the hypothesis of "cancer surveillance" and to"cancer immune surveillance" (proposed by Paul Ehrlich and Sir MacFarlane Burnet - 1908 and 1960 Nobel Prize laureates in Physiology or Medicine, respectively), the author pointed out

that the experimental and clinical evidence supported the potential effect of immune system, particularly the lymphocytes, on the cancer immune surveillance, however, the possible contribution from other leukocyte populations was ignored. Meanwhile, the author also gave a concise description about the fundamental difference between the innate immunity and adaptive immunity. At the end of this part, the author proposed that the poor curative effect of the current clinical immunotherapy for cancer by stimulating the activities of T and B lymphocytes and natural killer cells may result from an irreversible damage of the immune function in cancer patients. Finally, the chapter was concluded with two questions: 1) Is there a cancer specific immune surveillance system in healthy body, while this system no longer exists or be damaged in cancer patients? 2) What is the exact immune component serving this cancer specific surveillance system?

Chapter 3 discussed the serendipity discovery of the SR/CR "super mouse", which was the only survivor of a study in which mice were given injections of S180 cancer cells. Since then, thousands of mice have been bred from the original SR/CR mouse and approximately 30 percent of the offspring inherited the cancer SR/CR trait, in an autosomal manner. The author gave a detailed description about the confirmed anti-cancer mechanism from which it showed that the cancer resistance in SR/CR mice was mediated by the special immune system, exactly like the innate immune system with neutrophils, macrophages, and natural killer cells. The results supporting the innate immunity in cancer resistance were provided in detail, and three phases: infiltration, tight contact and tumor destruction were also explained. Moreover, you can find accompanying figures helping you conveying these concepts. In the chapters 4 and 5, in order to normalize cancer resistance ability, an *in vitro* assay of Cancer Killing Activity (CKA) has been developed and introduced. The author described the CKA assay in SR/CR mouse phenotype test, and then in human granulocyte assay. At last, the prospect of transfusing "super strength" cancer-killing granulocyte from donors to boost the cancer-killing ability of patient was discussed.

The chapter 6 entitled "Effect mechanisms of granulocyte and targeting" and the chapter 7 entitled "Cancer cells are the target of activated granulocyte" highlighted the mechanism of granulocyte activation



Price: 30 (CNY)
ISBN: 7302265542 /
ISBN 13: 9787302265542
Publisher: Tsinghua University Press
1st edition
Language: Simplified Chinese

in anti-bacterial infection which carried out mainly by the human neutrophil peptides (HNP) and the unique surface charge property of cancer cells, from which cancerous cells become the target of the activated granulocytes.

The last part (chapters 8, 9 and 10) provided the prospect of clinical application of Leukocyte Infusion Therapy (LIFT) for cancer. The author firstly proposed a hypothesis, as same as the cancer resistant mice, that some cancer resistant human exist, and they had "super strength" cancer-killing leukocyte during their entire lives. Then, the author gave a sketch about the development and current situation of traditional adoptive immunotherapy for cancer including lymphokine-activated killer cell (LAK) therapy, tumor infiltrating lymphocytes (TIL) therapy and cytokine-induced killers (CIK) therapy. At the end, the LIFT means, which has been approved by FDA to implement the phase I and phase II clinical trials, was highlighted and briefly introduced as follow: volunteers who will be selected as donors based on the observed potential CKA of their granulocytes will complete the leukapheresis blood donation to collect their "super strength" granulocytes. The cancer patients then will receive the granulocytes through a transfusion. This was considered as a truly innovative therapeutic approach possessing fundamental difference with the existing immunotherapy. In further, problems of this therapy were also provided, such as 1) how to collect and reserve sufficient "super strength" cancer-killing granulocytes? 2) whether patients can tolerate the transfused granulocytes? 3) which types of cancer would be more suitable for this treatment? These are the questions need to be answered, and also they are future directions for research

In sum, it has been more than ten years since the discovery of the SR/CR "super mouse", and many significant advances have been made, particularly with regard to the ongoing clinical trials of the Leukocyte Infusion Therapy which originated from this "super mouse". Therefore, the current book is necessary for a very diverse audience. The whole book is written succinct meaningful for being appeal to professionals and non-professionals. This is the first book of its kind and is a must-to-be-read for professionals, researchers, clinicians and students who are interested in the field of cancer immunology and specific granulocyte immune therapy.■

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