

Outlook

Naval Medical Research and Development Command



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Naval Medical Research
and Development Command
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CHANGE OF COMMAND AND RETIREMENT

Captain Edward T. Flynn, Jr., MC, relieved Captain James N. Woody, MC, as Commanding Officer of the Naval Medical Research and Development Command on June 6, 1991. The Change of Command was held in conjunction with Captain Woody's retirement in front of the Tower aboard the National Naval Medical Center, Bethesda, MD. Captain Woody was Commanding Officer of NMRDC since 1988. Captain Flynn, the sixth Commanding Officer of NMRDC, leaves his position as Chair of Science at the Naval Medical Research Institute (NMRI), Bethesda, MD, to assume command.

NMRDC INVESTIGATORS WIN THE NAVY'S TOP INDEPENDENT RESEARCH AWARD

NMRDC investigators made history this year by winning the "Best FY90 Independent Research Paper Award" at OCNR's Annual Independent Research/Independent Exploratory Development (IR/IED) Symposium. LT Steven Ahlers, Dr. John Thomas, and Ms. Donna Berkey of the Naval Medical Research Institute (NMRI) received the award for their manuscript "Hippocampal and body temperature changes in rats during delayed matching-to-sample performance in a cold environment" (Their IR study deals with the neurophysiological and neurochemical bases of loss of short-term memory due to cold exposure).

This is a very prestigious award; only one paper can be nominated by each of the eleven Navy laboratories participating in the IR program. The laboratories make preliminary selections from approximately three hundred IR studies conducted each year. For final selection of the "Best" IR paper, ONR conducts an intensive and extremely competitive scientific peer review of the laboratories' "Best" paper candidates.

The award was presented to LT Ahlers by Dr. Fred Saalfeld, the Director of the Office of Naval Research, who praised the work for its state-of-the-art approach to a genuine problem faced by Navy personnel during cold weather operations. Along with the award, the three co-authors received a check for \$5,000 (to share) and NMRDC was pledged a \$50,000 plus-up to its FY92 IR program funding. Additionally, NMRDC and NMRI received plaques commemorating the exceptional achievement of these three outstanding Navy scientists.

ONR's recognition of LT Ahlers and his co-workers' outstanding work is particularly noteworthy, since this research project was the first IR selected by NMRDC under the new competitive IR process that began in FY90. We all share in "the joy of victory" and offer our most sincere congratulations to LT Ahlers, Dr. Thomas, Ms. Berkey, and NMRI for their truly outstanding success.

INSIDE THIS ISSUE:

● VIEW FROM THE TOWER

- RESEARCH NOTEBOOKS
- FIRST CRDA CHECK
- CAPT MEL'S FAREWELL
- NFL ACHIEVEMENTS

- MALARIA STUDY
- IR/IED AWARD
- STRATEGIC PLAN
- RESEARCH HIGHLIGHTS

NAVY MEDICAL RESEARCHER TO BE ASSIGNED TO MALARIA STUDY IN KENYA

The Naval Medical Research Institute (NMRI) has initiated an agreement with the Walter Reed Army Institute of Research to assign a Navy medical research officer to work on malaria at the Army's research facility in Nairobi, Kenya.

NMRDC recently completed the administrative procedures to place a Navy billet in Nairobi, and expects that all arrangements will be finished in time for an officer to be on site in August, 1991.

LCDR Walter Weiss, MC, USN, who is currently working in the NMRI malaria vaccine program, has been selected as the officer to fill this new position. LCDR Weiss' responsibilities will be to establish a program to examine the molecular basis of the mechanism of acquired immunity to *Plasmodium falciparum* malaria.

Included in this effort will be the evaluation of a remarkable population of Kenyans who are resistant to malaria. This is the first group found anywhere in the world that appears to be naturally protected against malaria, and their resistance may be of utmost importance in understanding malarial immunity.

ACHIEVEMENTS OF THE NAVY FORWARD LABORATORY

In response to Operation Desert Shield, NMRDC and several of our laboratories quickly initiated efforts to establish a Navy Forward Lab (NFL) to provide unique laboratory services to complement the medical capabilities within theater. In September, 1990, infectious disease specialists from NMRDC, NMRI and NAMRU-3 deployed with the First Marine Expeditionary Force to Al Jubayl, Saudia Arabia. The laboratory, established in an abandoned Saudi hospital near the Kuwaiti border, allowed the researchers to track diseases disabling the front-line troops.

Achievements of the Navy Forward Laboratory

- Served as the only theater capability to detect epidemic diarrheal agents.
- Prevented a major diarrhea outbreak, saving 10-20% of the Navy and Marine Corps fighting force by prompt initiation of effective preventive measures and use of special antibiotics.
- Served as the only theater capability to diagnose region-specific tropical diseases and identify viral disease outbreaks.
- Employed an entire series of "state-of-the-art biotechnology" biological warfare (BW) detection systems. These systems were developed by NMRI with significant contributions from the U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID), Ft. Detrick, MD; and the chemical defense establishment at Porton Down, U.K.
- Was first to identify problems with fielded medical BW diagnostic systems (30-40% false positives). The systems were withdrawn by the U.S. Central Command (USCENTCOM). NFL provided theater reference backup for medical BW diagnostics.
- Was first to identify problems with environmental sample BW detection kits. NFL, with assistance from USAMRIID and the Chemical Research, Development and Engineering Center, Edgewood, MD, developed a "work-around" and the system was up by February 20, 1991.

FIRST CHECK RECEIVED UNDER A CRDA

In May, 1991, NMRDC received the first check representing "royalties" paid by PHARMINGEN resulting from the commercialization of the DS1 cell line developed by Dr. Donna G. Sieckmann of the Infectious Disease Threat Assessment Program of the Naval Medical Research Institute (NMRI), Bethesda MD. As the first Cooperative Research and Development Agreement (CRDA) authorized to the Command in July 1990, the cell line was transferred to PHARMINGEN, a

California-based corporation that provides biological test materials and monoclonal antibody tests to the public. The cell line produces monoclonal antibodies against mouse IgM^a, producing a key reagent for immunoglobulin test kits.

In the DON, only the Chief of Naval Research can authorize the signing for the Navy of a CRDA (SECNAVINST 6770.16 issued 27 October 1989). At NMRDC and the subordinate commands, Counsel David Spevack, helps with the

preparation of a CRDA and then guides it through the review process. Under a CRDA the laboratory "... may accept, retain, and use funds, personnel, services, and property from collaborating parties and provide personnel, services, and property to collaborating parties" (15 U.S.C. 3710a (b)(1)). The laboratory can also negotiate and agree in advance to the disposition of patent rights and royalties.

For more information on CRDA, contact NMRDC Code 00L (301)295-6759.

VIEW FROM THE TOWER

by CAPT E.T. FLYNN

"How do you relieve a legend?" These were the words spoken by VADM Donald Hagen last week as he relieved VADM James Zimble as the Surgeon General of the Navy. In many ways I felt the same way on June 6, when I relieved Jim Woody to become the sixth Commanding Officer of NMRDC.

Jim was tireless in his efforts to promote Navy Medical Research. Through "saturation" briefings he made the Naval Medical Research and Development Command a household word in the Pentagon. During his tenure, he increased the research funding base by more than 30%, an astounding figure in this era of budget contraction. And when it came time to fight a war, NMRDC showed its true mettle, deploying state-of-the-art infectious disease diagnostic capability to the theater in the Navy Forward Lab, performing studies on surface combatant ships, and doing many "quick-hit" physiologic studies in the laboratories to enhance combat performance on land and under the water. We all owe Jim Woody a big "thank you" for his superb leadership.

I was especially pleased to be in attendance at the Navy Independent Research, Independent Exploratory Development Symposium on June 19, when it was announced that the paper presented by LT Steve Ahlers, Dr. John Thomas, and Ms. Donna Berkey of NMRI was selected as the best Independent Re-

search Paper of FY90. This selection was especially gratifying because NMRDC receives only 4% of the IR money Navy-wide and was in competition with all of the big Navy warfare labs. Congratulations to the authors and to NMRI for a superb job.

Within the next few months I hope to unveil the NMRDC Strategic Plan. The plan will be our blueprint for operations in the years ahead. The plan, which is now in the final stages, represents the hard work of a special advisory group chaired by CAPT Bob Walter of NSMRL. I will have a lot more to say about the plan in the next issue of OUTLOOK.

One of my goals as Commanding Officer is to improve communications between headquarters and the laboratories and among the laboratories themselves. One forum for such communication is OUTLOOK. I encourage you to submit news articles about your activities, research summaries of work you consider important and want to disseminate, and letters to the editor about issues or areas of concern.

Any suggestions for improvement of the newsletter itself would also be appreciated. Articles, letters, and inquiries may be sent to Code 09D, NMRDC, NNMC, Bethesda, MD 20889-5044.

NEW RESEARCH PROJECT ON SPATIAL ORIENTATION WILL BEGIN AT NAMRL IN FY93

On March 6-7, 1991, NMRDC held a competitive scientific review of seven research proposals submitted as candidate Accelerated Research Initiatives (ARI) for the FY93 6.1N program.

A panel of scientific experts and Navy requirements/transition consultants were tasked with the job of selecting one proposal for funding, based on their reviews of the written proposals and their interaction with the principal investigator of each research proposal in a 50-minute briefing/QA session. The competition was very stiff and it was unfortunate that NMRDC's projected FY93 budget allowed funding for only one research proposal.

Congratulations to the winners, Dr. Fred Guedry and LCDR Angus Rupert, Naval Aerospace Medical Research Laboratory (NAMRL), who were awarded approximately \$2.4M for their 5-year proposal, "Psychophysical and Neurophysiological Approaches to the Dynamics of Spatial Orientation".

The other investigators who developed and presented excellent research efforts were: CDR Lyn Yaffe (BUMED), CDR Steve Hoffman (NMRI), Dr. Florence Rollwagen (NMRI), Dr. Scott Makeig (NHRC), Dr. Art Messier (NSMRL), and Dr. James Whinnery (Naval Air Development Center). Congratulations to you all for your outstanding efforts.

IMPORTANT NOTE: Investigators who wish to submit an ARI for FY94 should remember that ARI preproposals are due 1 Oct 1991 and ARI full proposals are due 1 Jan 1992. Due to the complexities of conducting the external review/selection of proposals and to the schedule imposed by ONR for reporting results, documents received after these deadlines will not be considered in the selection process.

FAREWELL TO THE R&D COMMUNITY

by CAPT A.J. Melaragno, MC, USN

As I return to the clinical side of Navy medicine, I would like to take a little time to reflect on the tremendous opportunities that the Navy medical department has afforded me for the past 13 years.

I've worked with talented, dedicated support personnel, in first class labs with state of the art equipment and with sufficient supplies to get the job done. More importantly, I've served with some of the greatest people in Navy medical research history; Dr. Bob Valeri who taught me tenacity, and that you should never become complacent with your research but must continue to explore new ideas and challenge the old ones; Jim Woody who instilled in me vision and enthusiasm; CAPT Ray Sphar who showed me how to be in charge and still be a gentleman; and Bob Gaugler who taught me how to work and give tirelessly and never ask for anything in return.

I have met Congressman and their staffs; briefed high-level people all over the Pentagon; and traveled all over the world. I've managed money and people and worked on as many exciting things as possible, and for the last four years I have overseen all of the Navy's medical research programs. Where else could anyone have opportunities like that?

I was given the most outstanding staff possible to accomplish a job that required many more people than we had. Each and everyone of my staff gave 150 percent every day even though they knew they were not going to get anything in return. I could write paragraphs on each one and how they have saved "this million" or "got this program started" or "answered this last minute fire drill". They've all done it, and I deeply appreciate each one of them.

I want to extend special thanks to Chris Eisemann because I couldn't have survived the past four years without her. Even though her exceptional talents are unrecognized and

are underappreciated by the labs, Chris is the real MVP of R&D because she is exceptionally valued by our sponsors and she always gets the job done. *Thank you Chris!*

By now you are asking, if it's so great why is he leaving? I'm leaving because I'm frustrated, tired, and to some degree angry. I'm frustrated because four years ago we set out to improve our image through escalated marketing. Our market strategy was focused on product improvement and delivery, and stressed meeting the needs of the Navy and Marine Corps. We initiated more vigorous peer reviews and competition, and attempted to enhance the quality of our research proposals at the behest of our sponsors and the external scientists that reviewed our programs.

We tried to open up the line of communication by asking for interim reports and using the information in the reports for accelerated public affairs initiatives. I'm frustrated because each of these enterprises was met with resistance and at times circumvention. I'm tired because each of these battles takes a little out of you and the daily "fire drills" emanating from Congress and sponsors began to look too familiar after a while. I'm angry because at times I feel decisions are made more for personal agendas rather than the good of the organization as a whole. Although important to me, these are just minor issues.

More importantly, I'm leaving because I'm not ready to abandon my skills as a hematologist and I feel that I still have something to contribute to the clinical side of Navy medicine.

Looking back, my greatest satisfaction has been seeing products of research projects that I worked on being deployed to the Persian Gulf. It was even more gratifying that none of them had to be used. Also, I've been impressed in the Navy that if you are willing to work *really hard* at

DATES TO REMEMBER

July 1991

11 July - NHRC change of Command

August 1991

9 Aug - NAMRL change of Command

September 1991

17 - 20 Sept - COs' Strategic Planning Retreat

October 1991

1 Oct - Five-Year Plans due

1 Oct - Accelerated Research Initiative(ARI)/Program Enhancement preproposals due

2 Oct - "Completion" and "Termination" DD1498s due

9 Oct - Third Interim Reports due

January 1992

1 Jan - ARI full proposals due

something, you have a good chance of accomplishing it. I want to openly thank all those in the Navy who gave me these opportunities. I'll be thinking of you all frequently.

The next time you're having a bad day, contemplate CAPT Mel at a hospital with a zero travel budget, no desktop computers, more patients than one could ever hope to see, and next on the list for deployment to Okinawa, and maybe you'll feel better.

Best of luck to all of you and I hope to see you in San Diego.

U.S. PATENT LAW AND RESEARCH NOTEBOOKS AS A PERMANENT RECORD

The research notebook is a permanent record and a chronology of development work establishing the scientific integrity of an individual or group at a research facility. This work can range from the first block diagrams for a computer program to a detailed, almost cookbook-like arrangement for a complicated chemical experiment.

The research notebook is a self-contained reference to all the work done and includes references to other documents corroborating dates of particular events.

The term notebook should be considered a generic term for all records of work on an RDT&E project.

OCNRINST 5210.2 of 19 February 1987 lists the reasons and rules for keeping a notebook. According to the OCNR instructions the basic reasons for keeping a notebook are "... to inform others, to evaluate accomplishments, to ensure recognition of successful investigators, and to defend the Government's right in the event of patent litigation."

The OCNR instruction lists other information required to be kept as permanent records, including computer software and programs, statistical data, administrative records etc. This information is necessary to prove an individual or group performed certain research efforts at a particular time.

What constitutes a good notebook?

- 1) The notebook must be dated and identify the person making the entry.
- 2) The notebook must be witnessed by someone who can corroborate the work recorded. Just having the notebook witnessed is not sufficient. In the case of *Hahn V. Wong*, 13 USPQ2d 1313 (Fed. Cir. 1989) the court rejected the research notebook because the work was not corroborated by the witness who signed the book. The court required the witness to corroborate that work actually occurred at the stated time.

- 3) Most importantly, the notebook must be complete enough that a reader five years later could understand what was done, how it was done, and to what the action applied. When the notebook describes material in another record, detailed cross references are required.

The United States awards a patent to the first inventor. An inventor's own unsupported statement cannot establish an invention date. Courts have recognized that an inventor's dated notebook will provide corroboration for an inventor's testimony.

The 1986 case of *Hybritech, Inc. v. Monoclonal Antibodies*, 802 F.2d 1367 (Fed. Cir. 1986), became a contest of proofs based on research notebooks. The Federal Circuit applied "a rule of reason" and accepted research notebooks as corroboration of dates of invention. In the *Hybritech* case, it was the research notebook that saved the company from losing a valuable patent.

The need for proof of what was done and when it was done is not limited to patent matters. Recently, scientific ethics investigators have resorted to laboratory notebooks to resolve disputes between scientists over whether work supports conclusions or who actually did the work. Notebooks are also used as proof that sufficient research is being done to support a program goal.

For more information on research notebooks and patent law, contact NMRDC Code 00L.

NMRDC REPRESENTED AT THE WASHINGTON DC NATIONAL VICTORY CELEBRATION

The Naval Medical Research and Development Command was invited to participate in the National Victory Celebration. The research efforts of NMRDC were represented on the Federal Mall near the Smithsonian buildings in Washington, DC, during the gala celebration for the troops who participated in Desert Shield/Storm. 200,000 people turned out to cheer the parade and view the exhibits of military hardware and support operations.

During the weekend celebration of June 8-9, 1991, the Navy Frozen Blood Program was demonstrated in an exhibit by the Naval Blood Research Laboratory, Boston University School of Medicine. Ms. Marilyn Leavy and Mr. Alan Gray, from the research laboratory, explained the program and answered questions about the frozen blood technology currently in the Fleet, which played a vital role in Operation Desert Shield/Storm.

There was a tremendous amount of interest by the general public with a variety of questions ranging from how to donate blood to how long frozen red blood cells can be stored and whether the frozen red cells were used during the conflict.

Another exhibit by the explosive ordinance diving community illustrated previous research performed by the Naval Medical Research Institute (NMRI). As part of the exhibit, Navy divers wearing conventional SCUBA gear and recirculation breathing gear "dove" in a large demonstration tank. A popular exhibit on the Mall, divers answered questions and provided information based on research by NMRI's Diving Medicine Department.

NMRDC's TOP INDEPENDENT RESEARCH STUDIES PRESENTED AT THE IR/IED SYMPOSIUM

On June 19, 1991, the fourth Annual Navy Independent Research/Independent Exploratory Development (IR/IED) Symposium was held at the Johns Hopkins University's Applied Physics Laboratory, Columbia, MD. Scientists from the ten warfare laboratories and NMRDC presented talks and posters on their FY90 IR studies, on topics ranging from signal processing, acoustics, and hydrodynamics to biomedicine.

Representing the NMRDC IR program, LT Steve Ahlers, Naval Medical Research Institute (NMRI), presented a paper describing the results of his IR project, "Cold-Induced Amnesia". LT Ahlers did an excellent job explaining the rationale and approaches of his research and stimulated a very enthusiastic, interactive discussion with the audience

of Navy scientists, engineers, and research managers. LT Ahlers' paper was co-authored by Dr. John Thomas and Ms. Donna Berkey and won this year's top honors for the "Best FY90 Independent Research Paper Award" of ONR's FY90 IR program (see "Award", pg. 1).

Three posters describing two outstanding FY90 IR projects and a very important IR transition to Navy medicine also were presented at the Symposium. Dr. Florence Rollwagen, NMRI, displayed a poster describing her unique *in vivo* model for assessing the local action of cytokines at the infection- or wound- site (co-authored by Shahida Baqar and Nancy Pacheco).

A poster shown by Dr. Lex Merrill, Naval Health Research Center,

presented a study on the potential use of event-related potentials to evaluate the cognitive abilities of recovering alcoholics (co-authored by the IR's principal investigator, LCDR Dave Kobus, and Jennifer Rogale).

Finally, a very timely poster on the deployment of polymerase chain reaction (PCR) technology to the Navy Forward Lab during Operation Desert Storm was presented by CDR Bill Nelson, NMRI, (co-authored by HM1 William Wojnar). This technology was first introduced at NMRI through an IR conducted by CDR Nelson during FY89.

To all our participants, sincere thanks and congratulations for representing NMRDC so well in this highly visible, Navy-wide research forum.

SCIENTISTS-AT-SEA PROGRAM

Scientists-at-Sea is a program designed to provide an opportunity for civilians to experience *the real Navy* by accompanying a Navy ship on a short deployment to sea. Although named Scientists-at-Sea, the program accepts any laboratory employee, male or female, including scientists, engineers, administrative personnel, and others recommended by the Command.

This program presents a unique op-

portunity to strengthen, on a one-on-one basis, the ties between the people in the labs and the true customers of our technology programs. Although this program is for civilian employees, it is possible to have this policy waived if there is a high level of interest on the part of medical R&D military personnel.

NMRDC was allocated six reservations for "ship rides" available from July 1991 - September 1991. "Ship

rides" usually last for 2-5 days on a cruiser, destroyer, or amphibious ship (aircraft carriers and submarines are not included). Larger ships accommodate 10 to 12 program participants; smaller ships may accommodate 1 or 2 participants. The ships are usually docked at Norfolk, VA, or another Navy base on the East Coast.

For more information on the Scientists-at-Sea program contact,
NMRDC Code 04A.

NMRDC AND THE NATIONAL MARROW DONOR REGISTRY

Bone marrow transplantation is a successful method of treating bone marrow suppression caused by disease, radiation, or chemical injury. Being actively engaged in bone marrow transplantation research, NMRDC was tasked by Congress to initiate research addressing tissue typing for patients without related donors and to recruit volunteers from the DoD community to be HLA (human leukocyte antigens) typed

and included in the National Marrow Donor Registry (NMDR). Congress appropriated \$21 million dollars to the Navy for supplemental funding of the NMDR and to initiate the DoD recruitment and typing activities.

NMRDC scientists at the Naval Medical Research Institute, Bethesda, MD, will expand existing HLA typing facilities and type 14,000 DoD donors annually; develop automated procedures for HLA typing and

matching; develop technology for clinical HLA typing by DNA methodology; identify antigens responsible for graft-versus-host disease; and automate virological screening procedures.

CAPT Robert Hartzman, MC, USN, is managing the Navy program. For information on the registry or becoming a volunteer, contact him at (301) 295-1847 or AV 295-1847.

STRATEGIC PLANNING UPDATE

On April 15-18, 1991, Captain James Woody, then CO, NMRDC, met with the laboratories' COs, OICs and Scientific Directors, NMRDC Research Area Managers and the Strategic Planning Advisory Group at the first COs' Strategic Planning Retreat held in Baltimore, MD.

The purpose of the retreat, to deliberate and gain consensus on the recommendations of the Advisory Group and to establish concrete actions to move toward the agreed-upon objectives, was accomplished with a notable amount of cooperation and corporate thinking on the part of all participants.

NMRDC's long range goals have been organized under four major categories. These categories include:

- 1) Developing and executing a powerful, robust marketing strategy.
- 2) Building and maintaining a well respected, high quality research capability that meets Navy and Marine Corps needs.
- 3) Establishing a corporate structure that maximized productivity and efficiency.
- 4) Creating a corporate environment that is characterized by

open participation and cooperative communications and decision making.

For all four goals, concrete actions have been identified and are now being taken. Briefly, these current efforts include:

- Interaction with high level Navy officials to understand better the factors effecting their investment strategies and funds allocations.
- Creation of a matrix of medical research thrusts as a function of Navy sponsor/user needs.
- Establishment of three corporate planning meetings per year for laboratory and headquarters leadership (the next one is scheduled for September 17-20, 1991).
- Development of a one to two day science meeting for investigators.
- Identifying and cost-analyzing the best corporate structure for NMRDC, considering projected available resources.

- Securing a civilian Technical Director and a Strategic Planner.
- Strengthening the relationship among NMRDC Research Area Managers and laboratory personnel.

Issues falling under the umbrella of strategic planning are numerous and complex, many requiring time-consuming, in-depth assessments of alternatives and cautious, incremental movement in the direction of change. However, other aspects for enhancing our R&D system can be addressed more readily by taking immediate action. Demonstrated progress on the latter issues helps us maintain momentum and confidence that our efforts in strategic planning are truly meaningful and not merely exercises that will have no strength in implementation.

While we proceed through these efforts, our number one criteria for deciding each strategic planning issue will be that it heightens the quality of science that NMRDC can conduct in support of Navy operational forces.

NOTES FROM THE INTELLECTUAL PROPERTY COUNSEL

MICROBIOLOGICAL SAMPLE EXPORT/IMPORT LICENSES

There are export laws which control the export of technology. A biological sample such as a cell line, a plasmid, a virus, etc., is considered technology. A license is needed to export biological samples to all countries in the world except Canada.

If a biological material to be imported is a disease material, clearance is needed from the Center for Disease Control (CDC) and a CDC license is required.

A REMINDER

A cell line developed at Government expense is Government property and can only be given away with the authorization of a proper authority under certain conditions. The transfer should always take place under an agreement to avoid problems such as ownership of the cell lines, liability of contaminated cell lines, etc. Counsel can assist in preparing the right agreement to cover the situation.

SEARCH OF PATENT LITERATURE

The preparation of a good protocol for a new research project requires a complete search of both the scientific and patent literature. Counsel will assist in a computer search of the patent literature from 1975 to date.

For more information on these items contact A.D. Spevack, Intellectual Property Counsel, NMRDC Code OOL, (301)295-6759

HIGHLIGHTS OF NMRDC RESEARCH

Computer Assisted Medical Diagnostics and Information

For several years, NMRDC has worked with various Naval laboratories and operational activities to expand the concepts and capabilities of the Computer Assisted Medical Diagnostics, Patient Management, and Medical Information System. The Naval Submarine Medical Research Laboratory in Groton, CT; the Naval Health Research Center, San Diego, CA and several contractors have produced the initial configurations and components of a multimedia-based computer and medical system. The multimedia capabilities will enhance information presentation and availability by providing a user-friendly interface utilizing real photographic images, video displays, and CD-ROM inputs. The system will provide independent duty hospital corpsmen with differential diagnostic consultations and recommendations based on available patient history, signs, symptoms and laboratory values. It will include several diagnostic modules based on expert systems and neural networks interfaced together, a broad medical and Naval manual/instruction library; office management and inventory routines; medical mission planning exercises; the Naval Health Sciences Education and Training Command's CAMIS education tool; and other advanced research computer concepts and applications. The overall system is being configured in the research and development phase to operate on an advanced 386/486 33 Mhz portable PC with a high resolution monitor, a large capacity hard drive, and CD-ROM laser disc players. Aspects of the system will be available through the Navy-wide SAMMS medical record system as components become validated.

Endotoxin-Binding Proteins Reduce the Toxicity of Endotoxin

Gram-negative sepsis remains a serious clinical problem with a high mortality rate in combat casualties and peacetime health care. Endotoxin, a cell wall component of Gram-negative bacteria, is released during generalized infection, causing reduced blood vessel contractility, low blood pressure, and shock. It has been suggested that endotoxin-binding proteins (EBP), like antibodies, can neutralize the toxic effects of endotoxin. Horseshoe crabs and similar primitive species have endotoxin-neutralizing materials as constituents of their plasma. Researchers in the Septic Shock Research Program at the Naval Medical Research Institute, Bethesda, MD and Navy-sponsored scientists at the Associates of Cape Code, Woods Hole, MA are evaluating the ability of purified and recombinant forms of EBP to reduce the harmful effects of endotoxin. The results of both *in vitro* and *in vivo* studies demonstrate

that EBP complexes with endotoxin and the resulting mixture greatly reduces endotoxin's toxicity. Further, the recombinant form of EBP appears to have improved properties over the naturally occurring material.

NMRI/TD Supports Operation Desert Storm

Early this year, in response to inquiries from the Navy and Marine Corps the Naval Medical Research Institute Toxicology Detachment (NMRI/TD) at Wright-Patterson, AFB, OH, and the Navy Environmental Health Center, Norfolk, VA, organized a workshop highlighting the hazards of major military operations in and around crude oil and oil refineries. Individuals who had participated in oil spill clean up operations and oil industry experts from API, BP Oil, Exxon, Mobil Oil and Texaco with experience in oil fields and oil refinery operations in the Middle East attended the workshop. The group developed recommendations for the international Armed Forces based on their collective toxicological knowledge, occupational medicine and hazardous operations experience and environmental aging data. A report was published describing the nature of the oil production and processing hazards in the Persian Gulf region and provided information on toxicological effects, specific hazards, hazard prevention and alleviation as well as recommendations concerning the effects of oil contamination on patient care and on the disease and nonbattle injury load on the casualty care system. The report specifically addressed issues on maintaining ship-board potable water while sailing in oil-contaminated waters.

Surfactant Replacement in Patients With ARDS

Sepsis, particularly from an abdominal source is the predominant risk factor for adult respiratory distress syndrome (ARDS), a lung disorder that causes increasing difficulty in breathing and results in a life-threatening deficiency of oxygen in the blood. Other predisposing factors include major trauma, massive aspiration of gastric contents and drug overdoses (heroin, methadone, and barbiturates). Navy-funded researchers at the Scripps Clinic and Research Foundation, La Jolla, CA, are investigating the effect of pulmonary surfactant replacement using a newly developed synthetic surfactant (surfactant keeps the alveoli in the lungs open). The research team has successfully sequenced the human lung surfactant molecule and developed an synthetic surfactant that reverses respiratory distress in animal models. Initial human trials appear promising. This unique therapeutic approach for the prevention of ARDS will reduce the very high mortality (60-90%) for respiratory distress that occurs in adults and premature infants.