

Annual Report
July 2004 - June 2005

**A Synopsis of Activities Pertaining To The
Center For Drug Design & Development (CD3)**

Submitted by
Paul W. Erhardt

People

The following individuals are employed by the CD3. All are supported from extramural grant/contract funding (see next section) except for the Director who is a tenured Professor in the Medicinal and Biological Chemistry (MBC) Department. While the CD3 operates as a close-knit research team, certain administrative tasks are largely undertaken by the individuals listed within the first block of names.

- Dr. Paul Erhardt, Professor MBC (Director)
- Mrs. Pam Hennen, Secretary (Administrative Assistant at 50 % time)
- Dr. Susanne Nonekowski, Part-time Instructor MBC (Academic Coordinator at 50% time)

- Dr. Mugunthu Dhananjeyan, Senior Research Associate (Bioanalytical Chemistry Core Resource Supervisor)
- Ms. Nicole Ellis, Research Assistant (Biological Testing)
- Dr. Peter Nagy, Research Professor (Computational Chemistry Core Resource Supervisor)
- Dr. Jeff Sarver, Research Assistant Professor (Biological Testing Core Resource Supervisor)
- Dr. Jill Trendel, Research Associate (Biological Testing)

- The CD3 has recently completed a search for a Research Assistant (Bioanalytical Chemistry) and an offer letter will be extended this month.

In addition to these staff members, all but one of the following graduate students are supported by the CD3's extramural funding in terms of their stipends and benefits. The one student's funding (MD's) may also become part of an already approved, external agency grant but, in this case, the latter's final release/award notice is pending completion of a written agreement among the three participating institutions who are involved in the project as collaborators (see next section).

- Mr. Mohammad Dakdouki (MD), MBC Ph.D. Program
- Ms. Nicole Ellis, Biology M.S. Program (part-time)
- Mr. Yasser Heakal, MBC M.S. Program (to graduate in July and then pursue a Ph.D. in Pharmacology at Penn State/Heshey)

- Mr. Zhiyong Hu, MBC Ph.D. Program (part-time while also presently at Johnson & Johnson, Inc. as a full-time employee)
 - Mr. Rahul Khupse, MBC Ph.D. Program
 - Mr. Jidong Liu, MBC Ph.D. Program
 - Ms. Zijuan Ma, Pharmacology M.S. Program
 - Mr. Ritesh Mittal, MBC Ph.D. Program
 - Ms. Yanmin Zhang, Pharmacology M.S. Program (graduated in May)
- Two new students are slated to join the CD3 team in the Fall and plan to pursue degrees in the MBC Ph.D. Program

Money

Present Funding

The following list summarizes the CD3's extramural funding in terms of this year's annual dollars by indicating for each source of money: (a) Project title; (b) The administrative investigators (PI and Co-Is); (c) Sponsor; (d) **Sponsor's annual award amount**; (e) Sponsor's indirect portion; (f) UT's contribution; (g) Total annual amount (d plus f); (h) Present year of award and total number of years anticipated; and, (i) Overall total award based upon multiplying '(g)' times the total number of years anticipated or by whatever else is applicable. Awards are listed in a chronology based upon their onset.

1. (a) Two projects: (i) Drug Metabolism Terms; and (ii) Human Drug Metabolism Database (hDMdb)
 (b) Paul Erhardt (PI in both cases)
 (c) International Union of Pure & Applied Chemistry (IUPAC) who administer the accounting of the budget versus expenses without UT's involvement
 (d) **\$10,000.00** (e) None (f) None (g) \$10,000.00
 (h) Year 5 of an unrestricted duration (i) \$10,000.00 (award made in one lump sum)
2. (a) hDMdb
 (b) Paul Erhardt (PI)
 (c) IUPAC, International Union of Pharmacology (IUPHAR) and International Council of Scientific Unions (ICSU) wherein UT administers the accounting of the budget versus expenses
 (d) **\$50,000.00** (e) None (f) None (g) \$50,000.00
 (h) Year 5 of an unrestricted duration (i) \$50,000.00 (award made in one lump sum)
3. (a) PAM Inhibitors
 (b) Paul Erhardt (PI), Wieslaw Klis (Co-I) and Jeff Sarver (Co-I)
 (c) US Army Materiel Command
 (d) **\$177,500.00** (e) \$52,500.00 (f) \$32,438.00 (g) \$209,938.00
 (h) Year 3 of 3 (a no-cost extension has also been granted for one more year)
 (i) \$629,814.00

4. (a) Determine Natural Product Induction in Legumes and the Pharmacological Consequences in Human Model Systems
(b) Paul Erhardt (PI)
(c) US Department of Agriculture
(d) **\$441,312.00** (e) \$40,119.00 (f) \$264,198.00 (g) \$705,510.00
(h) Year 2 of a 10 year initial proposal that requires annual renewal (Year 3 has already been approved for a start date of July 1st and Year 4's approval is underway)
(i) \$7,055,100.00

5. (a) Utility of Muscarinic Agonists for Alzheimer's Disease
(b) Paul Erhardt (PI), Ken Bachmann (Co-I) and William Messer (Co-I)
(c) NIH/Nat. Inst. On Aging SBIR with Cognitive Pharmaceuticals, Ltd.
(d) **\$93,930.00** (e) \$27,782.00 (f) \$106,032.00 (g) \$199,962.00
(h) Year 1 of 2 (i) \$408,566.00 (with an increase to occur in Year 2)

6. (a) Two projects: (i) Collaborative contract synthesis for MUO I; and, (ii) Collaborative contract synthesis for MUO II
(b) Paul Erhardt (PI)
(c) MUO
(d) **\$10,100.00** (e) None (f) None (g) \$10,100.00 (h) Ad hoc (i) Not applicable

7. (a) Two projects: (i) Paclitaxel Stability; and, (ii) Estrogen Receptor Ligands
(b) Peter Nagy and Paul Erhardt (Co-PIs)
(c) Ohio Super Computer Fund
(d) **ca. 5,000 RU Time was awarded**

8. (a) Absorption and Metabolism Studies
(b) Paul Erhardt (PI), Ken Bachmann (Co-I)
(c) Pfizer, Inc. Sponsored Research Agreement (SRA)
(d) **\$250,000.00** (e) \$50,000.00 (f) \$38,000.00 (g) \$288,000.00
(h) Year 1 of 2 (with the further possibility for indefinite extensions)
(i) \$468,864.00 (for just 2 years with a decrease to occur in Year 2)
• It can also be noted that as part of this SRA, the CD3 has received approximately \$250,000.00 worth of equipment from Pfizer on a donated basis and an LC-MS/MS instrument (valued at about \$500,000.00) that is on loan for the duration of the project.

9. (a) Travel associated with administrative posts in professional organizations and with membership on Study Sections
(b) Paul Erhardt
(c) IUPAC, US NAS, ACS, SBS and AAPS; NIH SBIR Drug Development Grants and US Army Prostate Cancer Grants program. All of these organizations administer the accounting of such expenses without UT's involvement
(d) **\$8,000.00** (e) None (f) None (g) \$8,000.00
(h) Open-ended although most posts generally turn-over every 4 years
(i) While funding is available for about one trip each month, time constraints limit such travel to about one trip every three months, thus the annual estimate of 4 trips x

\$2,000.00/trip = \$8K and an overall total estimate (that is likely to continue for at least 4 years) of \$16,000.00.

According to the above, the CD3's 2004-2005 annual funding from extramural sources can be calculated to be **\$ 1,040,842.00**. When UT's contributions are included, this figure becomes \$ 1,481,510.00 and when the dollar value of acquired equipment is further factored-in, this figure becomes \$ 2,231,510. Finally, in terms of accounting for multi-year awards and tentatively approved funding across future years, the CD3's present operating budget can be calculated to be about \$ 9,388,344.00 upon its extension to the year 2012. In addition to the ongoing grants listed above, potential future grants and SRAs (pending approval from already submitted grant applications and SRA contracts) are listed below. Rejected grant applications attempted during 2004-2005 are listed thereafter.

Pending Applications/Contracts

1. (a) A Partnership for Pharmaceutical and Economic Development of Wild Lebanese Plants
(b) Paul Erhardt (PI), Floyd Schanbacher (Co-I, OSU) and Salma Talhouk (Co-I, Am. Univ. Beirut)
(c) USDA
(d) \$167,489.00 for Year 1 with increases planned for subsequent Years 2 to 5
NOTE: This application has been approved by the USDA but release of funds are being held pending final agreement amongst the three participating institutions.
2. (a) Absorption and Bioavailability of Saw Palmetto Products
(b) Jeff Sarver and Paul Erhardt (Co-PIs), Jim Byers and Mugunthu Dhananjeyan (Co-Is)
(c) Consortium for Plant Biotechnology Research (CPBR)
(d) \$135,000.00 for Year 1 of a 2-year project
NOTE: This was submitted as a pre-proposal (also see section pertaining to Presentations) and has been recommended by the CPBR for further development into a full proposal submission.
3. (a) Saw Palmetto and Prostate Cancer Prevention
(b) Fred Williams and Paul Erhardt (Co-PIs), Mugunthu Dhananjeyan and Jeff Sarver (Co-Is)
(c) NIH/NCI
(d) \$180,00.00 for Year 1 of a 2-year project
4. (a) Impact of St. John's Wort on Sildenafil Pharmacokinetics
(b) Vince Mauro (PI), Paul Erhardt and Laurie Mauro (Co-Is), James Kleshinski and Sadik Khuder (Co-Is, MUO)
(c) Res. Inst. Am. Coll. Clinical Pharmacology
(d) \$50,000.00 for a 1-year project

5. (a) Esmolol Plus (also see section pertaining to Patents)
- (b) Paul Erhardt (PI)
- (c) NSF (Ann Arbor, MI)
- (d) \$100 K upfront plus \$225,000 for Year 1 of a two-year SRA

Rejected Grant Applications

1. (a) Research Experience for Undergraduates in Chemical and Biochemical Catalysis
 - (b) Mark Mason and Jim Slama (Co-PIs), Paul Erhardt et al. (Co-Is)
 - (c) NSF REU Program
 - (d) ca. \$75 K per year for a 3-year project
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2. (a) FGF-2 Short Peptidyl Inhibitors in Prostate Cancer
 - (b) Wieslaw Klis (PI), Paul Erhardt and Jeff Sarver (Co-Is)
 - (c) NIH RO1
 - (d) ca. \$333 K per year for a 3-year project
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3. (a) Saw Palmetto and Prostate Cancer Prevention
 - (b) Paul Erhardt (PI), Mugunthu Dhananjeyan, Wieslaw Klis and Jeff Sarver (co-Is)
 - (c) Prostate Cancer Foundation
 - (d) ca. \$85 K for 1 year

And Things Getting Done

Patent Activities

1. After considerable interactions with the US PTO that, this year, eventually led to one issued patent (Erhardt; US 6,750,238 B1; 2004), one issued CIP (Erhardt and Aouthmany [SVMMC]; US 6,756,047 B2; 2004), two ongoing Divisionals, and another ongoing CIP, all pertaining to ‘Aralkylester Soft Drugs,’ this entire platform technology was out-licensed as a package deal to ARYx Ltd. (CA) for an upfront fee of **\$125 K plus future royalties on any derived products**.
2. Similarly, the CD3 is close to finalizing an out-licensing agreement for its previously patented (Erhardt; US 5,977,409; 1999) technology pertaining to ‘Benzylamine-related Chiral Auxiliary Synthetic Reagents’ that will involve a significant Sponsored Research Agreement (see ‘Esmolol Plus’ SRA under Pending Contracts above), as well as an upfront fee of **\$100 K along with a royalty stream for UT**.
3. US Patent 6,846,937 B2 entitled ‘Method for the Selective Removal of Acyl-functionality Attached to the 2’-Hydroxy-group of Paclitaxel-related Derivatives’ (Erhardt, Klis and Sarver) was issued in early 2005. This process chemistry patent is part of the broader, medicinal chemistry technology involving ‘Paclitaxel Hybrid Derivatives’

for which patent application prosecutions are ongoing and for which International Application WO 2004/080412 A2 (Erhardt, Klis and Sarver) was also recently published.

4. In addition to the chemical support associated with the CD3's collaborative effort with MUO in the area of cancer diagnostic agents (see Present Funding above), and as a natural extension of the CD3's ongoing paclitaxel hybrid chemistry program (see Patent entry immediately above), a patent application assessment and response to a final office action was attempted by the CD3 on behalf of both institutions. The latter was subsequently abandoned. New applications will be submitted as appropriate during the progression of the CD3's continuing work in the diagnostic area.

5.^a A patent application entitled 'Novel Anthraquinones with Anti-filarial Activity and their Synthesis' (Nair, Dhananjeyan, Kron and Milev) was submitted in late 2004 (Serial # 60/650552).

6. An Invention Disclosure pertaining to the CD3's work with PAM Inhibitors was submitted and has been voted to receive UT funding toward the submission of patent applications. The latter will be pursued pending completion of planned in vivo testing that will take place very shortly.

Notes: (a) This work was done external to UT by M.R. Dhananjeyan prior to his joining the CD3.

Publications

1. K.W. Ward, P. Erhardt and K. Bachmann. *Application of Simple Mathematical Expressions to Relate the Half-lives of Xenobiotics in Rats to Values in Humans.* J. Pharmacological and Toxicological Methods, **51**, 57-64 (2005).
- 2.^a M.R. Dhananjeyan, Y.P. Milev, M.A. Kron and M.G. Nair. *Synthesis and Activity of Substituted Anthraquinones Against a Human Filarial Parasite, Brugia malayi.* J. Med. Chem., **48**, 2822-2830 (2005).
3. P.I. Nagy and P.W. Erhardt. *Monte Carlo Simulations of the Solution Structure of Simple Alcohols in Water-Acetonitrile Mixtures.* J.Phys. Chem. B, **109**, 5855-5872 (2005).
4. P.I. Nagy, G. Volgyi and K. Takacs-Novak. *Tautomeric and Conformational Equilibria of Tyramine and Dopamine in Aqueous Solution.* Molecular Phys., **103**, 1589-1601 (2005).
5. P.W. Erhardt and L. Matos. *Selective beta-Adrenergic Receptor Blocking Agents.* In Analog-Based Drug Discovery, ed. by J. Fischer and R. Ganellin; Wiley-VCH, Weinheim, Germany. **Accepted.**

6. P.W. Erhardt. *Case Study: "Esmolol Stat."* In Analog-Based Drug Discovery, ed. by J. Fischer and R. Ganellin; Wiley-VCH, Weinheim, Germany. **Accepted.**

7.^b P.W. Erhardt and J.R. Proudfoot. *Drug Discovery: Historical Perspective, Current Status and Outlook.* In Comprehensive Medicinal Chemistry II, Volume 1, ed. by J. Taylor and D. Triggle; Elsevier, Oxford, United Kingdom. **Accepted.**

8. G. Alagona, C. Ghio and P.I. Nagy. *Theoretical Conformational Analysis for Neurotransmitters in the Gas Phase and in Aqueous Solution. Serotonin.* J. Chem. Theory and Computation, **Accepted.**

9. P.I. Nagy and P. Erhardt. *Ab Initio Study of Hydrogen-bond Formation Between Cyclic Ethers and Selected Amino Acid Side Chains.* J. Phys. Chem. A, **Submitted.**

10. P.I. Nagy, F.R. Tejada and W.S. Messer, Jr. *Theoretical Studies of the Tautomeric Equilibria for Five-member N-Heterocycles in the Gas Phase and in Solution.* J. Phys. Chem. B, **Submitted.**

Notes: (a) This work was done external to UT by M.R. Dhanajeyan prior to his joining the CD3.

(b) This work represents a particularly prestigious invitation and professional accomplishment in that not only is this multi-volume compendium highly regarded by medicinal chemists internationally, the indicated contribution will constitute the lead chapter in the introductory volume for the entire series. The chapter has 94 pages of double-spaced text, 39 figures and schemes, and 6 tables, all of which is supported by 460 reference citations.

Presentations

1.^a P. Erhardt presented an administrative summary at the International Union of Pure and Applied Chemistry's (IUPAC's) Division VII Chemistry and Human Health meeting that was held June 11-12 in Boston.

2. As part of his work prior to joining the CD3, M. Dhananjeyan delivered a presentation entitled *Synthesis of Anti-filarial Anthraquinones* at the International Congress on Natural Products Research meeting that was held July 31-August 4 in Phoenix.

3. P. Erhardt presented a poster entitled *A Human Drug Metabolism Database* at the International Society for the Study of Xenobiotics (ISSX) meeting that was held August 29-September 2 in Vancouver, Canada.

4.^a P. Erhardt presented an administrative summary at the IUPAC Division Presidents' meeting that was held September 29-October 3 in Bled, Slovenia.

5 - 8.^b Several CD3 staff and students presented posters at the International e-Hormone Conference that was held October 25-30 in New Orleans. Specific authors and titles are listed below with the presenter's name underlined in each case.

- M. Dhananjeyan and P. Erhardt. *Quantification and Stability of Soybean Phytoestrogens by HPLC.*
- N. Ellis, J. Sarver and P. Erhardt. *Effect of Glycosylation on Soy Flavonoid Anticancer and Antioxidant Activity.*
- R. Khupse and P. Erhardt. *Total Synthesis of the Soybean Flavonoids Glyceollin I and II.*
- P. Nagy, W. Klis and P. Erhardt. *Computational Modeling of the Interactions Between Flavonoids and the Human Estrogen Receptor.*

9.^c P. Nagy presented a series of lectures pertaining to *Computational Chemistry* during a meeting held on November 4 at the University of Veszprem, Hungary.

10. P. Erhardt presented a lecture entitled '*Esmolol Stat*' (*The Birth of Soft Drug Technology*) And Beyond in a simultaneous manner for the seminar programs in both the UT Departments of Pharmacology and Biology on November 19.

11-12. P. Erhardt participated in the XI Summer School in Medicinal Chemistry by delivering two invited lectures (indicated immediately below) during February 14-18 at the Federal University of Rio de Janeiro, Brazil.

- '*Esmolol Stat*'
- *Drug Metabolism and Drug Design*

13-14. As part of his grant application to the CPBR (see item 2 under Pending Applications), J. Sarver delivered two posters (indicated immediately below) at the CPBR meeting on March 2 in Washington, D.C.

- J. Sarver, P. Erhardt, J. Byers, M. Dhananjeyan and N. Ellis. *Absorption and Bioavailability of Saw Palmetto Products (Technical Information)*
- J. Sarver, P. Erhardt, J. Byers, M. Dhananjeyan and N. Ellis. *Absorption and Bioavailability of Saw Palmetto Products (Laypersons' Information)*

15.^a P. Erhardt presented an administrative summary at the IUPAC Division VII Medicinal Chemistry and Drug Development Subcommittee meeting held March 5 in Amsterdam, Netherlands.

16. P. Erhardt presented an invited career pathing seminar entitled *Working in Biotechnology: Problems and Potential (Moving from Industry to Academe)* at the National American Chemical Society (ACS) meeting held March 13-17 in San Diego.

17. R. Khupse participated in Sigma Xi's Annual Student Presentations Program at UT wherein he delivered a talk entitled *Total Synthesis of Soybean Isoflavonoids and Their Anticancer Activities*. This program was held on April 16. P. Erhardt was a co-author.

18. P. Erhardt presented an overview of the CD3 and its research programs for the visit of UT's OOR by Battelle on June 14.

19. R. Khupse presented a poster entitled *Total Synthesis of Soybean Isoflavonoids Glyceollin I and II* at the 38th Annual Mid-Atlantic Graduate Student Symposium in Medicinal Chemistry that was held June 20 in Pittsburgh. P. Erhardt was a co-author.

Notes: (a) P. Erhardt is the current President of the IUPAC's Chemistry and Human Health Division (VII). Division VII is composed of three Subcommittees: Medicinal Chemistry and Drug Development; Clinical Chemistry; and, Toxicology. In addition to being associated with the IUPAC and its prestigious position within the overall, international chemical community, Division VII distributes about \$ 40 K each year to sponsor projects that, in particular, seek to bring cutting-edge medicinal chemistry to less-developed nations in a way that can upgrade their standard of living or allow them to become more competitive in the global marketplace.

(b) This conference is hosted each year by the Center for Bioenvironmental Research located at Tulane University which is one of the key collaborators for the CD3's soybean-related research project (see entry # 4 under Present Funding).

(c) This activity was a follow-up to P. Nagy's earlier presentation of a *Colloquium Lecture* and achievement of a *Doctor Habil Distinction* about one year prior to this date, and from which he has now been awarded the title of *Professor at The College of Chemical Engineering, University Veszprem*. He received both diplomas during the honorary ceremonies. Such distinctions enable him to present both undergraduate and graduate level accredited lectures at universities throughout Hungary.

Miscellaneous

While many of these activities are ongoing or occur in a periodic manner, their one-time entries in the following listing are arranged by the approximate chronology that they happened to first arise during the year.

1. In addition to his role as the IUPAC's *President of Div VII* (as already noted in conjunction with previously listed items), by serving as a member on The Society for Biomolecular Screening's (SBS's) *Academic Outreach Committee*, The American Association of Colleges of Pharmacy's (AACP's) *Paul Dawson Biotechnology Award Committee*, and on the American Association of Pharmaceutical Scientists' (AAPS') *Prodrugs Focus Group*, P. Erhardt participated in numerous teleconferences during the course of the year.
2. P. Erhardt joined UT's Biology Department as an Adjunct Faculty member in order to contribute toward graduate level instruction and with the hope that this relationship will enhance the CD3's collaborations with other researchers residing in this key, life science discipline. Already solidifying the first connection, N. Ellis is now pursuing an M.S. degree in Biology while continuing to work for the CD3 wherein her research activities will now also form the basis for her thesis project.
3. As part of a tie-in with the College's Centennial Celebrations and with several other similar events either hosted directly or supported by the CD3 (see later entries in this section), a poster and display of Dr. Joe Schradie's collection of plants and herbs was set-up in a series of cabinets along the corridor near BO 2003 and BO 2005. By intent, this site is directly across from where the CD3 will be conducting much of its own natural product extractions for the USDA-sponsored soybean research program.
4. Culminating a rigorous and lengthy series of professional steps (only some of which have been noted above), P. Nagy was awarded two prestigious diplomas from Hungary, namely a *Doctor Habil Distinction* and the title of *Professor*, both in affiliation with the University of Veszprem. These distinctions enable him to present undergraduate and graduate level accredited lectures at universities throughout Hungary.
5. Accepting such a prestigious invitation, P. Erhardt attended the U.S. National Academy of Sciences' National Committee Meeting that dealt with IUPAC interactions and was held in WA DC on November 13th. Now regarded as a regular member, P. Erhardt has an open invitation to attend the NAS NC satellite meetings held in conjunction with all national-level ACS venues, which he did while at the ACS San Diego meeting in March (see entry # 16 under Presentations).
6. P. Erhardt received the College of Pharmacy's *2004 Outstanding Researcher Award* during the College Faculty Meeting held in late November. Since nominations and voting for this award derive from the College's graduate student body, this award reflects

Dr. Erhardt's strong commitment toward high-level education, as well as his enthusiasm for engaging in basic research.

7. In an effort to enhance inter-institutional collaborations, the CD3 hosted two mini-symposia for selected investigators from the Medical University of Ohio (MUO). All CD3 staff and students participated by giving at least one, short presentation during these meetings. Likewise, as a follow-up to meetings initiated by MUO, P. Erhardt has agreed to participate in any manner useful to MUO's efforts to establish an NCI-designated Cancer Center. With a similar spirit of collaboration toward economic development within the Toledo area, P. Erhardt is serving on UT's Search Committee charged with identifying candidates for the position of Director, Science and Technology Corridor.

8. On behalf of our College, the CD3 hosted a delegation of academicians and administrators who visited UT from the Szeged University (Hungary) College of Pharmacy. Similarly, several staff and students attended our College's Herbal and Alternative Medicine one-day symposium wherein P. Erhardt also assisted as a host by attending a dinner and lunch, and then later by providing a presentation about the CD3 and a tour to the delegation from China upon their significantly delayed arrival for this event. Hosting of other, half-day visitors included Dianne Miller (Sen. Mike DeWine's Office), Howard Ando (Pfizer, Inc.) and Aline Lindbeck (NSF, Inc.), the latter two also constituting 'site visits' associated with potential funding scenarios.

9. On behalf of the entire life science research component at UT, the CD3 hosted two training programs relative to new equipment that it has established as part of its critical base of core research-related resources, namely for the LC-MS/MS (see note for item # 8 in the listing of Present Funding) and for an all-purpose plate reader. Both programs were well received and the latter piece of equipment, in particular, is being used heavily by investigators from UT's Biology Department, as well as from all three of the College's departments.

10. While P. Erhardt was able to maintain his periodic review of manuscripts for publication in The Journal of Medicinal Chemistry and for Pure and Applied Chemistry, scheduling during this particular year did not allow for his participation on either the NIH SBIR *Drug Development* Study Section or the US Army *Prostate Cancer* Study Section. The main reason for this time crunch was due to his attempt to focus his six-month sabbatical toward several ongoing projects in the area of drug metabolism that are otherwise difficult to find the time for (see next entry).

11. P. Erhardt was approved for and participated in a sabbatical 'leave' during the '05 Spring semester. The sabbatical's theme involved *The Human Drug Metabolism Database (hDMdb) Project and Related Activities*. Note that Dr. Erhardt's undergraduate teaching obligations are already covered by additional Departmental teaching staff who are funded via the CD3's ongoing grants and that his personal direction of all 7 graduate students was not diminished in any way during this period. The latter also pertains to his personal direction of and/or involvement with the 9 areas for which he is presently receiving funding. A Summary Report pertaining to his sabbatical activities will be

separately issued during the Fall semester as some of the things that were put in place hopefully come to fruition.

Programmatic-Related Technical Reports And Other Annual Summary Reports

The following additional reports have either already been completed or will be generated according to the time-frames indicated within parentheses. Reports marked by an asterisk are likely to contain proprietary research results and these will be supplied only to UT's Office of Research. The others will be available for any interested parties upon request after the indicated time-frames.

1. USDA Legumes (Soybean) Research Program Non-proprietary Update (Available)
2. IUPAC Division VII Activities (July)
3. Muscarinic Agonists (CDD-0102)* (September)
4. hDMdb and Related Activities Including Sabbatical Summary Report (November)

- US Army PAM Inhibitors Program* (A no-cost extension has been granted and it calls for a Final Report to be due in April, 2006 so this report will be issued as part of next year's annual report)
- Pfizer Prodrug Program* (The first-year anniversary for this program will be close to next year's July-June annual timeframe and so its report will, likewise, be included as part of next year's annual report)