

The Lazarette Gazette

NEWS FROM

The University of Texas at Austin
MARINE SCIENCE INSTITUTE

Port Aransas, Texas 78373-1267
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Vol. 4, Issue 1, 6 January 1995



In this issue of *Lazarette Gazette* —

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Students

Charles Warneford Laidley earns Ph.D. — Charles Laidley has finished his Ph.D. and will be departing Port Aransas soon to take a Post-doctoral appointment at Berkeley. While at UT, Charles studied under the direction of Drs. Peter Thomas and Clark Hubbs. The title of his dissertation is *Studies on the plasma sex-steroid binding protein in the spotted seatrout (*Cynoscion nebulosus*)*. Dr. Laidley was born in Trenton, Ontario, Canada and completed high school in Ottawa. He received both his B.Sc. and his M.Sc. from the University of Guelph, in Guelph, Ontario, Canada. The M.Sc. was under the direction of Professor John F. Leatherland and he also trained in aquatic toxicology at the Canadian Center for Inland Waters in Burlington, Ontario under Drs. Uwe Borgmann and Peter Hodson. The focus of his research is endocrine regulation of reproduction and the mechanisms by which environmental toxicants act to disrupt these processes. At Berkeley, Charles will be in the Environmental Chemistry and Toxicology Laboratory where he will study the mechanisms of toxic chemical action in humans and other vertebrates. Charles: *I loved my stay in Port Aransas. I met lots of great people and had tremendous amounts of fun. I enjoyed playing roller-blade hockey, volleyball, softball, and windsurfing. Please come visit me in California.*

Abstract

STUDIES ON THE PLASMA SEX-STEROID BINDING PROTEIN IN THE SPOTTED SEATROUT (*Cynoscion nebulosus*)

Charles Warneford Laidley, Ph.D.

Supervisors: Peter Thomas and Clark Hubbs

A sex-steroid binding protein (SBP) that binds both androgens and estrogens was identified in the plasma of the spotted seatrout, *Cynoscion nebulosus*. Scatchard analysis revealed a single steroid-binding component with a dissociation constant (K_D) of 5.99 ± 0.13 nM for testosterone and 3.13 nM ± 0.11 nM for 17β -estradiol ($n=95$). The plasma SBP concentration ranged from 200 to 800 nM with a mean binding capacity of 400 ± 11 nM. Competition studies demonstrated that the seatrout SBP had very high affinity for a number of estrogens and androgens, with exception of the potent male androgen, 11-ketotestosterone, and little affinity for other physiological steroids including the stress steroid, cortisol, and the maturation-inducing steroid, $17\alpha,20\beta,21$ -trihydroxy-4-pregnen-3-one. The rates of steroid association and dissociation were extremely rapid, with a $t_{1/2}$ of less than 30 seconds for ligand association and 90 seconds for ligand dissociation.

Plasma SBP concentration and binding affinity did not differ significantly ($P < 0.05$) between male ($n=14$) and female ($n=81$) spotted seatrout. SBP levels increased with the stage of ovarian recrudescence in the females, with the lowest levels (approx. 300 nM) in regressed females and the highest levels of (approx. 470 nM) in females with fully developed ovaries. In addition, the affinity of this protein for plasma steroids decreased approximately 50% in association with the onset of hepatic vitellogenesis. This change in binding affinity and the fact that the concentration of this blood protein was nearly one-hundred fold greater than that necessary to bind 100% of the circulating sex steroids, suggests that this protein may have additional functions to that of acting as a steroid-carrier protein.

The seatrout SBP was purified to homogeneity by acetone precipitation, ammonium sulphate precipitation, anion exchange chromatography, gel filtration chromatography, preparative electrophoresis and reverse phase HPLC. The 2400-fold purified protein demonstrated a slight increase in binding-affinity following the preparative PAGE step, suggesting that the shift in steroid-binding affinity seen in the seasonal study may be mediated through cofactors that modify the affinity of the SBP for testosterone and estradiol. The purified SBP migrated as a single band with a molecular mass of 135 kDa on native PAGE and as several closely spaced bands with molecular masses of 49 to 52 kDa on SDS-PAGE. These bands centered at 50 kDa were shown to consist of a single protein with an N-terminus having little "homology" to any presently known protein sequences. Moreover, the amino acid composition also appears substantially different from that of previously characterized SBPs. However, there were two regions within the N-terminus of the seatrout SBP that demonstrated slight sequence "similarity" with a wide range of known proteins including the N-terminus of the non-secretory form of the intracellular precursor to the human SBP and with several viral proteins including that of the HIV virus type 1.

The seatrout SBP was an extremely stable molecule. It maintained greater than 70% of its binding activity after 3 weeks storage at 4°C and was stable for 20 minutes at temperatures up to 50°C. However, removal of endogenous steroid or divalent ions such as Ca^{++} resulted in a complete loss of steroid-binding activity associated with dissociation of the dimeric protein into monomeric subunits. Steroid-binding activity was restored by re-addition steroid and calcium resulting in a recombination of the SBP subunits into a single 135 kDa protein.

Personnel

MSI Employees Proud Parents of —

P.A.I.S.D. — THIRD SIX WEEKS HONOR ROLLS

- **H.G. OLSEN ELEMENTARY A HONOR ROLL**
third grade: Jennifer Seguin, James Cantu, Dani Buskey, Jack Montagna
fifth grade: Karli Dunton, Jo Anna Jackson, Stephanie Tinnin,
- **H.G. OLSEN ELEMENTARY A/B HONOR ROLL**
first grade: Paul Burgess
fourth grade: Lauren Kalke
fifth grade: Brince Abel, Alex Seguin, Ashley Harris, Nikki Buskey,
Tess Montagna
- **BRUNDRETT MIDDLE SCHOOL A HONOR ROLL**
sixth grade: Rachel Pearson, Sarah Seguin
seventh grade: Nathan Dunton, Kate Montagna
- **BRUNDRETT MIDDLE SCHOOL A/B HONOR ROLL**
sixth grade: Sean Cantu
seventh grade: Chris Kalke, Patricia Tinnin
eighth grade: Daniel Jackson, Matt Pearson
- **HIGH SCHOOL A HONOR ROLL**
twelfth grade: Jill Thompson
- **HIGH SCHOOL A/B HONOR ROLL**
twelfth grade: Robert Benton

P.A.I.S.D. — FIRST SEMESTER HONOR ROLLS

- **H.G. OLSEN ELEMENTARY A HONOR ROLL**
third grade: Jennifer Seguin
fifth grade: Karli Dunton, JoAnna Jackson, Stephanie Tinnin
- **H.G. OLSEN ELEMENTARY A/B HONOR ROLL**
third grade: Dani Buskey, Jack Montagna, James Cantu
fourth grade: Lauren Kalke
fifth grade: Nikki Buskey, Alex Seguin
- **BRUNDRETT MIDDLE SCHOOL A HONOR ROLL**
sixth grade: Rachel Pearson, Sarah Seguin
seventh grade: Nathan Dunton, Chris Kalke, Patricia Tinnin
- **BRUNDRETT MIDDLE SCHOOL A/B HONOR ROLL**
sixth grade: Sean Cantu
seventh grade: Kate Montagna
eight grade: Daniel Jackson, Matt Pearson
- **HIGH SCHOOL A HONOR ROLL**
twelfth grade: Jill Thompson
- **HIGH SCHOOL A/B HONOR ROLL**
twelfth grade: Robert Benton

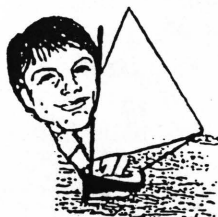
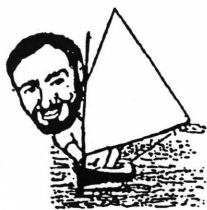
Egabrag Wocs

I loved my stay in Port A. — Charles Laidley's statement was really, *I loved my stay in Port Aransas*. The previous issue Matt Cottrell said, *I have really enjoyed my time here in Port A*. I just put the two together to make a cutesy little rhyme. Connie Chung told me the media needs to be honest, and I should tell you. It appears to be unanimous among those featured in the *Lazarette Gazette*—they all loved Port A. It wasn't always so. Sorting through old records (as we make space for the telecommunications classroom), I have found more negative than positive said about Port A., e.g. in 1952, Director Gordon Gunter: *Dr. Hedgpeth and Mr. Burkenroad are both on leave. Whether or not they will return is problematical, for neither one likes the isolation of this location*. Parenthetically, one *hit* Port Aransas took was as accurate as the official (Cowboys/Packers) ruling Irvin caught the ball on the bounce when it never got closer than three feet to the ground. A group of high muckedy-mucks was discussing an MSI Research Scientist/Faculty member who, without benefit of prior approval, moved to Austin. Sympathy was expressed inasmuch as the poor guy *just had to do it because his family couldn't stand Port Aransas*. Being familiar with Port Aransas as they knew they were, they felt that was certainly understandable! But I am aware of one small problem—this fellow and his family didn't live in Port Aransas. He commuted to MSI each day from another small town. Oh well—even the local news media can't keep straight between Port Aransas and Aransas Pass. Daughter Jill just received back her registration packet from The University of Texas at Austin. Instead of *Port Aransas* the registrar's office had typed in *Port Arthur*. While on a personal note, in my time with MSI, I have one major regret—that I waited seven years before moving from Corpus Christi to Port Aransas. I missed a lot of good old-time Port Aransas between 1960 and 1967. While folks like Port A for the obvious reasons of beach, surf, bays, gulf, fishing, boating, etc., this is not the point. First, *there is basketball!* Two weeks back two games featured Port A. old timers against the high school varsity and the *really* old timers against the junior varsity. Believe me, these games were great, and you would not have had to live most of your life in Port Aransas to have loved it. The Marlin Classic Basketball Tournament was between Christmas and New Years. If you can't always get to Vail or Aspen over the holidays (or to Palmer Station in the Antarctica ala Tony Amos), this is not a bad second choice. Not only did both the boys and girls win the tournament, the boys knocked off the number one rated class A team in the state. The feeling in the gym during that game was absolutely *electric*. I enjoyed it more than when UT knocked off Arkansas in the Darrell Royal days to take the national football championship. To basketball add Ken Dunton's youth soccer, another Port Aransas institution. And there is volleyball, the Cub Scout Pack, Boy Scout Troop, Girl Scouts, Little League, etc. Norman Rockwell, why did you leave us without putting Port Aransas on the cover of the *Saturday Evening Post*? More seriously, there is the Port Aransas Independent School District which rates accolades. The Elementary School, the Middle School, the High School, and the District as a whole were all *recognized* (a rating, next to the top) by the TEA this year. Few other schools in South Texas were recognized at all; and no other districts had a clean sweep. The last six valedictorians at Port A. High School have gone to The University of Texas at Austin. One or two more and maybe the folks in the registrars office will know it is Port *Aransas* and not Port *Arthur*. Whether others learn the difference between *Port Aransas* and *Aransas Pass* we can only hope.

—John Thompson

Seminars

- Mike Dibble, UTMSI, *Inorganic nitrogen uptake by two kelp species, Laminaria solidungula and Laminaria saccharina in the Alaskan High Arctic*, January 4, 1995.
- Dr. Ralph Pledger/Dr. David Mitchell, UT MD Anderson Cancer Center, *UV damage and DNA repair in marine systems*, January 6, 1995.



Irish Pennants

Gas charge tickets — Please follow this procedure: **GIVE ALL GAS CHARGE TICKETS TO VICKI ROBERSON; INDICATE ON THE TICKET IF THE GAS WAS FOR A BOAT.** We need all the tickets because some of the oil companies are no longer supplying copies to us when we are billed. We need it marked for boat so the gas charge can go against boat use (while if the gas goes in a vehicle the cost is covered by the mileage charge). Vicki will see to it that Mark gets the information.

Trip Reports & Travel

Travel ending between December 24 and January 13

✦ *Tony Amos*, November 19—January 4, Antarctica, install tide gauge at Palmer Station in Antarctica; join *R/V POLAR DUKE* for cruise—*SANTA CLAUS*; install research equipment on *R/V SURVEYOR* for upcoming cruise (Santiago—Valparaiso—Santiago).

✦ *Paul Montagna*, January 8—10, College Station, Texas, attend meeting at TAMU to prepare final report for the GOOMEX program.

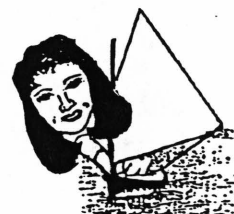
Publications

New listings since October, 1994

- Brinkmeyer, R.L. and G.J. Holt. (in press). Response of red drum larvae to graded levels of menhaden oil semipurified microparticulate diets. *The Progressive Fish-Culturist* 57:
- Buskey, E.J., J.O. Peterson and J.W. Ambler. (in press). The role of photoreception in the swarming behavior of the copepod *Dioithona oculata*. *Mar. Beh. and Physiology*.
- Chen, F. and C.A. Suttle. (in press). Amplification of DNA polymerase gene fragments from viruses infecting microalgae. *Applied and Environmental Microbiology*.
- Chen, F. and C.A. Suttle. (in press). Nested PCR with three highly degenerate primers for amplification and identification of DNA from related organisms. *BioTechniques*.

- Czerny, A.B. and K.H. Dunton. (in press). The effects of *in situ* light reduction on the growth of two subtropical seagrasses, *Thalassia testudinum* and *Halodule wrightii*. *Estuaries*.
- Davis, D.A. and C.R. Arnold. (in press). Effects of two extrusion processing conditions on the digestibility of four cereal grains for *Penaeus vannamei*. *Aquaculture*.
- Davis, D.A., L. Castro and C.R. Arnold. (in press). Evaluation of nutrient retention (nitrogen phosphorus) and growth response of red drum (*Sciaenops ocellatus*) to commonly used commercial feeds. *J. of the World Aquaculture Society*.
- Davis, D.A. and A.L. Lawrence. (in press). Minerals. *J. of the World Aquaculture Society*.
- Davis, D.A. and D.M. Gatlin, III. (in press). Dietary mineral requirements of fish and shrimp. *CRC Reviews*.
- DeYoe, H., A. Chan, and C.A. Suttle. (in press). Phylogeny of *Aureococcus anophagefferens* (Chrysophyceae) and a morphologically similar bloom-forming alga from Texas as determined by 18S rDNA sequencing analysis. *J. of Phycology*.
- Dunton, K.H. and P.K. Dayton. (in press). The Biology of High Latitude Kelp. In: Symposium on the Ecology of Fjords and Coastal Waters, Tromsø, Norway, December 5-9, 1994.
- Henley, W.J. and K.H. Dunton. (in press). A seasonal comparison of carbon, nitrogen and pigment content in *Laminaria solidungula* and *L. saccharina* (Laminariales, Phaeophyta) in the Alaskan Arctic. *J. Phycol.*
- Hoff, G.R. and L.A. Fuiman. (in press). Environmentally induced variation in elemental composition of red drum (*Sciaenops ocellatus*) otoliths.
- Jirsa, D.O., D.A. Davis and C.R. Arnold. (in press). Effects of dietary nutrient density on water quality and growth of red drum (*Sciaenops ocellatus*) in closed systems. *Aquaculture*.
- Kaczmarek-Ehrman, I. and A.M. Chan. (in press). *Navicula pulchripora*, a new species of diatom isolated from the coastal waters of Texas, USA. *Diatom Research*.
- Montagna, P.A. (in press). Rates of metazoan meiofaunal microbivory: a review. *Vie et Milieu*.
- Montagna, P.A., J.E. Bauer, D. Hardin and R.B. Spies. (in press). Meiofaunal and microbial trophic interactions in a natural submarine hydrocarbon seep. *Vie et Milieu*.
- Pakulski, J.D., R. Benner, R. Amon, B. Eadie and T. Whitledge. (in press). Community metabolism and nutrient cycling in the Mississippi River plume: evidence for intense nitrification at intermediate salinities. *Marine Ecology Progress Series*.
- Williams, A.S., D.A. Davis and C.R. Arnold. (in press). Density dependent growth and survival of two penaeid shrimp, *Penaeus setiferus* and *Penaeus vannamei*. *J. of the World Aquaculture Society*.

— compiled by Patty Baker



Letters to the editor

■ First, a big HI to Ruth Grundy, Curly, John Thompson, and any others who remember the graduate student who dug up half of Mustang Island to study fiddler crabs (Larry Powers, 1973-1977, Ph.D., 1975). I was a student of Larry Gilbert and George Bittner in Austin, overlapping with another of George's students, Milt Charlton (1972-73). I worked on BLM projects with Carl Oppenheimer and Bill Brogden from 1975-1977. In 1978 I returned for the summer with a class of animal behavior students from the American Museum of Natural History (New York).

To catch you up with what has happened since I left UTMSI: I accepted a joint appointment with City College and the American Museum in New York from 1977-1981, continuing field work with fiddler crabs in South Carolina, teaching for USC at Beaufort or working at Georgetown in the summers. In 1981 I moved to Mobile, Alabama, did some environmental work for the U.S. Army Corps of Engineers, then cross-trained into the medical laboratory field. From 1984-88, I taught medical lab courses at the University of Mississippi Medical Center in Jackson, then took the Chair position in the Med Tech department at University of South Alabama in Mobile. I left there in 1993 to be the Dean of Health, Arts and Sciences at the Oregon Institute of Technology in Klamath Falls, Oregon. Now I am putting together a high tech environmental program and returning to some marine biology interests. So the circle closes once more.

I have thoroughly enjoyed your newsletter and I echo Richard Moore's comment about all those old people in the photos at Pat's retirement party. By the way, if you need other photos taken during the '70's at UTMSI, I have a number of B&W (negatives) and color slides. I hope to visit the "megacenter" (will I recognize it?) next time I'm in Texas. My best to you all for a job very well done!

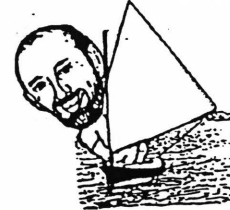
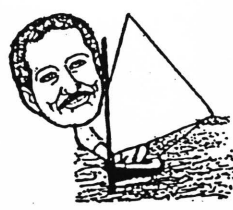
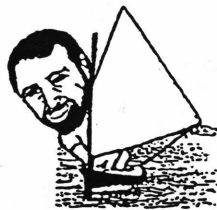
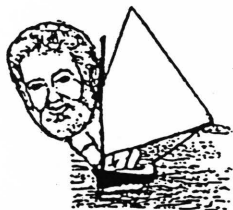
(Lawrence W. Powers, Ph.D., 1975. Larry's current address is: Dr. Lawrence W. Powers, Dean, School of Health, Arts and Sciences, Oregon Institute of Technology, Klamath Falls, OR 97601, Phone: 503-885-1183, Fax: 503-885-1823)

Tony's Tidings...

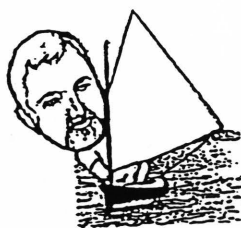
Weather Report December 19—January 8

19 - 25 DEC 1994										
	MON	TUE	WED	THU	FRI	SAT	SUN	MEAN		
DATE	19	20	21	22	23	24	25			
AIR TEMP	HIGH	66.7	68.1	68.5	66.2	63.3	57.5	60.4	64.4	
AIR TEMP	LOW	55.2	60.9	57.3	52.7	48.3	52.8	45.8	53.3	
SEA TEMP	LOW	—	—	—	—	—	—	—	—	
RAINFALL	TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
26 DEC 94 - 1 JAN 95										
	MON	TUE	WED	THU	FRI	SAT	SUN	MEAN		
DATE	26	27	28	29	30	31	01			
AIR TEMP	HIGH	65.3	67.6	66.9	64.7	60.9	61.7	56.3	63.3	
AIR TEMP	LOW	47.6	62.0	51.8	49.4	53.0	55.4	44.9	52.0	
SEA TEMP	LOW	—	—	—	—	—	—	—	—	
RAINFALL	TOTAL	0.00	0.00	2.80	0.00	0.00	0.73	0.05	3.58	
2 - 8 JAN 1995										
	MON	TUE	WED	THU	FRI	SAT	SUN	MEAN		
DATE	02	03	04	05	06	07	08			
AIR TEMP	HIGH	49.6	48.3	47.1	46.9	67.2	60.9	71.0	55.8	
AIR TEMP	LOW	41.5	43.5	42.4	41.7	44.7	48.5	50.3	44.7	
SEA TEMP	LOW	—	—	—	—	—	—	—	—	
RAINFALL	TOTAL	0.00	0.71	0.00	0.00	0.00	0.00	0.00	0.71	

—Andi Wickham



Editor's Note



Many thanks to Charles Laidley for his help with this issue of the *Lazarette Gazette*. And his statement, *I loved my stay in Port Aransas*, helped me to get some thoughts together for the scow garbage section. I think the positive change in most people's attitude towards Port Aransas is real. As I sorted through those old files to make way for the telecommunications classroom, I found there is one thing which has not changed at MSI—the habit of long intervals between Directors. Let's see, when did Bob Jones announce his resignation? Seems like it was in February 1973. No, it was only 93. It was good to hear from another of MSI's ex-students, Larry Powers, and we appreciate his kind words about the *Lazarette Gazette*. Even if you don't have an address change, as Larry did, or even his kind words for the *LazGaz*, write anyway and tell us what has happened to you since you left P. A. Did you notice Tony Amos' Antarctica trip listing in the travel section? Tony promises to relate his adventures for us in the next issue. Thanks for help with this issue to JoAnn Page, Kathy Quade, Patty Baker, and Lynn Amos. This issue of the *Lazarette Gazette* is produced with the assistance of my new computer with the *Pentium* chip. If there are any mistakes, it is just that once-in-every-27,000-years error.

—John Thompson

