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Long Island University-Brooklyn Campus

Conference Theme *"Cancer and the Environment: Their Impact on the Future"*

The Brooklyn Campus of Long Island University has been long known as the urban campus of the seventh-largest private university in the country. Established in 1926, the Campus delivers undergraduate and graduate education to students who represent the changing demographics of first generation collegians.

The Brooklyn Campus has enriched the opportunities for its students and community by establishing itself as a significant contender in major research initiatives. In the last five years, its faculty members have become principal and co-principal investigators in over $15 million in research and training-related grants. These awards ranged from training grants that support student research as well as prestigious and highly competitive independent investigator awards of the National Institutes of Health (NIH).

Many of these investigator-driven awards have been awarded to a cross-section of faculty in a major cancer-focused partnership with Columbia University. Funded primarily through a $1 million Planning Grant (2001-2004), and a $10 million U-54 grant (2004-2007) from the National Cancer Institute, the awards include $5.8 million in direct funds to Long Island University's Brooklyn Campus and $5.2 million to Columbia University's Herbert Irving Comprehensive Cancer Institute. At the Brooklyn Campus, the principal investigator is Dr. Carol Magai, Dean of Research and Professor of Psychology. Dr. Anthony DePass, Associate Professor in the Biology Department and Dr. Nathan Consedine, Research Assistant Professor of Psychology and Deputy Director of the Intercultural Institute on Human Development and Aging at Long Island University, are the Co-principal investigators.

These NCI-supported projects, enhanced with Institutional support provided by Provost Gale Stevens Haynes, are providing numerous opportunities for students to participate in the scientific discovery process. Additionally, student projects receive funding through programs such as the MBRS-RISE, led by Dr. Edward Donahue, Associate Professor of Chemistry, the BRIDGE program led by Dr. Samuel Watson, also an Associate Professor of Chemistry, and the COR program that supports students in Psychology, with Dr. Magai as the Project Director.

"Research at the Brooklyn campus has expanded so much that we now can include students from other institutions as well as our own for training in cutting-edge projects," Dr. Magai notes. "Moreover, the implications of this research expansion go beyond the training of individual students in the various one-to-one mentoring environments. It enhances the quality of instruction for all students, since active researchers tend to bring to the classroom an infectious enthusiasm for their topic and communicate the significance of research in ways that textbooks often cannot," she points out.

The importance of these research activities and opportunities, of course, reaches even further. Dr. Magai emphasizes, "With close ties to the racially and ethnically diverse communities of Brooklyn, we can help ensure that the complex health issues in our research are addressed fully and sensitively."

A Publication of the Metropolitan Association of College & University Biologists

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IInstructions for Authors

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The Rodlet Cell, An Enigmatic Cell in Fish

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An intriguing cell, the rodlet cell has been observed in the tissues of marine and freshwater teleosts[1,2, 3] where it has been most often described associated with the viscera and epithelium[4,5,6,7]. Since its original description over a century ago[8] this cell has posed a conundrum to those working in the field of fish biology. Thelohan[8] described the cell as being exogenous in origin and represented the sporocyst stage of a sporozoan parasite. This led Laguesse[9] to name this presumptive exogenous structure *Rhabdospora thelohani* in honor of its original discoverer. These early observations serve as the basis for what has become known as the exogenous hypothesis explaining the origin and function of this cell, adhered to by several investigators[2,3,18]. In 1906, Plehn[10] interpreted rodlet cells to be normal constituents of the fish's tissues and suggested that they were glandular in function. Plehn named these cells "Stabchendruzenstellen." This is the basis for the alternate interpretation of origin and function of the rodlet cells, namely that they are endogenous components of the tissues of the fish[6,7,11]. Recently, Fishelson and Becker[12] proposed a hypothesis combining the two points of view, i.e., the rodlets themselves are endosymbionts that have been taken up and incorporated by a leucocyte.

General Description of the Rodlet Cell

A. Distribution

Rodlet cells have been observed in epithelium associated with the skin[13], gill[1], intestine[4,5,11] including that of embryos and neonates[17] , kidney[14], kidney tubule[6,12], biliary duct[7,15], thymus gland[16], endothelium[4,5] and mesothelium[7]. The general consensus is that the cell begins to form or originate beneath the epithelium and subsequently migrates to the epithelial surface during its maturation where it will apically discharge its contents into a luminal space[2,6]. Once at the surface, the mature rodlet cell establishes junctional complexes usually in the form of desmosomes and tight junctions with the surrounding epithelial cells in order to be anchored in place[14] (Figs. 1 and 2).

B. Morphology and development

The description of rodlet cells that follows is based upon light and EM observations made on the hemopoietic tissue of the head kidney of the platyfish, *Xiphophorus maculatus* by Kramer and Potter[14] although, in general, these observations are consistent with those reported for other teleost forms[4,5,6,7].

1. Immature cell

The immature rodlet cell (Figs. 3 and 4) is round to slightly oval in shape. Its long axis measures 5.1 to 13.3 μm and its width from 3.5 to 6.7 μm. The nucleus is large and rounded and fills most of the cytoplasm. For the most part it is electron lucent and contains a peripheral rim of heterochromatin. The most conspicuous organelle is the rough endoplasmic reticulum (RER) which pervades much of the cytoplasm. Its cisternae are most dilated. Rodlets at different stages of

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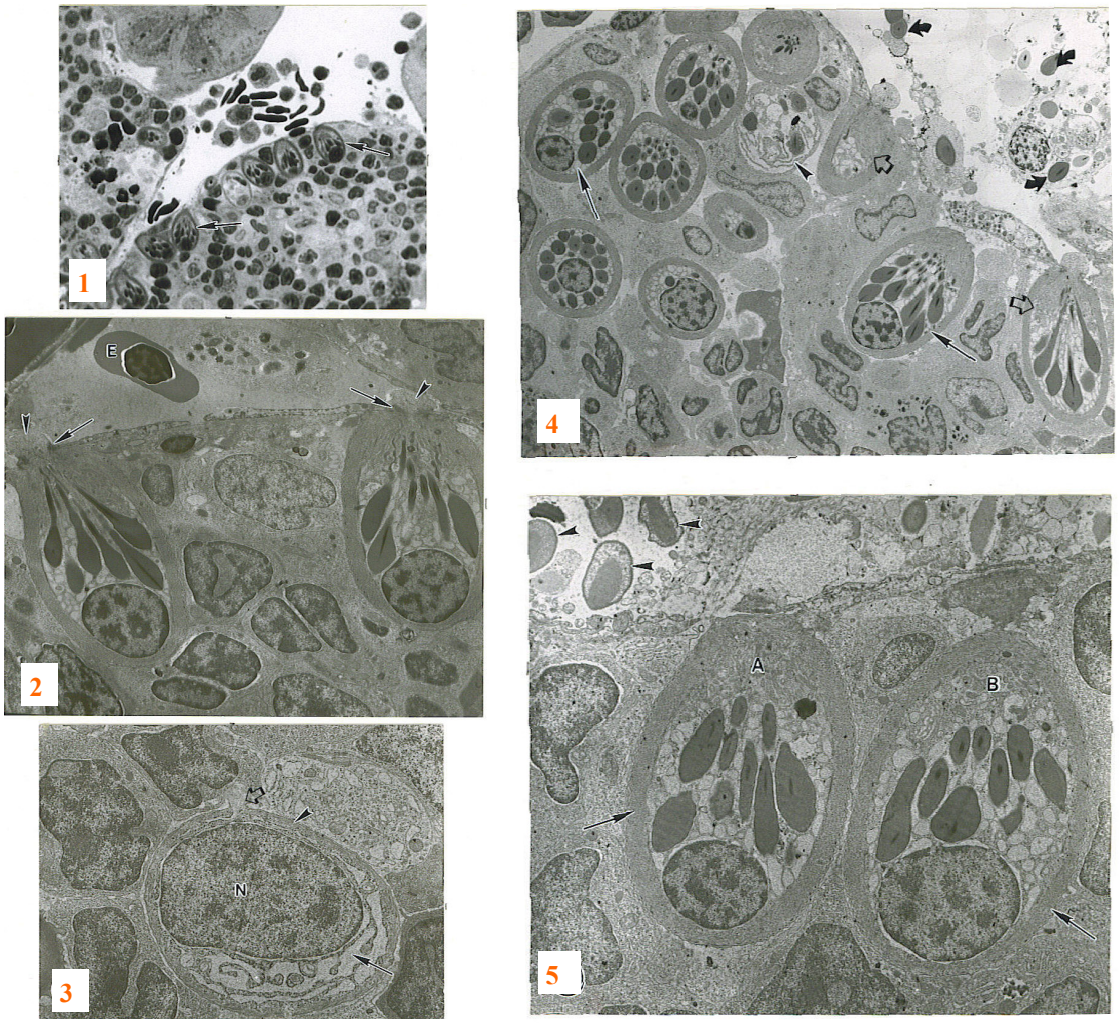


Figure 1. A thick epon section of the head kidney of the platyfish, *Xiphophorus maculatus* showing several mature rodlet cells (arrows) associated with the endothelium of a sinusoid.

Figure 2. An EM section of the platyfish head kidney showing mature rodlet cells attached to the sinusoidal epithelium. Note the apical-basal polarity of the cells and the orientation of the intracellular rodlets which are composed of a dense core and less dense outer zone. Junctional complexes (arrows) between the rodlet cells and the epithelial cells are seen. Each cell is undergoing apocrine secretion (arrowheads). A mature erythrocyte (E) is visible within the lumen.

Figure 3. An EM section of a developmentally younger rodlet cell within the hemopoietic tissue of the platyfish head kidney. Note the prominent nucleus (N), the dilated RER (arrow) and thin fibrous coat (arrowhead). A small interruption in the coat is seen with some cytoplasmic protrusion (open arrow).

Figure 4. An EM section of the hemopoietic tissue of the head kidney of the platyfish underlying a sinusoidal space. Mature rodlet cells (arrows) prevail while an immature cell (arrowhead) is also apparent. Two surface rodlet cells (open arrows) are discharging their contents. Some free rodlets (curved arrows) are seen within the luminal space.

Figure 5. An EM section through the platyfish head kidney showing two mature rodlet cells associated with the epithelium lining a sinusoid. One cell (A) has made apical contact with the epithelium. A thick, well defined fibrous coat (arrows) is apparent. The coat appears to have dissolved in the apical region of cell A which is attached while in cell B, which remains unattached, the coat is continuous. Several discharged rodlets (arrowheads) are seen in the lumen.

development are seen within the cisternae. They appear to undergo a condensation which accounts for their variable size at this stage. The presumptive younger rodlets are large and appear flocculated while the dense core is lacking at this time. A membrane surrounds the developing rodlets. As the rodlet matures it decreases in diameter as its outer zone becomes more dense and a central core appears. The fibrillar coat, a defining character of the rodlet cell, is immediately found beneath the plasmalemma. It is thin (0.1 - 0.4 μm) and in most cells continuous. Occasionally, there is a small interruption in the coat through which the cytoplasm protrudes (Fig. 3). This protoplasmic extension might be involved in nutrient uptake[1]. These cells are never seen

to be discharging their contents and are found most often deep within the tissue away from the epithelial surface.

2. Mature cell

The mature rodlet cell is oval in shape and has an apical-basal polarity (Figs. 4 and 5). The average length and width of this cell is 8.43 and 5.52 μm respectively. It has a basal nucleus with varying amounts of heterochromatin. The organelles are consolidated near the apical region of the cell. The RER which is most conspicuous in the younger cells, appears to diminish as the cell matures. The most conspicuous structures in the cytoplasm are the rodlets. These components are surrounded by a membranous sac and contain a dense proteinaceous central core[6] and a less dense outer zone composed of glycoprotein[19]. When viewed in longitudinal section the rodlets taper at one end and are oriented toward the apex of the cell. The central core resembles a stylette and extends into tip of the rodlet. Immediately under the plasmalemma is a conspicuous fibrous coat which measures 0.62 ± 0.13 μm in thickness. This structure resembles smooth muscle[20] and presumably aids in the expulsion of the rodlets during apical discharge[1]. According to Hirji and Courtney,[20] the fibrous coat could enable the rodlet cell to withstand pressure exerted by surrounding cells. Once the rodlet cell makes contact with and establishes adhering junctions with the overlying epithelium part of the apical coat dissolves allowing the apocrine release of the cellular contents. Once discharged, free rodlets can be seen within the luminal space (Figs. 4 and 6).

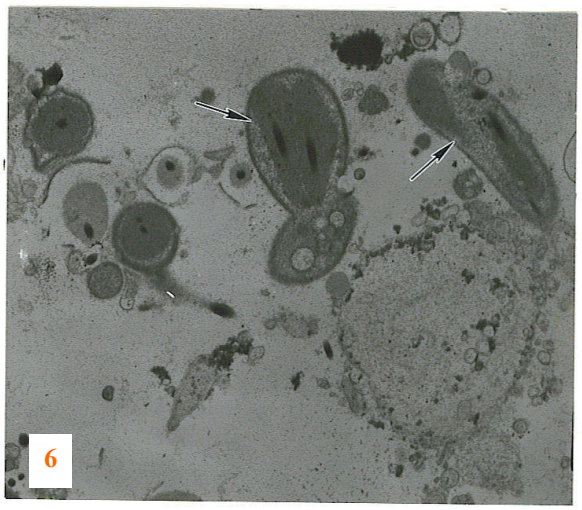
3. Spent cell

Once the rodlet cell releases its contents into the luminal space or occassionally into the intertubular spaces it often remains attached to the epithelium. The cell has a contracted appearance: the outer membrane and fibrillar coat are dramatically puckered or scalloped and a gap or space exists between them (Fig. 7). The cell has an overall round shape (2.4 - 7.8 μm in diameter). The fibrous coat remains thick (0.44 - 0.77 μm). The nucleus appears apoptotic and very little else remains within the cell.

4. Discharged rodlets

The most commonly observed material released from the rodlet cell are the rodlets. These structures remain generally intact (Fig. 4). The integrity of the rodlets, i.e., the cortical area and the central electron dense core, is maintained following expulsion. On occasion, rodlets are arranged as linear groups of two or more. In this case, a common limiting membrane surrounds them (Fig. 6).

The rodlet cell continues to pose a puzzle for those studying fish biology. Support for both tenets as to the origin and function of this cell persists. The endogenous supporters emphasize that the rodlet cells are found in a wide variety of both marine and freshwater fishes[21,22] and thus lack species specificity. Leino[6] claims that rodlet cells must be endogenous because the fibrillar wall develops beneath the cell membrane and is part of the cytoplasm and its structure differs significantly from that of a cyst which would form if the cell were a parasite. He also is of the opinion that the desmosomes which are established by the rodlet cells with neighboring epithelium are not formed between parasitic cells[19,23]. Furthermore, rodlet cells typically do not appear to produce pathological conditions even after releasing their rodlets[6]. The fact that rodlet cells have been observed in extremely young fish[6], including embryos and neonates,[17], supports further the endogenous hypothesis. Although several functions have been proposed for the rodlet cells the currently prevailing idea is that the cell is part of the fish's immune system and may release a defensin-like material in response to environmental contaminants, stress factors or infectious agents[6,7,11,24].



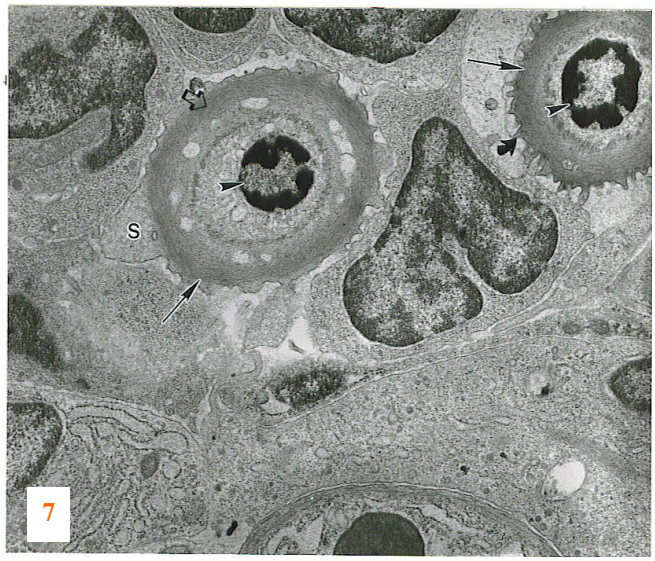


Figure 6. An intertubular space in the platyfish head kidney showing several discharged rodlets. Note, two rodlet sacs (arrows) appear to contain more than one rodlet.

Figure 7. The hemopoietic tissue of the platyfish head kidney showing two spent rodlet cells (arrows). Note the apoptotic nuclei (arrowheads) and the puckered surface of the cell membrane (curved arrow). The fibrous coat (open arrow) remains conspicuous. A space (S) between the plasmalemma and fibrous coat is conspicuous.

Proponents of the exogenous hypothesis propose that the rodlet cells are parasites of some form. Mayberry *et al*[2] suggest that these cells represent a member of the Apicomplexa group of parasites. They base this support on the observation that the size of the rodlet cells and the organelles within the rodlet cells are most similar to those of the Apicomplexa. In addition, Mayberry *et al*.[2] suggest that the rodlets themselves could be rhoptries of sporozoites and merozoites of the Apicomplexa. Barber *et al*.[1] make a point that when the rodlets are released they do not dissolve. According to these investigators it is hard to imagine the rodlets having a normal physiological function if they remain intact. This idea is also supported by Richards *et al*.[25] Barber *et al*.[1] also emphasize that desmosomes can form between parasitic cells and neighboring cells. This is the case with the *Giardia* parasite[1]. Other parasites have been shown to establish gap junctions with surrounding cells[1]. Bielek and Viehberger[3] and Richards *et al*.[25] speculate that the rodlets are foreign as they are often seen being phagocytized by macrophages upon their release. The lack of an inflammatory response in the area of the rodlet cell should not be interpreted as support for the endogenous hypothesis[3]. According to Bielek and Viehberger[3], sporozoans often infect tissues with no signs of inflammation. Furthermore, in fish tissues that are pathologically damaged, although different cells are affected, the rodlet cells are seen to remain intact[3].

When the origin and function of this enigmatic cell are finally resolved, perhaps it will prove be a product of both schools of thought. As suggested by some, the rodlets could be commensals and act as endosymbionts within a specialized granulocyte[2] or the rodlets are true parasites that have infected an endogenous leucocyte[12]. In future work, the use of histochemistry and immunocytochemistry will provide useful tools in helping to unravel the mystery of the rodlet cell.

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Can LASSI Make the Cut?

Using "Learning and Study Strategies" to predict performance in Biology courses

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ABSTRACT

The purpose of this study was to utilize the Learning and Study Strategies Inventory (LASSI) developed by [1]Weinstein, Palmer and Schulte (1987), to identify predictor variables of students' actual performance (numerical grades) in introductory biology courses from three different colleges. The LASSI assesses some of the areas required for success in biology courses, such as attention and listening skills; motivation; anxiety level; information processing; selecting main ideas; self-testing; use of study aids and other important skills. Multiple regression analyses were performed for each school separately as well as collectively. Results indicated some different predictors variable for each school, but also some commonality for the schools pooled together.

INTRODUCTION

The Learning and Study Strategies Inventory (LASSI) was developed by Weinstein, Palmer and Schulte[1] in order to obtain vital information about how students learn, how they study and their attitude towards these practices. It is a test with high reliability and validity[2] and has been used on student populations at both the high school and college levels.

Successful completion of a college-level course is a difficult task for most entering students. It would help students, as well as their instructors, to be able to identify the learning and study strategies that best predict students' course performance, as measured by their numerical grades. Educators may then use the LASSI to determine in which areas students need help.

The LASSI assesses the following parameters:

- Information processing (INP) – Creating effective images and explanation of concepts and using reasoning skills to gain knowledge.
- Selecting main ideas (SMI) – Mining lectures and reading for key information.
- Attitude (ATT) – Mind-set towards school and motivation for success.
- Anxiety (ANX) – Feeling tense about papers, assignments and tests (A high score indicates a high level of anxiety).
- Time management (TMT) – Using schedules and monitoring techniques to ensure timely completion of academic tasks and avoid procrastination. (A low score indicates need for better skills in managing time).
- Concentration (CON) – Focusing on school-related tasks.

- Study aids (STA) – Using charts, summary sheets, mnemonic devices and other aids to help with learning and retention.

- Self-testing (SFT) – Asking questions, and reviewing and applying new information.
- Motivation (MOT) – students' diligence, self-discipline and willingness to work hard.
- Test strategies (TST) – students' approach to preparing for and taking examinations.

If instructors could determine which parameters are the best predictors of performance in general biology courses, then they might be able to successfully guide students to improve those study skills and strategies. After completing the LASSI questionnaire, students currently may take advantage of the newly developed online version of the LASSI.[3] This second phase is an online helping strategy called *Becoming a Strategic Learner*. It provides information and activities designed to help students overcome learning difficulties that are identified during the scoring of the LASSI questionnaires. Students may opt to take this online help program on their own time. Faculty do not have to be present.

A pilot study was performed using the LASSI inventory on three groups of students.[4] Each group was composed of 25 biology students. One group was from an urban community college, (Kingsborough Community College, KCC); a second from a four-year suburban college, (The College of Staten Island, CSI); and a third from a university with strict entrance requirements, (Rutgers, the State University of New Jersey, RU). The official Institutional profiles for each institution indicated the following:

KCC (15,000 students), 30% are African-American, 9% Asian and 13% Hispanic

CSI (11,000 students), 9% are African American, 9% Asian and 11% Hispanic

RU (37,112 undergraduates), 10% are African-American, 18% Asian and 9% Hispanic

Only 52% of the students at KCC are born in the United States, a factor that has a strong impact on students' performance. There are often significant language difficulties, coupled with cultural differences, which frequently lead to serious problems in comprehending concepts, especially in science. Results from this pilot study indicated significant differences among the three schools in areas tested by the LASSI, such as motivation, use of study aids and time management.

In the present investigation the following questions were examined:

Questions:

1. Will there be significant differences in the LASSI predictor variables among these three different colleges?
2. Which of the LASSI parameters will best predict students' performance in biology courses?

Hypotheses

a. There will be significant differences in the LASSI predictor variables for the three different schools.
b. There will be a correlation between the LASSI scores and students' actual performance in the course, as measured by their numerical grades.
c. On the basis of the pilot study, it is predicted that motivation (MOT), use of study aids (STA) and time management (TMT) will be the best overall predictors of biology students' performance.

Previously, only students with adequate academic preparation entered the nation's colleges and universities. Recently, however, an increasing number of at-risk students have been enrolled in introductory courses. Since 1970 a growing trend towards open admission policies has resulted in poorly prepared students who urgently required support for the learning process to occur. Many of these students are unable to meet the academic demands of college level courses and, eventually, they drop out.

Claire E. Weinstein, co-developer of LASSI, believes that most students who have difficulties in school could enhance their performance if they understood their own learning process thoroughly.[1] Students should be able to improve their course grades if they improve the method they use for learning. Weinstein, working at the University of Texas at Austin (UT), has developed successful courses for low achieving students. These courses are designed to enhance their learning and study strategies and, in fact, they significantly increased the graduation rates of at-risk students as compared with the general UT student body.[5]

The LASSI has previously been used to predict success in various types of college courses. Research-Report 2002-06 indicated that mid-term students' performance in intermediate algebra at Boise State University, ID, was consistently related to the concentration scale on the LASSI.[6] Overall, researchers discovered that students' motivation and concentration were the most significant predictors of success for intermediate algebra.

At the University of Missouri at Kansas City (UMKC), interactive video courses with supplemental instruction (VSI) were developed to facilitate students' mastery of difficult subjects. College students in a history course, who had VSI were given the LASSI pre-and-post test to measure changes in their study skills and behavior.[7] Results indicated positive changes in nine out of the ten parameters measured by the LASSI. Attitude scores remained the same.

A study which questioned whether or not changes in study skills have any impact on academic performance for at-risk students in their first college year found that, although students showed significant gains in some study skills areas such as anxiety management, concentration, information processing, ability to self-test and use of study aids, these gains had little impact on academic performance as measured by first and second semester grade point average[8]. One can speculate that, perhaps, students' LASSI scores only indicated better skills in answering the LASSI questionnaires. The study does not mention any intervention program based on the scores of the LASSI pre-test that was administered to the students at the beginning of the study.

In a study to determine the relationship between the LASSI parameters and students' performance in an online research method course,[9] LASSI was administered prior to the start of the course. LASSI scores were later correlated with grades, total class points, project and assignments. Significant correlations were identified between students' performance and their attitude, time management, concentration, selecting main idea, and use of study aids.

In this study attitude was a predictor for whether a student dropped the class prior to the end of the semester. Time management was a very strong predictor for overall students' performance in the online course. The LASSI parameter with the strongest correlation was the use of study aids. Many study skills that had already been acquired prior to the beginning of the online course were important predictor of success in the course.

A study at Murray State University, Kentucky investigated study strategies of 514 college freshmen.[10] The results indicated that students who score high in motivation, concentration and test-taking strategies achieved higher grades at the conclusion of their first year in college. Also students scoring lower in attitude, time management and anxiety found college more challenging.

MATERIALS AND METHODS

The present study administered the LASSI to 100 biology students from each of the three different biology student populations, KCC, CSI and RU (n = 300). The study skills parameters measured by the LASSI are: attitude (ATT), motivation (MOT), time management (TMT), information processing (INP), test strategies (TST), anxiety (ANX), concentration (CON), selecting main ideas (SMI), use of study aids (STA), and self-testing (SFT). Students' resulting study skills scores were compared and statistically analyzed. A Pearson correlation coefficient was performed on all of the predictor variables of the LASSI. Full regression models were examined for evidence of instability due to co-linearity.

Permission from the students at all three schools was requested in writing. Approval from the Committee for the Protection of Human Subjects was obtained from all three institutions. In addition, NIH certification for the study of human subjects was obtained using the NIH Office of Human Subject Research computerized certification process. ESL students at all three students were not part of the group tested with the LASSI.

The investigators scored the questionnaires. Each investigator examined the answers separately and the results were compared and discussed in order to achieve 85% inter-rater reliability. Statistical analyses of the results were performed on the square of the grades to optimize the distribution of the dependent variables. A Multiple Regression test was performed on data from all three schools pooled together. Scatter plots for each school were also done. In addition, qualitative analyses were performed that consisted of examining each significantly different parameter of the LASSI and hypothesizing about possible reasons for the differences between the three student groups for these parameters.

RESULTS AND DISCUSSION

Mean biology course grades in each school were analyzed. For KCC, the mean grade was 66.0, with a standard deviation of 19.8. CSI students had a mean grade of 67.8, with a standard deviation of 21.9. The results demonstrated the highest grades for RU students (mean of 73.8, with a standard deviation of 14.0), as expected, because RU is an academic institution with more rigorous student entrance requirements.

When the Multiple Regression tests were performed on each school separately (Tables 1, 2, 3), the results pointed to different predictors for each school; reduced models for each school can be seen in each table. For KCC 14% of the variance was explained by self-testing (SFT), which was the most reliable predictor of students' performance. For CSI, the most reliable predictors, explaining 21% of the variance, were anxiety (ANX) and motivation (MOT). For RU, the most reliable predictor, explaining 14% of the variance, was motivation (MOT).

The Multiple Regression shown in Table 4 illustrated that 13% of the variance in students' performance was explained by anxiety (ANX) and motivation (MOT). These results supported one of our original hypotheses, based on the pilot study, that motivation (MOT) would be one of the predictors of students' performance. However, for KCC, as indicated previously, ability to self-test (SFT) seemed to be a good predictor of students' performance. Self-testing is important for the learning process. It helps students review for examinations and apply new information.

Rheinberg defined motivation as a characteristic that "provides an impetus towards a goal for all current processes".[11] Therefore, motivation not only affects what students learn but also the intensity and the duration of the learning activities.[12] A 5 year longitudinal study predicting college students' success demonstrated that ability and

Table 1. Regression of grade-squared on predictors: Kingsborough Community College					
Reduced Model					
	Unstandardized Coefficients	Standardized Coefficients		t	Sig
	B	St. Error	Beta		
(Constant)	3097.603	462.833		6.693	0.000
SFT	26.977	6.762	0.391	3.989	0.000
Model R^2	0.153				
Adj R^2	0.144				

Table 2. Regression of grade-squared on predictors: The College of Staten Island					
Reduced Model					
	Unstandardized Coefficients	Standardized Coefficients		t	Sig
	B	St. Error	Beta		
(Constant)	2551.245	601.727		4.240	0.000
ANX	37.546	10.216	0.377	3.675	0.000
MOT	20.867	8.700	0.246	2.399	0.019
Model R^2	0.230				
Adj R^2	0.210				

Table 3. Regression of grade-squared on predictors: Rutgers University					
Reduced Model					
	Unstandardized Coefficients	Standardized Coefficients		t	Sig
	B	St. Error	Beta		
(Constant)	4637.618	352.465		13.158	0.000
MOT	22.505	6.516	0.370	3.454	0.001
Model R^2	0.137				
Adj R^2	0.126				

Table 4. Regression of grade-squared on predictors: Schools Pooled					
	Reduced Model				
	Unstandardized Coefficients	Standardized Coefficients		t	Sig
	B	St. Error	Beta		
(Constant)	3442.062	310.200		11.096	0.000
ANX	16.145	4.786	0.204	3.374	0.001
MOT	19.361	4.273	0.274	4.531	0.000
Model R^2	0.132				
Adj R^2	0.125				

Figure 1a: KCC: distribution of grades and plot of grade^2 by motivation

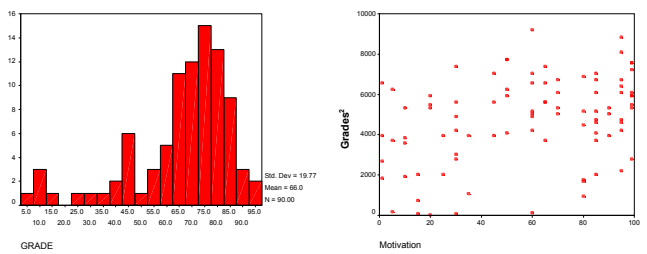


Figure 1b: CSI: distribution of grades and plot of grade^2 by motivation

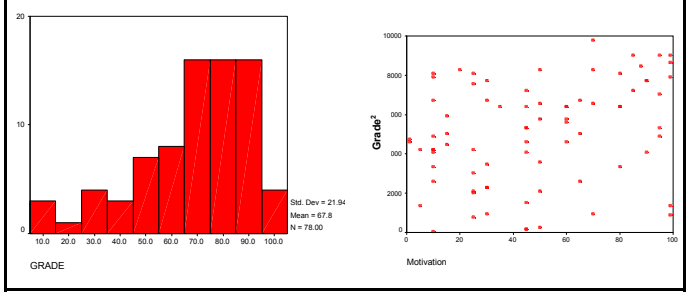
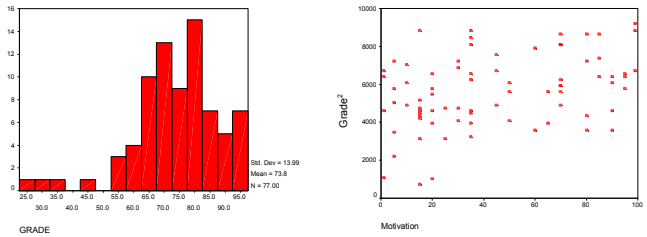


Figure 1c: RU: distribution of grades and plot of grade^2 by motivation



motivational variables both proved to be important in predicting students' performance, at least in the short term.[13] The present study indicated that students with the lowest grades had the lowest motivation. However, the scatter plots tables (Figure 1a,b,c) suggested that there was a greater variety of motivation scores, hence performance, within the KCC student group than with the other schools.

This variety of performance may be reflective of the tremendous diversity of the KCC student population. Students at KCC come to biology courses with a multitude of different academic and cultural backgrounds which impinge upon their learning processes.

As previously mentioned, anxiety also appeared to be a good predictor of students' performance. In order to increase students' performance, educators and counselors should be able to help students with low scores on the anxiety scale. Low scores on this scale indicate that students have trouble concentrating because of fears about failure and incompetence. Programs based on the LASSI scores should aim at helping students to deal with irrational thoughts and negative self-talk, while learning to take responsibility for the direction of his/her own thinking process.[1] These programs should be handled by the counseling departments at individual schools.

This study also indicated the need to introduce methods to increase students'

motivation, which appeared to be an overall predictor of students' performance. In addition, since motivation is strongly correlated with most of the LASSI parameters, (self-testing, selecting main ideas, use of study aids, time management and test-strategies), we can conclude that motivation is the most significant predictor of performance.

The main purpose of using the LASSI questionnaires is to assist biology students in taking inventory of their learning skills and, eventually, to improve these skills which may result in better performance in their biology courses. Psychological counseling, coupled with teaching methods aimed at increasing their study strategies, could be useful tools to increase their motivation. Furthermore, future goals for our particular institution, KCC, could be to implement programs that include online improvements, such as the newly developed online LASSI, *Becoming a Strategic Learner*. This module contains detailed instructions that guide students through each of the LASSI parameters, with the aim of improving specific weaknesses that students might have demonstrated during the questionnaire phase. The online program could be particularly useful for KCC students. Moreover, other methods to aid students might include the use of cooperative learning groups, where students teach each other in a more relaxed setting. This method might be used to help increase students' motivation because, in a cooperative learning environment, students have more control of the learning process. There are many ways to improve students' learning and study strategies. It is hoped that colleges and universities will assess students' difficulties and employ a variety of methods to accomplish the goal of supporting students so that they may succeed in college.

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37th ANNUAL FALL MACUB CONFERENCE MEMBER PAPER PRESENTATIONS AND POSTER PRESENTATIONS

Proposals are now being accepted for member paper presentations and poster presentations. If you wish to make a paper presentation (20 min.) which will discuss the results of research or share ideas, please send an abstract to Prof. Carla Beeber, Department of Biological Sciences, Kingsborough Community College, 2001 Oriental Boulevard, Brooklyn, NY 11235 (718-368-5265).

If you or any of your students wish to make poster presentations, please notify Dr. Mary Ortiz, Department of Biological Sciences, Kingsborough Community College, 2001 Oriental Boulevard, Brooklyn, NY 11235 (718-368-5724) or Prof. Anthea Stavroulakis, Department of Biological Sciences, Kingsborough Community College, 2001 Oriental Boulevard, Brooklyn, NY 11235 (718-368-5095).

The abstract submission deadline is October 20, 2004. No abstracts will be accepted after that date.

INSTRUCTIONS FOR CONFERENCE POSTER ABSTRACTS

Abstracts of poster presentations for the Annual MACUB Conference should be submitted to Dr. Mary Ortiz or Dr. Anthea Stavroulakis, Department of Biological Sciences, Kingsborough Community College, 2001 Oriental Boulevard, Brooklyn, NY 11235 by mail or email and conform to the following format. The total abstract including title, authors, affiliations, faculty mentors, text and acknowledgments should be typed with an Arial font no smaller than 10 point (title and authors in bold) and sized to fit into a space described by the box below (7.25" X 3.00"). Indicate presenting author's class level (undergraduate or graduate student) as a note, not in the abstract. **Please follow the form in the sample abstract and submit a computer file on disc or a camera ready copy.**

Sample Abstract

Design and Construction of a RET Mutant Expression Vector. Eduardo Areche, and Ramona Kennedy, Montclair State University. Faculty Mentor: Dr. Quinn C. Vega.

RET is a transmembrane tyrosine kinase activated in response to a ligand. Under normal circumstances, the ligand binds to the extracellular domain leading to activation of the cytoplasmic kinase domain. In specific disease states such as multiple endocrine neoplasia (MEN) 2A and 2B, the receptor is activated in the absence of this ligand leading to thyroid tumors. MEN2A is caused by a mutation in the extracellular domain leading to receptor dimerization and activation. MEN2B is caused by a mutation in the cytoplasmic domain leading to increased activity and altered autophosphorylation. As yet, the sites of autophosphorylation in the MEN2B mutant have not been identified. In order to analyze the phosphorylation pattern and activity of the MEN2B mutant, it would be beneficial to express and purify the protein. In order to rapidly express and purify the RET mutant, a bacterial system will be used. This system consists of a plasmid containing an ampicillin resistance gene and a multi-cloning site located behind the glutathione-S-transferase (GST) gene. Using DNA amplification techniques and other molecular biology tools, this vector will allow us to make a protein consisting of GST and the kinase domain of RET. This fusion protein can then be purified using GST's affinity for glutathione. By attaching glutathione to beads, the fusion protein can be separated from the column using excess glutathione. Upon purification of the kinase, enzyme activity and function can be further analyzed.

NOMINATION RESULTS

The following individuals were nominated for the respective positions:

President - Gray Sarinsky

Corresponding Secretary - Paul Russo

Member-at-Large (2 positions) - George Sideris Michael Palladino

The election will be held during the Fall Conference

2004 MACUB Conference Registration Form
37th Annual MACUB Conference at Long Island University
Saturday, November 6, 2004

Registrations should be returned no later than October 25, 2004. Registration on the day of the conference will be $50. A separate form must be completed by each person attending the conference. Please photo copy this form for each additional registrant.

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Registration fees are refundable upon written notification by **October 29, 2004.** The membership fee ($15 for regular members and $5 for student members) will be deducted. *No refunds will be given postmarked after October 29, 2004.*

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