محمد علي نقوي

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EDUCATION:

Expect to graduate in November 2008 with a Bachelors in Developmental Biology

RESEARCH PROJECTS:

UNI393:

Vegetal Rotation in Xenopus laevis is an important force generating process during Gastrulation that plays an important part in tissue separation at the Brachet's cleft, as well as in the internalization of the mesoderm. XRhoA plays a major role in vegetal rotation since a dominant-negative form thereof significantly blocks vegetal rotation. Inhibiting Rho-Activated Kinase (ROK) also causes the same effect. The blastopore never closes in these embryos. Here we show that the DN-XRhoA-induced phenotype can be partially rescued by countering the effects of the Dominant Negative with three times more amount of the Wildtype RNA. Moreover we also found that inhibiting myosin just before vegetal rotation has a weak effect on vegetal cell upwelling. This suggests the involvement of additional players downstream of ROK in the pathway that causes vegetal cell upwelling during gastrulation.

ZOO499:

Vegetal Rotation in *Xenopus laevis* is an important force generating process during Gastrulation that plays an important part in tissue separation at the Brachet's cleft, as well as in the internalization of the mesoderm. Here we show that XRhoA plays a major role in vegetal rotation since a dominant-negative form thereof significantly blocks vegetal rotation at low and intermediate doses and freezes the embryos in the blastula stage at higher doses with little or no development thereafter. The blastopore never closes in these embryos. Moreover we also show that inhibition of ROK, a kinase acting downstream of RhoA in many cell mobility pathways, produces a phenotype with respect to vegetal rotation that is strikingly similar to the phenotype produced by DN-XRhoA. This suggests a possible downstream role of ROK in RhoA signalling during vegetal rotation.

ZOO498:

Investigating the correlation between fitness and recombination (if any) in *Drosophila melanogaster*. The idea that there might be such a correlation came from the fact that adverse environmental conditions (such as a deviation from the optimal temperature, overcrowding, malnutrition etc.) have long been known to increase the rate of recombination. This increase in recombination, as theorized, copes with the environmental stress by generating a unique haplotype (in the next generation) that might carry the allelic combination perfectly equipped to comply with the environmental stress.

These earlier investigations led to our hypothesis that if an organism was subjected to stress by altering its genotype rather than by changing the environment, it would also have a similar increase in recombination as was observed with environmental stress in earlier studies. In other words, individuals with a "bad" genotype should have a higher recombination rate than those with "good" genotypes; because recombination in case of a bad genotype may serve to assemble a better haplotype, whereas in case of a good genotype, recombination may break apart an already good haplotype.

Here we assumed that having deleterious alleles would generate the same kind of effect on the overall physiology of the organism as was caused due to environmental stress. For example a mutation that debilitates the feeding apparatus will generate the same consequences as if the individual was subjected to malnutrition or food shortage.

WORK EXPERIENCE:

Agrawal Lab (Dr. Aneil Agrawal), Dept. of Zoology University of Toronto

Fall/Winter 2005-2006 Work-study placement

Position: Research Assistant.

Responsibilities:

Assisted graduate students in a study on the evolution of genetic recombination as an adaptive strategy in ***Drosophila melanogaster***.

The project was aimed at exploring the adaptive significance of the evolution of genetic recombination during gametogenesis in female *Drosophila*.

Andrade Lab (Dr. Maydianne Andrade), Dept. of Zoology U of T

Summer 2005 Work-study placement

Position: Research Assistant.

Responsibilities:

Assisted a postdoc in his study on cannibalistic tendencies among ***Latrodectus hasselti*** (red-back) spider lings.

Subjected the experimental animals to the trials and procedures of the protocol.

Recorded observations following each trial and procedure.

Fed and breed the subjects for use in the experiment.

Informed the researcher, of any trends or patterns in the course of the experiment, or of any unexpected findings.

Pathways to Education (A project of Regent park Community Health Center)**:**

November 2004 onwards.

Position: Tutor (Grade 11 & 12 Biology/Chemistry)

Responsibilities:

Provided academic assistance to high school students.

Helped students acquire the key concepts covered in their curriculum.

Helped students undertake academic activities assigned to them by their schoolteachers.

Toronto and Region Conservation Authority:

July 2003 onwards

Position: Volunteer.

Responsibilities:

Collected and compiled information on assigned endangered species in order to

generate public education handouts.

Conducted terrestrial monitoring surveys in the designated site.

Conducted wood duck nest-box surveys.

Gave presentations to visitors on public education events.

Titles Received:

Volunteer of the month for March 2004.

Sindh Wildlife Management Board (Herpetology Division)**:**

June 1999 to September 2002.

Position: Field Surveyor (Seasonal Assignments).

Responsibilities:

Collected data on the age, sex, and some body indices of the individuals of the target species in designated study areas.

Collected loose skin, venom and saliva samples for the lab.

Collected crude data for population assessments.

University of Karachi (Sindh Medical College):

October 2000 to April 2002

Position: Volunteer (Anatomy Lab).

Responsibilities:

Assisted the instructor in dissections and to get first hand demonstrations and to give demonstrations to assigned group of classmates later.

Shah Wilayat Higher Secondary School (Karachi, Pakistan):

April 1997 to May 1999

Position: Volunteer (Biology Lab)

Responsibilities:

Sat up apparatuses before the beginning of lab exercises and/or exams.

Took the set of test observations prior to the start of a lab.

Cleaned the apparatuses at the end of a lab.

Listed preserved and labeled specimens (mostly tidal and marine invertebrates) collected on field trips.

SKILLS:

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Molecular Biology Lab Course (BGYB12)**:**

Summer 2005

Introduction to different molecular biology laboratory techniques.

Spectrophotometry.

Culturing bacteria using liquid medium and plates.

Analysis of bacterial growth & enumeration using spectrophotometric data.

Designing primers for amplification of DNA using web-softwares.

Cloning amplified DNA into plasmid vectors; transforming *E. coli* with recombinant plasmids using chemical transformation.

Growing and characterizing transformed bacteria using selectable markers.

Extraction and purification of plasmid DNA; restriction digestion and agarose gel electrophoresis; restriction mapping.

Extraction of proteins from the homogenate, ion exchange chromatography, conducting functional assays and running SDS-PAGE gels.

REFERENCES:

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