

Research Summary for Allison Vlach

Third-Year Beckman Scholar (2015-2016), University of Nebraska-Lincoln

Comparative Analysis of the Physical and Functional Properties of the Human Hyaluronidases

Hyaluronic acid (HA) is a naturally occurring carbohydrate polymer within the human body. It is mostly found in the extracellular matrix, especially in the skin, eyes, and cartilage of joints. Newly made HA exists as polymers with a wide range of average lengths, which can be degraded to shorter polymers and tetrasaccharide fragments by an enzyme called hyaluronidase, or Hyal for short. An excess of the Hyal enzyme has been linked to increased cancer metastasis for several reasons. First, the degradation of HA polymers in the extracellular matrix makes it easier for cancerous cells to move to new areas in the body. In addition, the surrounding cells recognize shorter HA polymers as a signal to reorganize tissue and bring in new blood vessels that feed the tumor cells. Finally, the shedding of Hyals in small vesicles is increased when Hyal is in excess, which allows other cells to take it in and use HA for an additional fuel source. There are four Hyal enzymes in the human body, named Hyal 1, 2, 3, and 4. Only Hyal 1 has been extensively researched and shown to have significant HA degrading activity. Hyal 2 has been researched to an extent, but still little is known about its properties. Hyals 3 and 4 have hardly been studied and it is unknown if they contain any enzyme activity. My project will involve characterizing all four Hyal enzymes by determining their location in the cell, thermal stability, substrate-binding ability, and substrate-degrading function.

Unofficial UNL Undergraduate Academic Record

Name: Allison Nicole Vlach
Student ID: 93551167

Institution Info: University of Nebraska - Lincoln
 Print Date: 01/29/2015

Other Institutions Attended:

Washburn Rural HS
 Washburn Univ

Beginning of Undergraduate Record

Fall 2013					
Course	Description	Grade	Cr	Gr	Gr
CHEM 109	GENERAL CHEMISTRY I	A	4.00	16.00	
EDPS 97	COLLEGE MAJOR FORUM <i>College Major Forum</i>	P	0.00		
ENGL 216	CHILDRENS LITERATURE	A	3.00	12.00	
GEOG 140	INTRO TO HUMAN GEOG	A+	3.00	12.00	
MATH 106	ANLY GEOM & CALC I	A+	5.00	20.00	
PHIL 106	PHIL&CURRENT ISSUES	A	3.00	12.00	

Test Credits:

Art History	3.00
English Literature	3.00

Test Credits Total: 6.00

Transfer Credit from Washburn Univ

COLLEGE ALGEBRA	B	3.00
Transfer Totals:		3.00

	AHRS	EHRS	QHRS	QPTS	GPA
Term	18.00	18.00	18.00	72.00	4.000
Transfer	9.00	9.00			
Combined	27.00	27.00	18.00	72.00	4.000
Cumulative	27.00	27.00	18.00	72.00	4.000

Term Honor: Honors Convocation
 Program: Arts & Sciences Undergraduate
 Major: Biochemistry
 Minor: Chemistry
 Minor: Psychology

Spring 2014					
Course	Description	Grade	Cr	Gr	Gr
CHEM 110	GENERAL CHEMISTRY II	A+	4.00	16.00	
LIFE 120	FUND OF BIOLOGY I	A	3.00	12.00	
LIFE 120L	FUND BIOLOGY LAB I	A+	1.00	4.00	
MATH 107	ANLY GEOM & CALC II	B+	4.00	13.32	
PSYC 181	INTRO TO PSYCHOLOGY	A+	4.00	16.00	
	AHRS	EHRS	QHRS	QPTS	GPA
Term	16.00	16.00	16.00	61.32	3.832
Cumulative	43.00	43.00	34.00	133.32	3.921

Program: Ag & Natural Resources Ugrd
 Major: Biochemistry
 Minor: Psychology
 Minor: Mathematics

Summer 2014					
Course	Description	Grade	Cr	Gr	Gr
LIFE 121	FUND OF BIOLOGY II	A	3.00	12.00	
LIFE 121L	FUND BIOLOGY LAB II	A	1.00	4.00	
STAT 218	INTRO TO STATISTICS	A	3.00	12.00	

	AHRS	EHRS	QHRS	QPTS	GPA
Term	7.00	7.00	7.00	28.00	4.000
Cumulative	50.00	50.00	41.00	161.32	3.934

Program: Ag & Natural Resources Ugrd
 Major: Biochemistry
 Minor: Psychology
 Minor: Mathematics

Fall 2014					
Course	Description	Grade	Cr	Gr	Gr
BIOS 213	HUMAN PHYSIOLOGY	I		(3.00)	
BIOS 213L	HUMAN PHYSIO LAB	I		(1.00)	
CHEM 251	ORGANIC CHEMISTRY I	A	3.00	12.00	
CHEM 253	ORGANIC CHEM I LAB	A	1.00	4.00	
CHEM 898	SPECIAL PROBLEMS <i>Teaching Methods in Chemistry</i>	P		1.00	
MATH 208	CALCULUS III	W		(4.00)	

	AHRS	EHRS	QHRS	QPTS	GPA
Term	13.00	5.00	4.00	16.00	4.000
Cumulative	63.00	55.00	45.00	177.32	3.940

Program: Ag & Natural Resources Ugrd
 Major: Biochemistry
 Minor: Psychology
 Minor: Mathematics

Spring 2015					
Course	Description	Grade	Cr	Gr	Gr
ASCI 260	BASIC EQUITATION			(2.00)	0.00
BIOS 206	GENERAL GENETICS			(4.00)	0.00
CHEM 252	ORGANIC CHEMISTRY II			(3.00)	0.00
CHEM 254	ORGANIC CHEM II LAB			(1.00)	0.00
CLAS 116	SCIENTIFIC GRK & LAT			(2.00)	0.00
ECON 212	PRINC OF MICROECON			(3.00)	0.00

	AHRS	EHRS	QHRS	QPTS	GPA
Term	15.00	0.00	0.00	0.00	0.000
Cumulative	78.00	55.00	45.00	177.32	3.940

Program: Ag & Natural Resources Ugrd
 Major: Biochemistry
 Minor: Psychology
 Minor: Mathematics

Undergraduate Career Totals

	AHRS	EHRS	QHRS	QPTS	GPA
Cumulative					
Enrollment	69.00	46.00	45.00	177.32	3.940
Transfer	9.00	9.00			
Combined	78.00	55.00	45.00	177.32	3.940

End of Unofficial UNL Undergraduate Academic Record