## BIOL 1114 Exam #3 (Preview) November 19, 2018

Use a #2 pencil to fill in the information on your NCS answer sheet.

1) Enter your last name and first name as indicated and darken the corresponding circles

2) Enter your CWID in the spaces indicated for "Student ID" and darken the corresponding circles.

3) Enter 1833 in the spaces indicated for "Course number" and darken the corresponding circles.

4) Enter the form of the exam 001 or 002 in the spaces indicated for "SEC" and darken the corresponding circles

5) Write your O-Key Account Username above the words "Last Name".

		2 <sup>nd</sup> Letter							
1 <sup>st</sup> Letter	U		С		A		G		3 <sup>rd</sup> Lette
U		Phenylalanine	UCU UCC UCA UCG	Serine	UAU UAC	Tyrosine	UGU UGC	Cysteine	U C
	UUA	A G			UAA	CTOP.	UGA	STOP	A
	UUG				UAG	STOP	UGG	Tryptophan	6
с	CUU CUC	Leucine	CCU CCC CCA CCG	CAU CAC	Histidine	CGU CGC		U C	
	CUA CUG			Proline	CAA CAG	Glutamine	CGA CGG	Arginine	AG
А	AUU AUC	U C Isoleucine A	ACU ACC ACA ACG	Threonine	AAU AAC	Asparagine	AGU AGC	Serine	U C
	AUA				AAA		AGA AGG	Arginine	A
	AUG	Methionine; START			AAG	Lysine			G
6	GUU	GUU GUC GUA GUG	GCU GCC GCA GCG	Alanine	GAU	Aspartate	66 U	Glycine	U
					GAC		000		
	GUG				GAG	Glutamate	666		G

important equations: r = b - d G = r N G = r N [ (K-N)/K ]

British economist Thomas Malthus (1766-1834) had a strong influence upon Charles Darwin. After carefully collecting data from the history of many human civilizations, Malthus wrote that human populations, like animal and plant populations in nature, grow rapidly and deplete their resources, resulting in famine and disease, which caused a population decline. Darwin incorporated these observations into his ideas on natural selection following his voyage to the Galápagos Islands.

Some studies in trout show seasonal changes in metabolic rate (MR) independent from the surrounding temperature, for example higher MR in spring than summer.

Most fishes are about the same temperature as the surrounding water, which may be cold or warm. However, a few species have evolved the ability to produce heat, a condition called either **heterothermy** or **regional endothermy**. Heterotherm fishes have "heater organs" such as *red swimming muscles* that produce heat during cold temperature. *Red swimming muscles* enable the fish to travel long distance and contain more mitochondria and more synaptic connections with motor neurons than *white muscles*.

Some fish such as Atlantic Cod synthesize *antifreeze proteins* during winter to prevent formation of ice crystals, which can puncture cell membranes. There is an apparent variation among populations of Atlantic Cod in the ability of the fish to synthesize *antifreeze proteins*. Ichthyologist Elizabeth Turner did an extensive tissue sampling in Cod populations from the warm waters of Florida and the cold waters of Maine to determine either the presence or absence of *antifreeze proteins* in their cells. She found out that Cod from Florida cannot produce the protein. Conversely, those fishes from Maine have the *antifreeze protein*. She captured a female from Maine and a male from Florida and bred them. She found out that all the offspring in the first generation had *antifreeze protein*. Dr. Turner sequenced the gene that codes for the *antifreeze protein*. She found out this gene has a sequence of 378 nitrogenous bases.

Biochemists at the University of British Columbia recently announced that they had discovered an enzyme that is able to cuts off both the A and B antigens from the surfaces of human red blood cells (RBCs). They were optimistic about the medical implications of this discovery.

Duchenne muscular dystrophy (DMD), an X-linked recessive trait, is a human disease that causes progressive muscular weakness.

Rather than use the estimates of total populations of macrophages or B-cells populations in a human, health care professionals use population estimates in microliters( $\mu$ L) of blood. During a secondary pneumonia infection, Pat's macrophage count (N) in a  $\mu$ L rises from 100 macrophages to 400 macrophages in a day.