May 4th -8th , 2020
Class 31 "METABOLISM OF NUCLEOTIDES"

Tasks:

I. Prepare <u>at least 6-pages outline of the class,</u> containing answers to the questions listed in the training guidelines.

THEORETICAL PART

1. Biosynthesis of purine nucleotides: synthesis of phosphoribosylamine, origin of atoms in the purine ring.
2. Inosinic acid as a precursor for synthesis of adenylic and guanylic acids. Regulation of biosynthesis of purine nucleotides.
3. Biosynthesis of pyrimidine nucleotides. Regulation of biosynthesis of pyrimidine nucleotides.
4. Synthesis of deoxyribonucleotides. Synthesis of thymidylic acid.
5. Digestion of nucleic acids in the gastrointestinal tract. Degradation of nucleic acids in tissues.
6. Re-utilization of nucleosides and nitrogenous bases for synthesis of nucleotides (salvage pathways).
7. Degradation of purine and pyrimidine nucleotides.
8. Disorders of metabolism of nucleotides: xanthinuria, orotaciduria, gout.

LITERATURE FOR TRAINING:

1. Harper's Illustrated Biochemistry / Robert K. Murray [et. al.]. – 28th ed. – New York [etc]: McGraw-Hill, Medical, 2009. – P. 285-291, 293-301, 630-632.
2. Harper's Illustrated Biochemistry / Robert K. Murray [et. al.]. – 29th ed. – New York [etc]: McGraw-Hill, Medical, 2012. – P. 323-342, 741-743.
3. Biochemistry: manual for the medical faculty for international students (in English) / Н.Э. Петушок, А.А. Масловская, М.Н. Курбат. – Гродно: ГрГМУ, 2014. – P. 219-231. (Chapter 27).
4. Harper's Illustrated Biochemistry / Robert K. Murray [et. al.]. – 31st ed. – New York [etc]: McGraw-Hill, Medical, 2018. – P. 319-337.
5. Harper's Illustrated Biochemistry / Robert K. Murray [et. al.]. – 30th ed. – New York [etc]: McGraw-Hill, Medical, 2015. – P. 347-358.
6. Lecture "Metabolism of nucleotides".

II. **Draw** ***GENERAL SCHEME OF AMINO ACID METABOLISM***

using template:

- Place acetyl CoA to the lower LEFT corner.
- Write the names of **essential** and **non-essential amino acids** into appropriate boxes.
- The scheme must contain:
  - Sources of amino acids in tissues.
  - General pathways of amino acid metabolism (**decarboxylation, deamination, transamination);**
  - Synthesis of glutamine and asparagine;
  - Urea cycle.
- Write the names of **ketogenic amino acids,** which break down leads to formation of acetyl CoA **(**Phe, Lis, Tyr, Leu, Trp).
- Write the names of amino acids, which breakdown leads to the TCA cycle substrates : **oxaloacetate, succinyl CoA, α-ketoglutarate;**

On the back side of the scheme write normal values of the activities of diagnostic enzymes and the levels of the end products of amino acid and nucleotide metabolism:

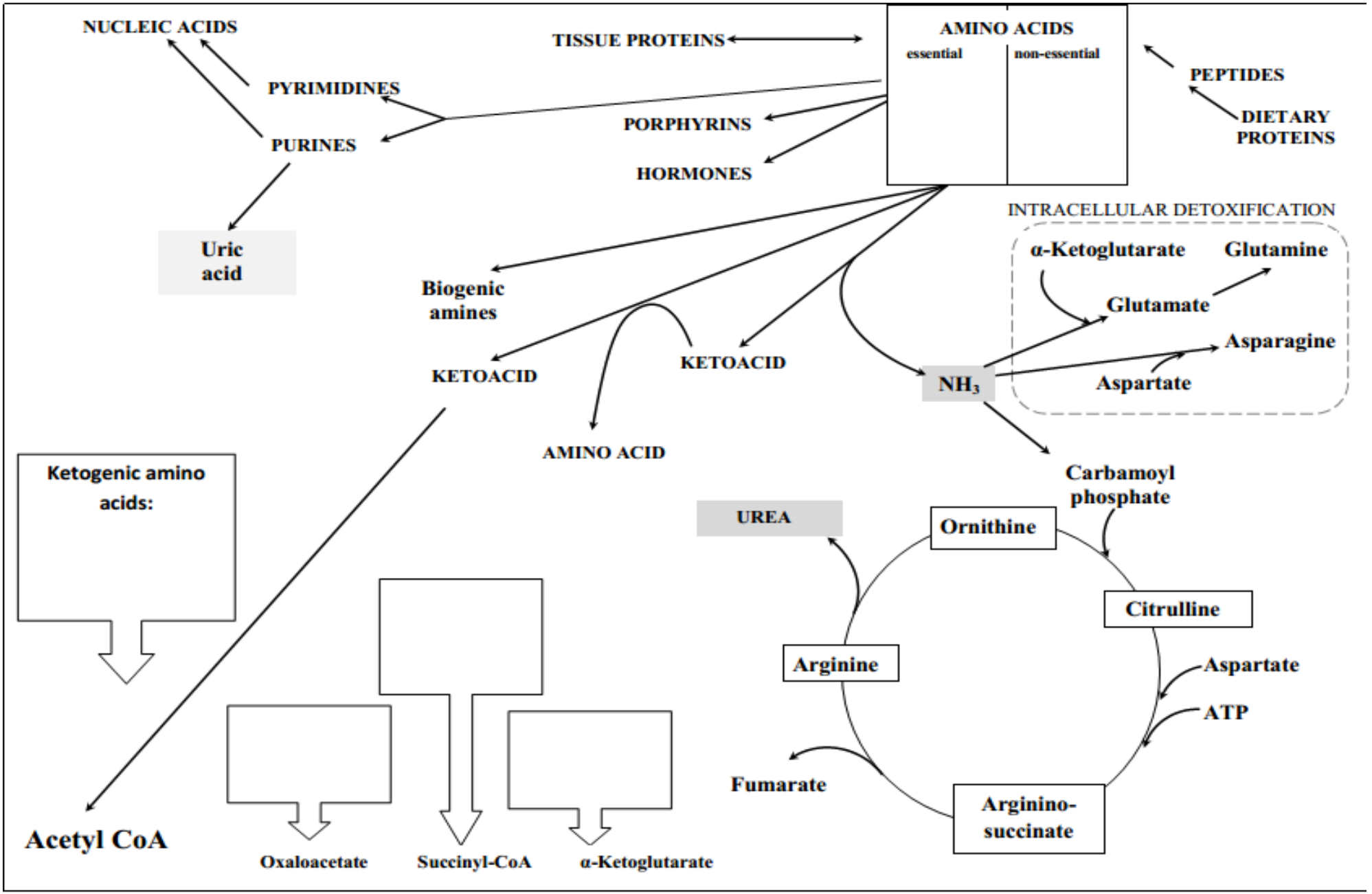
AlAT – 0.1 – 0.68 mmol/h/l

AsAT - 0.1 – 0.45 mmol/h/l

- Urea in blood – 2.5 – 8.33 mmol/
- In urine – 333 – 583 mmol/day
- Creatinine – 53 – 115 mkmol/l
- Uric acid in blood – 0.19 – 0.40 mmol/l
- In urine – 1.6 – 6.4 mmol/day

The notes and schemes will be revised by your teacher by the end of the distance learning period.

Please, report whether you have received this letter.


NUCLEIC ACIDS
PYRIMIDINES
PURINES
Uric acid
TISSUE PROTEINS
AMINO ACIDS
essential
non-essential
PEPTIDES
DIETARY PROTEINS
PORPHYRINS
HORMONES
INTRACELLULAR DETOXIFICATION
α-Ketoglutarate
Glutamine
Glutamate
Asparagine
Aspartate
Biogenic amines
KETOACID
KETOACID
AMINO ACID
NH3
Ketogenic amino acids:
Carbamoyl phosphate
UREA
Ornithine
Citrulline
Aspartate
ATP
Arginine
Fumarate
Arginino-succinate
Acetyl CoA
Oxaloacetate
Succinyl-CoA
α-Ketoglutarate

Template.