CADERNO DE QUESTÕES

NÚCLEO DE LÍNGUAS *CAMPUS* ITAPERI | EXAME DE PROFICIÊNCIA 2022

Nome:
CPF:

LEIA ATENTAMENTE AS INSTRUÇÕES SEGUINTES:

1. As respostas deverão ser em Língua Portuguesa. Esteja atento à linguagem formal da Língua Portuguesa, observando as normas de uso gramaticais e ortográficas;
2. O tempo disponível para esta prova é de três horas e trinta minutos, tendo início às 13h30min e encerrando às 17h, não haverá tempo adicional;
3. O celular deverá estar desligado durante toda a avaliação, sob pena de ser desclassificado(a);
4. Será permitido o uso, somente, de dicionário impresso. Não será permitido, em hipótese alguma, o uso de dicionário eletrônico;
5. Ao terminar a prova, envie este CADERNO DE QUESTÕES por meio do *Google Classroom*;
6. Será permitido sair da sala do *Google Meet* somente após decorrida uma hora do início da aplicação;
7. O resultado preliminar será divulgado, no site ***http://www.uece.br/nucleodelinguasitaperi/proficiencia/***, no dia **13 de setembro de 2022**.
8. O resultado final será divulgado, no site ***http://www.uece.br/nucleodelinguasitaperi/proficiencia/***, no dia **26 de setembro de 2022**.

EXAME DE PROFICIÊNCIA EM LÍNGUA INGLESA

ÁREA 04: Ciências Agrárias (Agronomia, Recursos Florestais e Engenharia Florestal, Engenharia Agrícola, Zootecnia, Medicina Veterinária, Recursos Pesqueiros, Engenharia de Pesca e Ciência e Tecnologia de Alimentos);

COMPARATIVE PHYSIOLOGICAL ASPECTS OF PLASMA HEMOSTASIS OF SOME COMMERCIAL FISH SPECIES

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The clotting (blood coagulation) system appeared before the descent of tetrapods and bony fishes about 430 mln years ago. The hematological triad of roundworms, cartilaginous fishes, and cartilaginous ganoids formed the main evolutionary path of the blood system by natural selection. The intrinsic, extrinsic, and common pathways of the clotting system of marine and freshwater bony fishes have been described by colleagues [LEWIS 1996; OBETA et al. 2019], including theoretical and experimental aspects. Along with this, the genes of multiple factors comprising the hemostatic response cascade have been characterized, and the ways of this essential function formation in phylogeny have been proposed.

Rapid blood clotting is very important for fish life, especially benthic fish. Studies carried out on bony fishes indicate that the coagulation process is fundamentally similar to other vertebrates, particularly mammals, with the only difference being that it is adapted to lower temperatures. The main thrombogenic protein components have been found in fish: thrombotropin, prothrombokinase and thrombokinase, prothrombin, thrombin, and fibrinogen. The abovementioned genetic and routine laboratory screening tests used for human blood also show that fish blood clotting factors are similar to those in mammalian or human blood, and the coagulation factors cascade also involves three classical processes (phases).

Enzymes involved in the blood clotting of fish can work in a wider range of temperature than in warm-blooded species. Blood clotting in fishes: loach (Cobitidae), perch (Perca), sterlet (Acipenser ruthenus), sturgeon (Acipenseridae), carp (Cyprinus carpio), and gudgeon Gobio gobio), is almost instantaneous, i.e., within 10–12 s, whereas in mammals and birds – within 2–12 min. Skin mucus, which is believed to contain a large amount of thrombokinase, serves as a process accelerator.

The main differences between blood clotting in fish and that in mammals lie in the predominance of internal conversion of prothrombin to thrombin in the latter, while the extrinsic pathway is probably similar. Platelets in fish play a central role in the internal conversion of prothrombin to thrombin and are responsible for clot retraction, although the nature of platelet factors promoting clotting is unknown. As for bony fish of fishery importance, some data on secondary (plasmic) hemostasis in bony fish cover a

small number of freshwater species, such as tilapia (Oreochromis mossambicus), carp (Cyprinus carpio), rainbow trout (Onchorynchus mykiss), and catfish (Ameiurus nebuiosus).

LEWIS [1996] studied the coagulation cascade of vertebrates, including cartilaginous fish, bony fish, and cartilaginous ganoids. This work quantitatively characterised the hemostasis functioning of valuable fish species like sturgeon (Acipenseridae), arctic trout (Salvelinus alpinus), flounder (Paralichthys dentatus), sea bass (Dicentrarchus labrax), mullet (Mugil cephalus), and others.

These studies revealed differences in clotting time and content of certain clotting factors in different groups of fish. They emphasized the need to use validated and uniform procedures (e.g., nature of thromboplastin used, type of laboratory dishes) in hemostasis studies of these hydrobionts. DOUDA et al. [2017] suggest that interspecies differences in blood clotting in fish may well be the result of differences in the resistance of these fish to stress. We assume that the functioning of the plasma hemostasis system has species specificity regardless of stress resistance, especially in commercial fish belonging to different classes.

As for bony fish of fishery importance, some data on secondary (plasmic) hemostasis in bony fish cover a small number of freshwater species, such as tilapia (Oreochromis mossambicus) [SMILEY et al. 2001], carp (Cyprinus carpio), rainbow trout (Onchorynchus mykiss), and catfish (Ameiurus nebuiosus). LEWIS [1996] studied the coagulation cascade of vertebrates, including cartilaginous fish, bony fish, and cartilaginous ganoids. This work quantitatively characterised the hemostasis functioning of valuable fish species like sturgeon (Acipenseridae), arctic trout (Salvelinus alpinus), flounder (Paralichthys dentatus), sea bass (Dicentrarchus labrax), mullet (Mugil cephalus), and others.

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The main objective of our study was a comprehensive assessment of the plasma component of the hemostasis system of some common species of commercial fish. To achieve it, we had to solve the following tasks: (1) to study the functional state of the plasma component of hemostasis in commercial species of cartilaginous ganoids and bony fishes; (2) to compare the pathways of coagulation activation in fish of different classes.

RESULTS AND DISCUSSION

Secondary hemostasis is mainly performed by plasma clotting factors and includes three phases. Activated partial thromboplastin time (APTT) characterizes the first phase of blood coagulation (prothrombinase formation). It describes the intrinsic pathway of coagulation activation, prothrombin formation. It is a multistep process that results in the accumulation of a complex of factors in the blood that can convert prothrombin into thrombin. According to the results of our study (Fig. 1), APTT was reliably different in sturgeon and carp from hybrid and tilapia. APTT of sturgeon was 20.6 times longer than that of the related hybrid and 16.8 times longer than that of tilapia. APTT of carp was 2.8 and 2.2 times longer, respectively. Prothrombin time (PT) indicates the activity of the extrinsic clotting pathway. This parameter characterizes the first (prothrombinase formation) and second (thrombin formation) phases of plasma hemostasis and reflects the activity of the prothrombin complex. Literature data indicate APTT and PT values in carps much less than the values we obtained. When evaluating the extrinsic clotting pathway, which is of predominant importance in fish], it may be noted that cartilaginous ganoids have 1.9–2.6 times reliably more rapid clot formation when tissue factor is added than bony fish.

The third phase of blood coagulation (fibrin formation) was assessed using fibrinogen and thrombin time (TT) values. The fibrinogen quantitative content in blood plasma providing clot formation was the lowest in tilapias, 4.8–6.11 times lower than in hybrids, and 3.2 times lower than in carps. TT is a

screening test of the last phase of blood clotting, reflecting the rate of fibrinogen to fibrin conversion. Analysing obtained characteristics of the plasma-coagulation component of the bony fish clotting system and comparing them with the corresponding ones of cartilaginous ganoids, it can be said that the rate of fibrin clot formation (TT) in the former is reliably higher by 17.8–26.0 times than in the latter. […]

The data obtained confirm the vast variability of coagulation parameters in fish of different classes and fishery importance. It is worth considering the identified species specificity when developing and implementing diagnostic and therapeutic methods. Also, by the basic clinical diagnostic tests, it is possible to conclude the functioning of the clotting cascade in commercial fish. Its activation by the common pathway is several times faster in cartilaginous ganoids than in both species of bony fish. This observation also finds its confirmation in the difference in the level of fibrinogen – Its highest amount was detected in cartilaginous ganoids, the lowest – in tilapias. Carp also have slower clotting by the extrinsic pathway. Hemostasis with activation of the intrinsic pathway is faster in hybrids and tilapias, unlike carp and sturgeon. The highest amount of fibrin degradation products was detected in carp, which, along with the slowing of PT and APTT, may indicate the activity of the processes of thrombosis and fibrinolysis with the revealed signs of hypo coagulation due to stress. The lowest SFMC was in hybrid, which can be explained by the coagulation processes activity and fibrinolysis inactivity with the rest of the data.

https://ejabf.journals.ekb.eg/article_209965_785e2e64bd8aa7863a79e5a703ace289.

Responda as questões abaixo com base no artigo:

1. Segundo os autores, as informações abaixo são verdadeiras, **EXCETO**:

a) O sistema de coagulação (coagulação do sangue) apareceu antes da descendência dos tetrápodes e peixes ósseos há cerca de 430 milhões de anos.
b) A tríade hematológica de lombrigas, peixes cartilaginosos e ganóides cartilaginosos formou o principal caminho evolutivo do sistema sanguíneo por seleção natural. A coagulação sanguínea rápida é muito importante para a vida dos peixes, especialmente peixes bentônicos.
c) Estudos realizados em peixes ósseos indicam que o processo de coagulação é fundamentalmente semelhante ao de outros vertebrados particularmente mamíferos, se diferenciando apenas de que é adaptado a temperaturas mais elevadas.
d) Os principais componentes de proteínas trombogênicas foram encontrados em peixes: trombotropina, protromboquinase e tromboquinase, protrombina, trombina e fibrinogênio.

(Valor: 10 escores / obtidos: ____ escores)

2. Segundo o artigo, quais são as principais diferenças entre a coagulação do sangue em peixes e em mamíferos?

RESPOSTA:

(Valor: 10 escores / obtidos: ____ escores)

3. Segundo o artigo, qual o principal objetivo do estudo apresentado? Quais as etapas para alcançá-lo?

RESPOSTA:

(Valor: 15 escores / obtidos: ____ escores)

4. As afirmações abaixo são V (verdadeiras) ou F (falsas):

( ) As plaquetas em peixes desempenham um papel central na conversão interna de protrombina em trombina e são responsáveis pela retração do coágulo, embora a natureza dos fatores plaquetários que promovem a coagulação seja desconhecida.
( ) Os estudos revelaram diferenças no tempo de coagulação e no conteúdo de certos fatores de coagulação em diferentes grupos de peixes e sugerem que as diferenças interespécies na coagulação do sangue em peixes podem ser o resultado de diferenças na resistência desses peixes ao estresse.
( ) Coagulação do sangue em peixes: loach (Cobitidae), perca (Perca), sterlet (Acipenser ruthenus), esturjão (Acipenseridae), carpa (Cyprinus carpio) e gobio gobio), acontece de forma semelhante aos mamíferos, , ou seja, dentro de 2-12 minutos.
( ) Lewis estudou a cascata de coagulação de vertebrados, incluindo peixes cartilaginosos, peixes ósseos e ganóides cartilaginosos. Este trabalho caracterizou quantitativamente o funcionamento da hemostasia de espécies valiosas de peixes de água doce, como a tilápia (Oreochromis

mossambicus), carpa (Cyprinus carpio), truta arco-íris (Onchorynchus mykiss) e bagre (Ameiurus nebuiosus).

(Valor: 20 escores / obtidos: ____ escores)

5. Segundo os autores, podemos afirmar que:

a) A hemostasia secundária é realizada principalmente por fatores de coagulação do plasma e inclui três fases, a formação de protrombinase, a coagulação extrínseca de protrombina (TP e a formação de trombina)
b) O tempo de tromboplastina parcial ativado (APTT) caracteriza a segunda fase da coagulação sanguínea e descreve a via intrínseca de ativação da coagulação, formação de protrombina.
c) O tempo de protrombina (TP) caracteriza a primeira fase da coagulação sanguínea e descreve a via intrínsecaextrínseca de ativação da coagulação, formação de protrombina.
d) De acordo com os resultados do estudo apresentado, o tempo de tromboplastina parcial ativado (APTT) foi confiavelmente diferente em esturjão e carpa de híbrido e tilápia

(Valor: 15 escores / obtidos: ____ escores)

6. Segundo informações contidas neste artigo, como a terceira fase da coagulação do sangue (formação de fibrina) foi avaliada? E quais os resultados encontrados?

RESPOSTA:

(Valor: 15 escores / obtidos: ____ escores)

7. Traduza o trecho abaixo extraído do artigo, use termos apropriados e uma linguagem formal em sua produção escrita.

"The data obtained confirm the vast variability of coagulation parameters in fish of different classes and fishery importance. It is worth considering the identified species specificity when developing and implementing diagnostic and therapeutic methods. Also, by the basic clinical diagnostic tests, it is possible to conclude the functioning of the clotting cascade in commercial fish. Its activation by the common pathway is several times faster in cartilaginous ganoids than in both species of bony fish."

RESPOSTA:

(Valor: 15 escores / obtidos: ____ escores)