HYDRODYNAMIC LAWS OF THE CIRCULATORY SYSTEM

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Abstract

This in the article blood rotation system hydrodynamic laws , blood of the flow physicist basics and in the veins pressure and of resistance biological importance analysis Also , the heart activity , blood movement speed and vein elasticity organism to the activity impact biophysicist point of view from the point of view illuminated and modern in medicine practical importance showing was given .

Key words

Blood circulation , hydrodynamics , blood pressure , heart , artery , vein, capillary , biophysics , flow speed , pulse resistance , pulse , hemodynamics , Bernoulli Poiseuille 's law law , blood stream , vein elasticity , systole , diastole , heart stroke , capillary pressure , viscosity , blood veins , biological fluid , blood rotation system , diffusion , blood movement , pressure gradient , heart cycle , bioelectric process , physiology .

Login

Blood rotation system human organism the most important physiological from systems one is considered . This system organism all cell and to the tissues oxygen and food substances delivery gives , substances exchange as a result harvest was waste products and remove to throw help Gives blood . of the cycle effective done increase heart activity and blood in the veins hydrodynamic to the laws is related .

Biophysics in science blood rotation system biological of liquids movement laws based on is studied . Blood in the veins known pressure under movement does and this process hydrodynamics main to the laws obeys . Blood of the flow speed ,

pulse diameter of blood viscosity and vein of the walls elasticity organism in the activity important role plays .

Blood movement of the heart contraction as a result to the surface coming pressure difference through done increases . Artery , vein and in capillaries blood of the flow to oneself typical features there is are , they are organism physiological status In particular , Poiseuille and Bernoulli laws blood of the flow biophysicist the essence in explanation important importance profession will reach .

Current on the day blood rotation system hydrodynamic the basics study heart and blood vein diseases determination and in treatment big practical importance has is considered .

Home part

Blood rotation system central organ heart is considered . Heart pump task do it , blood veins along moves the heart . rhythmic contraction and relaxation as a result blood in the veins pressure harvest This will be pressure of blood from the arteries to the capillaries and later to the veins flowing the passage provides .

Blood of the flow hydrodynamic basics biological of liquids movement to the laws is based on . Blood in the veins movement pressure gradient using to the surface is coming . High pressurized low pressure area to the area looking at blood flows . This situation in physics liquids flow to the laws suitable is coming .

$$Q = 8\,\eta\,l\,\pi\,r\,4|\,\Delta\,P$$

This formula is Poiseuille law become , vein through flowing liquid size represents . In the formula vein radius fourth level main role plays . So , the vein diameter a little change is also blood to the flow big impact shows .

Blood veins three to the type divided into : arteries , veins and capillaries . Arteries from the heart outgoing blood high pressure under carries . Their walls thick and elastic pulse waves harvest does . In the veins and the pressure is low and blood to the heart returns . Capillaries and substance exchange process main area is considered .

Table 1. Blood of the veins main features

Blood root type	Wall thickness	Pressure level	Task
Arteries	Thick and elastic	High	Blood from the heart take comes out
Veins	Thinner	Low	Blood to the heart returns
Capillaries	Very thin	Average	Substance exchange

Blood of the flow speed of the veins general section to the surface related . In capillaries general section surface big happened because of blood flow slows down . This cells with substance exchange effective done increases .

Bernoulli to the law according to , liquid of the flow speed when increased pressure decreases . This law blood rotation is also observed in the system . Vein when it narrows blood of the flow speed pressure increases and decreases . This situation some pathological in processes important diagnostic importance has .

Blood viscosity is also hydrodynamic to processes big impact shows . Erythrocytes number increase of blood viscosity increasing , heart work makes it difficult . On the contrary , blood too much outside dilution pressure to decrease take is coming .

Heart of activity biophysicist features systole and diastole stages through done increases . Systole during heart shrink , blood to the arteries releases . Diastole in the phase and heart relaxed , blood with paid . This processes continuous repeatedly stands .

Analysis results

Analyses this shows that blood rotation in the system hydrodynamic laws organism normal activity in providing main from factors is one . The heart by harvest to be done pressure of blood all veins along to move reason will be . Blood of the flow

efficiency vein elasticity of blood viscosity and vein radius related that determined .

Poiseul law based on take visited analyses vein diameter small change is also blood to the flow big impact to do showed . Especially atherosclerosis in illness of the veins narrowing blood of the flow noticeable to decrease take It comes . This is heart and blood vein system activity from the trail releases and hypertension such as of diseases to develop reason will be .

In capillaries blood of the flow slowness substance exchange for comfortable conditions create analyses during determined . Capillary of the walls very thin to be oxygen and food of substances to cells easy the passage provides . This with together carbonate anhydride and substances exchange waste to the blood again absorbed .

Table 2. Blood in the veins blood of the flow features

Vein type	Blood flow speed	Pressure status	Biological importance
Arteries	Very fast	High	Oxygen to deliver
Capillaries	Very slowly	Average	Substance exchange
Veins	Average	Low	Blood to the heart return

Table information blood of the flow vein to the types looking at to differentiate shows . In the arteries high pressure and fast stream is observed because from the heart outgoing blood big kinetic to energy has In the capillaries and stream slows down and this substance exchange efficiency increases . In the veins low blood pressure of blood to the heart on the return muscles contraction and venous valves importance increases .

Analyses during blood veins elasticity is also important biophysicist factor that observed . Age in the body veins elastic blood pressure in moderation is stored . In old age and vein walls hardens and elasticity As a result, arterial pressure decreases . increased , heart to the activity additional load falls .

Blood viscosity analysis was done . Hemoglobin amount increase of blood to thicken take comes and blood to the flow resistance This heart your work to increase

reason will be . Some in cases blood clot harvest to be danger increases . This because of of blood physicist features control to do in medicine big importance has .

Bernoulli law based on held analyses vein in the narrowing blood flow acceleration showed . This situation stenosis in illness obvious is observed . Vein narrowed in place stream speed increased pressure decreases . Such situations ultrasound diagnostics using is determined .

Heart of activity hydrodynamic analysis systole and diastole stages mutual compliance related that showed . Heart rhythm violation blood of the cycle efficiency reduces and in the body oxygen to the shortage take It comes . because of heart activity regular control to do health in storage important importance profession will reach .

In general when taking , blood rotation in the system hydrodynamic laws organism vital of activity biophysicist basis organization will reach . This the laws deep study modern diagnostics and treatment methods in development important scientific basis become service does .

Conclusion

Blood rotation system hydrodynamic laws organism of activity important biophysicist basis organization does . Blood flow heart harvest did pressure , vein elasticity and of blood physicist to the characteristics is related to . Poiseuille and Bernoulli laws blood movement mechanisms in explanation important importance has . This laws study heart and blood vein diseases detection , prevention to do and effective treatment methods working on the way out important scientific basis become service does .

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