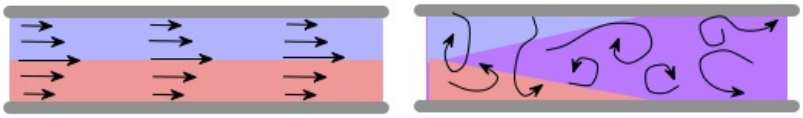
Turbulent flow

Turbulent flow is a way of movement of viscous liquids (e.g. blood), in which individual particles of the liquid pass through different layers of the liquid, causing mixing of these layers. During the flow, the liquid particles, in addition to shifting, also perform a complex motion of their own, which leads to the formation of eddies and is accompanied by sound phenomena (in contrast to laminar flow). The velocities of individual liquid particles change irregularly, i.e. the particles no longer have constant speed in all places, so the flow is not stationary.

The probability of turbulent fluid flow in a thin tube (e.g. blood in a blood vessel) is determined by the velocity of the fluid flow, the diameter of the tube (vessel), viscosity and density of the fluid. This probability is expressed in terms of the Reynolds number:

$$Re = \frac{\rho \cdot R \cdot v}{\eta}$$

- Re − Reynolds number
- ρ − liquid density
- R − radius of the tube (vessels)
- v − liquid flow rate
- η - viscosity



The higher the Reynolds number, the higher the probability of turbulent flow. Turbulence often occurs in anemia due to reduced blood viscosity. Sound phenomena accompanying turbulent flow are used in blood pressure measurement − narrowing of an artery using an inflated cuff accelerates the blood flow at the point of constriction, which leads to turbulence and the creation of sounds, the so-called Korotkov phenomena.

Links

Related articles

- Laminar flow
- Hagen-Poiseuille law
- Reynolds number

Source

- ŠVÍGLEROVÁ, Jitka. *Turbulentní proudění* [online]. The last revision 2009-02-18, [cit. 2010-11-14]. <https://web.archive.org/web/20160501161936/http://wiki.lfp-studium.cz:80/index.php/Turbulentn%C3%AD_proud%C4%9Bn%C3%AD>.