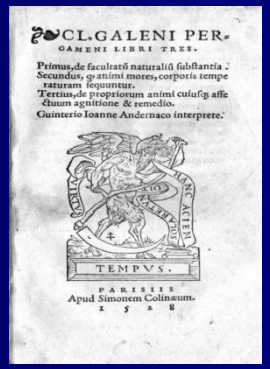
Andrey Larichev

Pathophysiological effects of vacuum therapy of wounds and wound infection

Yaroslavl State Medical University, Russia

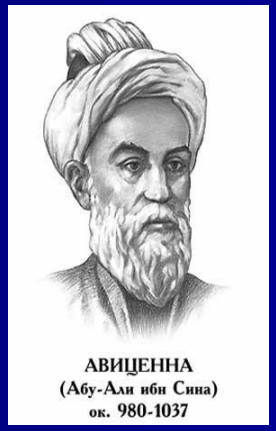
NPWT: mechanical antiseptics


CL. GALENI PER-
GAMENI LIBRI TRES.

Primus, de facultatũ naturaliũ substantia:
Secundus, q animi mores, corporis tempe
raturam sequuntur.
Tertius, de propriorum animi culusq; affe
ctuum agnitione & remedio.
Quinterio Ioanne Andernaco interprete.

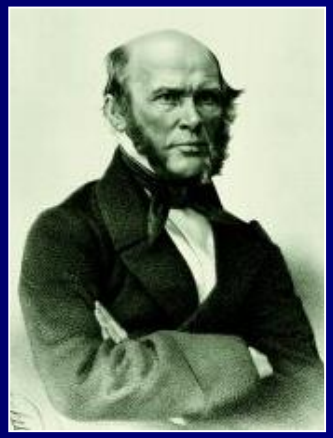
TEMPVS.

PARISIIS
Apud Simonem Colinæum.
1528

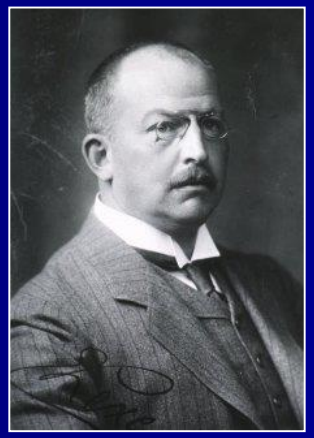

АВИЦЕННА
(Абу-Али ибн Сина)
ок. 980-1037

Removing poison from the wound
and cleaning the body from "bad blood"

NPWT: mechanical antiseptics



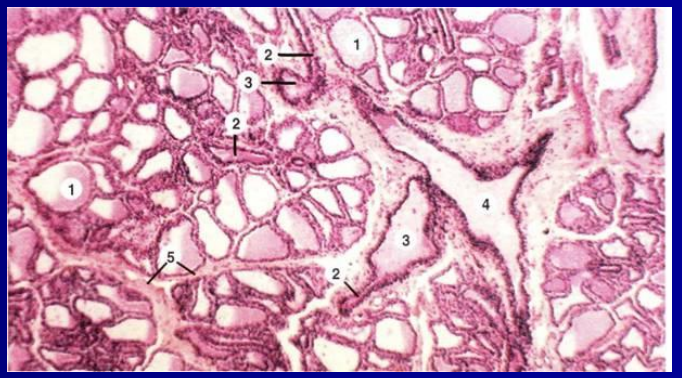
Nikolai Pirogov, 1863



Erich Lexer, 1928

Removing infectious agents from inflammatory focus

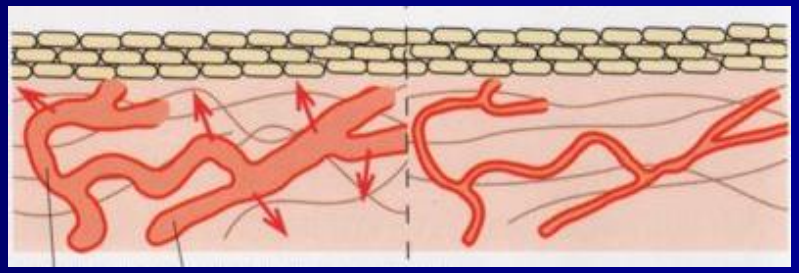
NPWT: change of the local blood circulation



James Murrey
Observation of lactation mammary gland under vacuum exposure
«Lancet», 1834

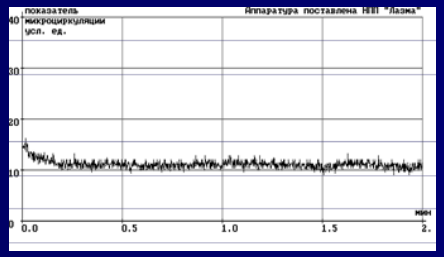
NPWT: change of the local blood circulation

The concept of Microcirculation by B.W. Zweifach, 1950

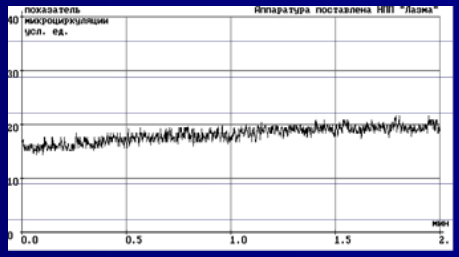


dilatation paralysis **constriction of vessels**

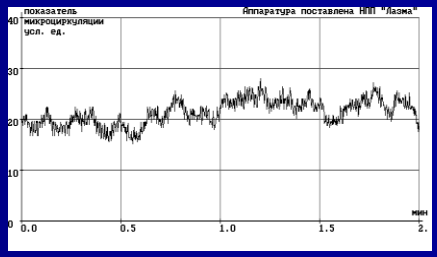
NPWT: change of the local blood circulation



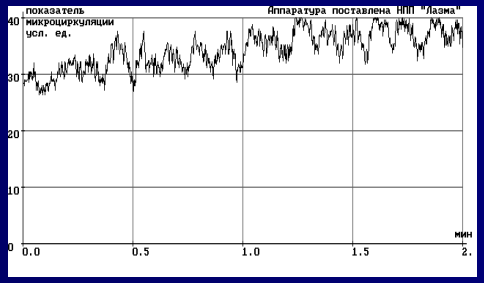
physiological level



postoperative wound



purulent wound

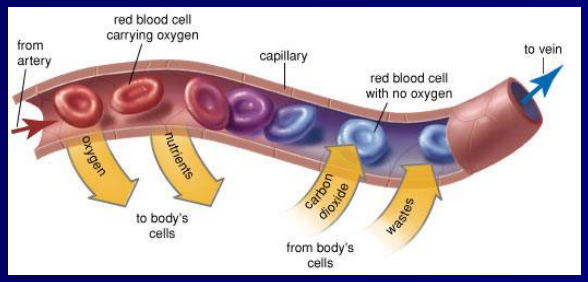


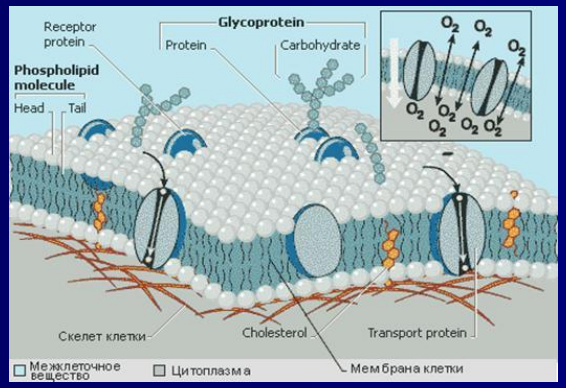
after vacuum therapy session

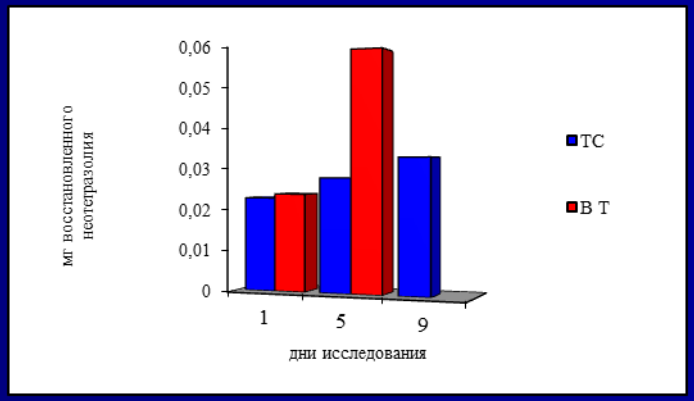
Doppler research

Larichev A.B. et al., 2001

NPWT: change of tissue metabolism







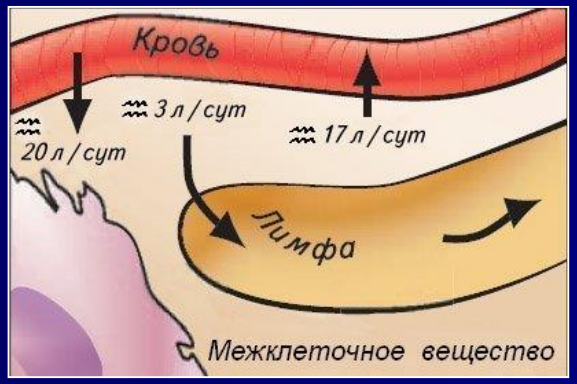
Larichev A.B., 1988

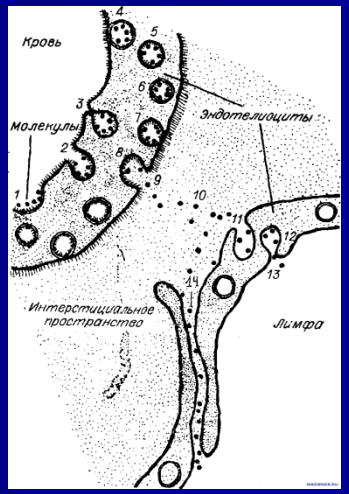
Switching the redox processes to the aerobic power supply of the cells

NPWT: local detoxication

Mechanisms of endotoxicosis

- ***production;***
- ***infection;.***
- ***resorption;***
- ***retention;***
- ***reperfusion***





by Ya.L. Karaganov et al., 1982

NPWT: local detoxication

Mechanisms of detoxication

- *termination of production of toxins;*
- *antibacterial effect;*
- *prevention of resorption;*
- *potentiation of a lymphatic drainage*

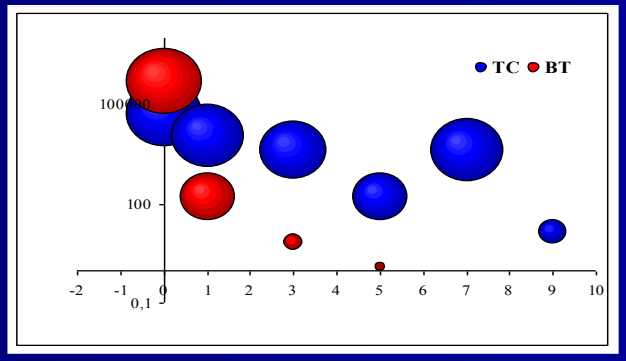
dynamic of toxicity of an exsudate

Larichev A.B. et al., 1998, 2007

NPWT: bacterial decontamination

Mechanisms of antibacterial effect

- *elimination of an exudate;*
- *reaction pH alkalization;*
- *potentiation of antibacterial activity leukocytes*



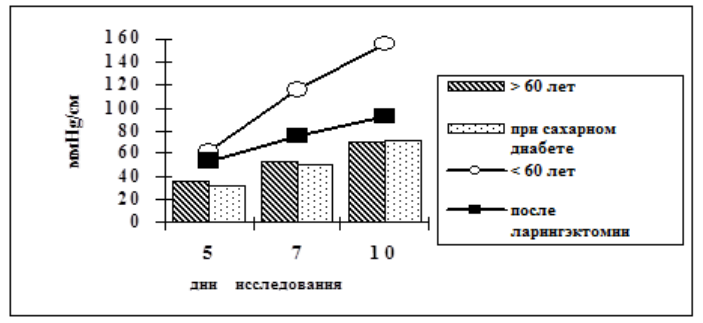
Dynamics of bacterial contamination

Larichev A.B. et al., 1988-2007

NPWT: potentiation of hysthoproliferation

Mechanisms of potentiation of proliferation

- *stabilization of the metabolism in tissues;*
- *rhythmical mechanical tension;*
- *stimulate of formation of granulation*



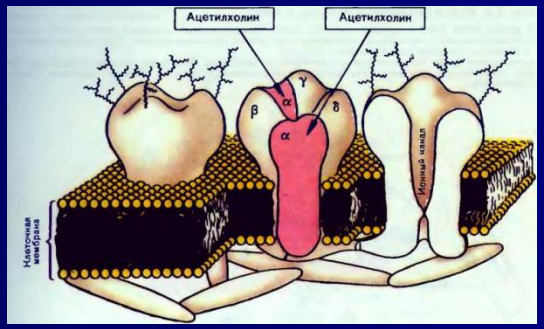
Dynamic of biological force consolidation of wounds

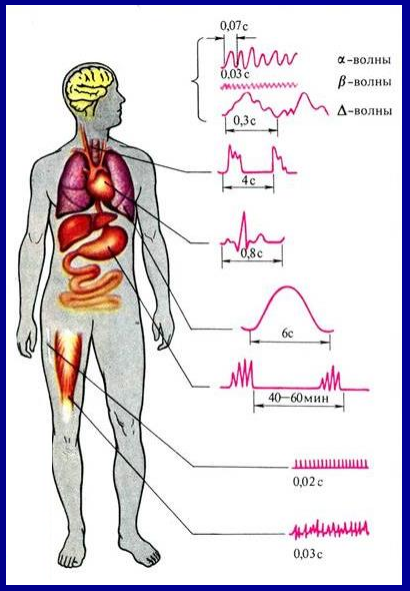
Larichev A.B. et al., 1988-2007
Mendez-Eastman S., 1998; Ovington L.G., 1998

NPWT: systemic adaptation reaction

Mechanism of systemic reaction

- *irritation of receptors;*
- *reflexes to such stimuls;*
- *turning on the adaptation mechanisms*





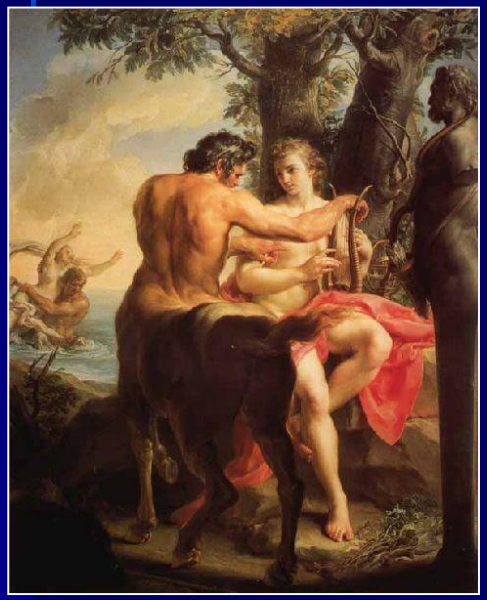
Voloschin V.G., 1974; Katkovski B.S., 1974; Korobkov A.V., Talischev F.M., 1974

NPWT: pathophysiological effects

- change of the local blood circulation;
- activation of tissue metabolism;
- local detoxication;
- bacterial decontamination;
- potentiation of hysthoproliferation

Larichev A.B. et al., 1988-2007

NPWT: clinical effect



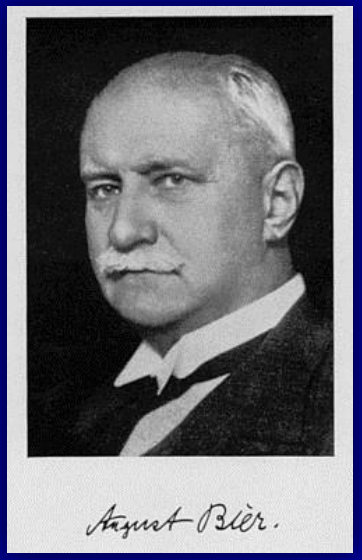
to compare the sign	Method of treatment	
	traditional (n=915)	NPWT (n=563)
local complete	102 (11,2%)	15 (2,7%)
sepsis	23 (2,7%)	1 (1,8%)
total	23 (2,5%)	5 (0,9%)

Larichev A.B., 1988

NPWT: clinical effect

«I don't know any tool that is so successful could be used, and be so versatile, for wide variety of illnesses»

«It is unfair to demand from one remedy to cure everything; such means isn't present and won't be»



August Bier, 1908


Thanks for attention !