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Sergey Zaets

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Medical & Regulatory Affairs, Novo Nordisk, Inc,
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USA

Executive Editor of

ANATOMY & PHYSIOLOGY: CURRENT RESEARCH

BIOGRAPHY

Sergey Zaets received MD degree from Moscow Medical Institute and PhD and DSc degrees from Bakoulev Center for Cardiovascular Surgery (Moscow, Russia), and used to work as a pediatric cardiac surgeon until relocation to the USA in 1999. During the years 1999-2005, performed research studies on red blood cell dysfunction in trauma-hemorrhagic shock, burn, gut ischemia, and pancreatitis at the UMDNJ - New Jersey Medical School. In 2005, joined Novo Nordisk Inc. Investigated the role of coagulation Factor XIII in prevention of multiple organ dysfunction after experimental trauma-hemorrhagic shock, burn, gut ischemia, and cardio-pulmonary bypass. Since 2009, is involved in clinical development of new recombinant factors to be used in hemophilia and FXIII congenital deficiency.

RESEARCH INTEREST

Trauma-hemorrhagic shock, sepsis, coagulation disorders, congenital “open-heart” surgery.

ACHIEVEMENTS

Author of more than 200 publications.

PUBLICATIONS

- **Normal Dimensions of Cardiac Valves: What do Normative Bases Tell us? Sergey Zaets**, Anat Physiol 2012, 2: e113

- **Repair of congenital heart defects associated with single pulmonary artery.** Leo A Bockeria, Osman A Makhachev, Titalav Kh Khiriev, Vladimir P Podzolkov, Mikhail A Zelenikin, Aleksey I Kim, **Sergey B Zaets**

- **Dynamics of Factor XIII Levels After Open Heart Surgery for Congenital Heart Defects: Do Cyanotic and Acyanotic Patients Differ?** Leo A Bockeria, Natalia N Samsonova, Ivan A Yurlov, Ludmila G Klimovich, Elena F Kozar, Eva H N Olsen, **Sergey B Zaets**

- **Does Recombinant Factor XIII Eliminate Early Manifestations of Multiple-Organ Injury After Experimental Burn Similarly to Gut Ischemia-Reperfusion Injury or Trauma-Hemorrhagic Shock? Sergey B Zaets**, Da-Zhong Xu, Qi Lu, Eleonora Feketova, Tamara L Berezina, Inga V Malinina, Edwin A Deitch, Eva H N Olsen

- **Palliative surgical treatment of congenital heart defects associated with unilateral absence of the pulmonary artery.** Leo A Bockeria, Vladimir P Podzolkov, Osman A Makhachev, Bagrat G Alekyan, Titalav Kh Khiriev, Mikhail A Zelenikin, Konstantin V Shatalov, **Sergey B Zaets**
- **Immediate results of bidirectional cavopulmonary anastomosis and Fontan operations in adults.** Vladimir P Podzolkov, Mikhail M Zelenikin, Ivan A Yurlov, Dmitry V Kovalev, Ketevan A Mchedlishvili, Neele A Putiato, **Sergey B Zaets**
- **Recombinant factor XIII mitigates hemorrhagic shock-induced organ dysfunction.** **Sergey B Zaets**, Da-Zhong Xu, Qi Lu, Eleonora Feketova, Tamara L Berezina, Inga V Malinina, Edwin A Deitch, Eva H Olsen
- **Effectiveness of stroke education in the emergency department waiting room.** Yu-Feng Yvonne Chan, Roxanne Nagurka, Lynne D Richardson, **Sergey B Zaets**, Michael B Brimacombe, Steven R Levine
- **Double outlet right ventricle with anomalous left pulmonary artery.** Leo A Bockeria, Osman A Makhachev, Andrey V Sobolev, Viktoria V Plakhova, Sergey V Gorbachevsky, **Sergey B Zaets**


DRG 871
death
#1 cause of ICU deaths
time sensitivity
virus
severe
bacteria
blood chemicals
DRG 870
death
SIRS
infection
organ failure
SEPSIS
toxic response
fungi
shock
mortality
reimbursement
50%
unnecessary
parasite
No dedicated drug tx
increased LOS
death
difficult
diagnosis
severe
inflammation
top billed DRG

DEFINITION

Sepsis is a potentially life-threatening complication of an infection. Sepsis occurs when chemicals released into the bloodstream to fight the infection trigger inflammatory responses throughout the body. This inflammation can trigger a cascade of changes that can damage multiple organ systems, causing them to fail.

If sepsis progresses to septic shock, blood pressure drops dramatically, which may lead to death.

Anyone can develop sepsis, but it's most common and most dangerous in older adults or those with weakened immune systems. Early treatment of sepsis, usually with antibiotics and large amounts of intravenous fluids, improves chances for survival.

Skin shows the signs of Sepsis

EXPLANATION

It is a illness in the body in which body gives severe response to bacteria and other germs. This response is termed as **S**ystemic **I**nflammatory **R**esponse **S**yndrome (SIRS).

SIRS is considered as the main symptom towards Sepsis.

Sepsis caused Septic Shock which occurs by high lactate level.

Sepsis causes by the serious infected immune system in the body which becomes the cause of other severe diseases.

Sepsis cause billions of deaths globally each year.

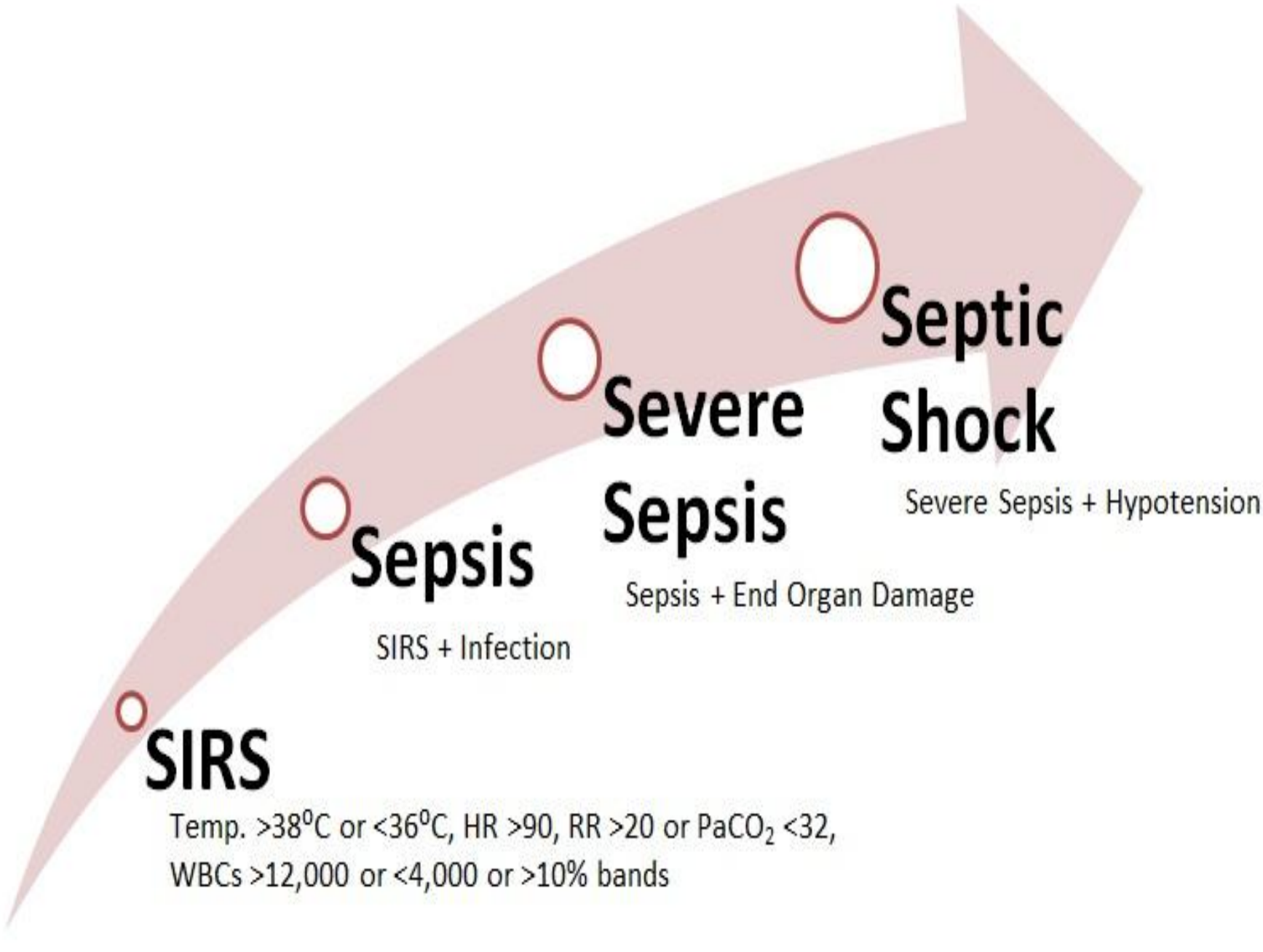
How to diagnose sepsis???

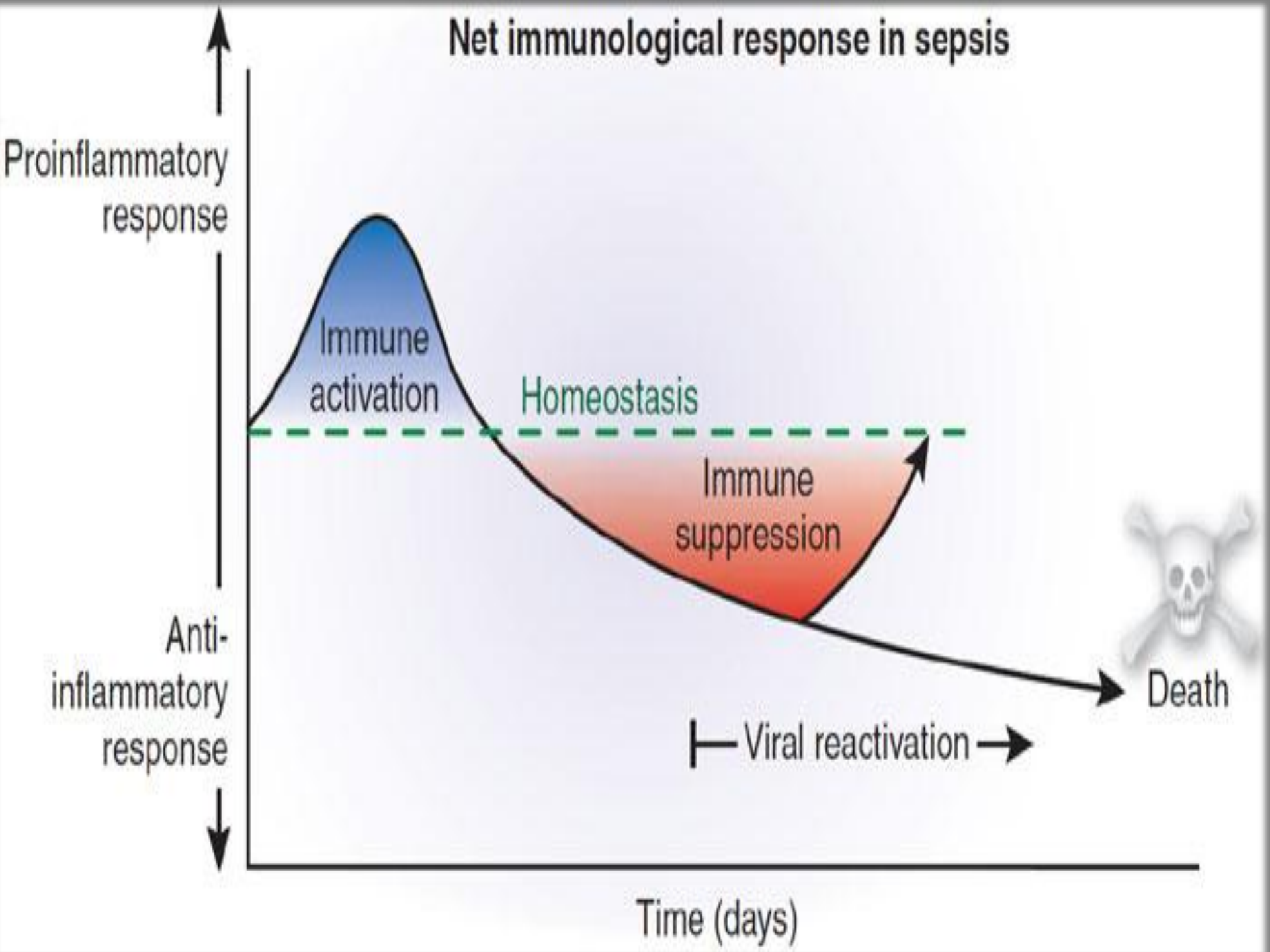
To be diagnosed with sepsis, you must exhibit at least two of the following symptoms:

1. Body temperature above 101 F (38.3 C) or below 96.8 F (36 C)
2. Heart rate higher than 90 beats a minute
3. Respiratory rate higher than 20 breaths a minute
4. Probable or confirmed infection

In case of Severe sepsis

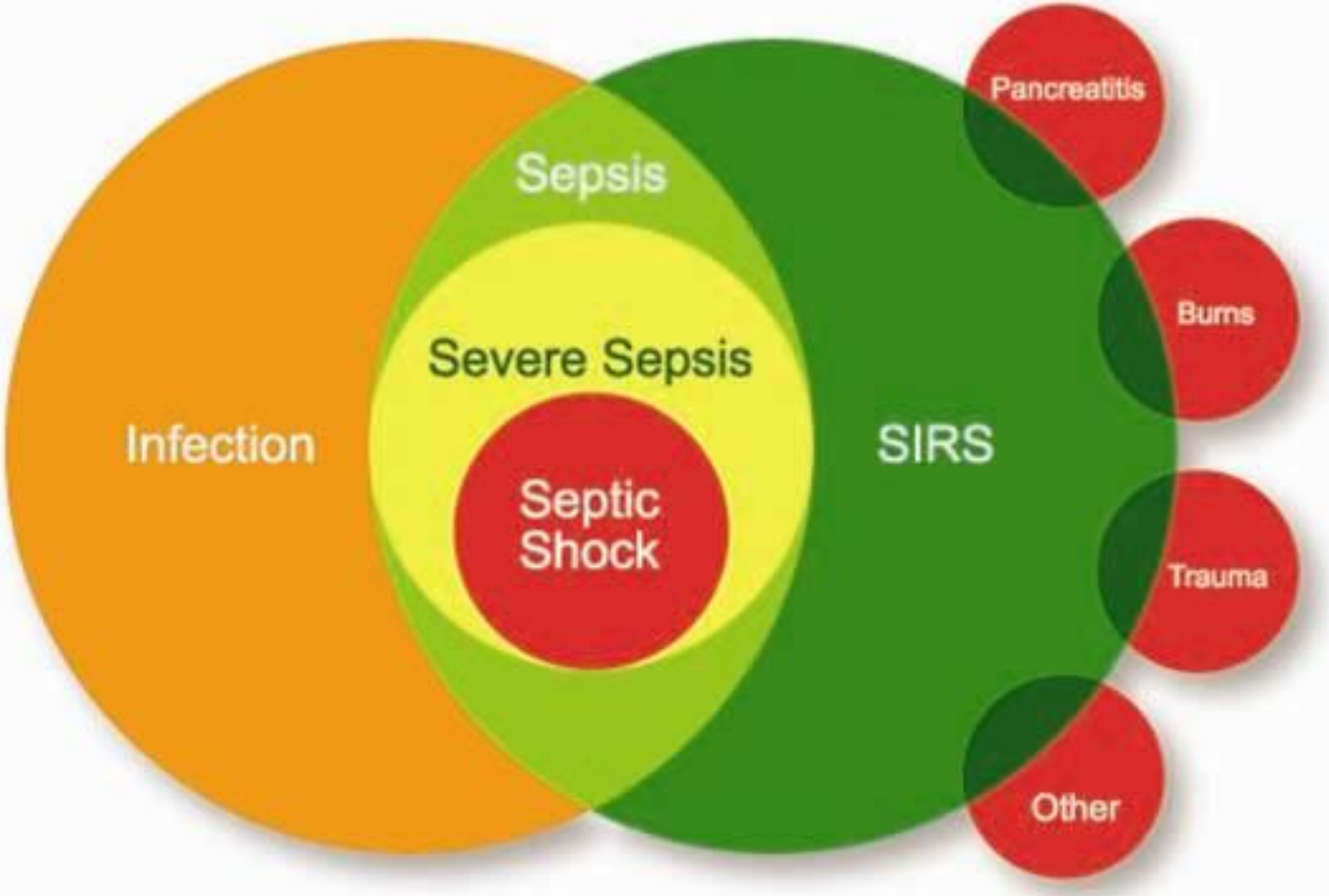
- Your diagnosis will be upgraded to severe sepsis if you also exhibit at least one of the following signs and symptoms, which indicate an organ may be failing:
- Significantly decreased urine output
- Abrupt change in mental status
- Decrease in platelet count
- Difficulty breathing
- Abnormal heart pumping function
- Abdominal pain


SIRS
Temp. >38°C or <36°C, HR >90, RR >20 or PaCO2 <32,
WBCs >12,000 or <4,000 or >10% bands
Sepsis
SIRS + Infection
Severe Sepsis
Sepsis + End Organ Damage
Septic Shock
Severe Sepsis + Hypotension

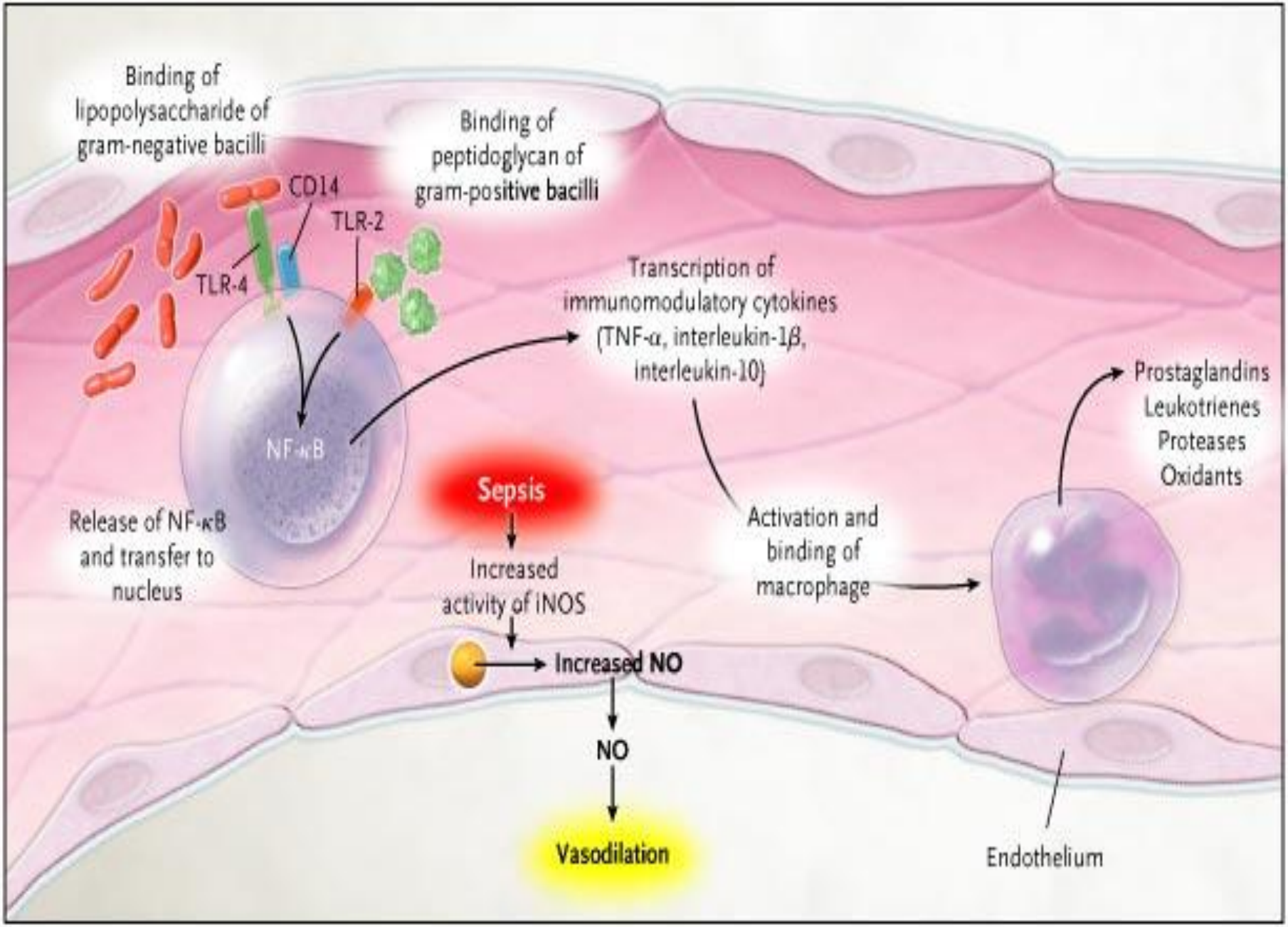

Net immunological response in sepsis
Proinflammatory response
Anti-inflammatory response
Immune activation
Homeostasis
Immune suppression
Death
Viral reactivation
Time (days)

Relationship of

Infection, SIRS, Sepsis, Severe Sepsis and Septic Shock



Bone et al. *Chest* 1992; 101:1644


Binding of lipopolysaccharide of gram-negative bacilli
CD14
TLR-2
TLR-4
Binding of peptidoglycan of gram-positive bacilli
Transcription of immunomodulatory cytokines (TNF-α, interleukin-1β, interleukin-10)
Prostaglandins
Leukotrienes
Proteases
Oxidants
NF-κB
Release of NF-κB and transfer to nucleus
Sepsis
Activation and binding of macrophage
Increased activity of iNOS
Increased NO
NO
Vasodilation
Endothelium

People at high risk of developing sepsis include:

- the very young and very old
- people with weak immune systems
- ICU patients that are already very sick
- patients exposed to invasive devices (such as intravenous catheters or breathing tubes)

TREATMENT

Sepsis is required to be treated as soon as possible as the symptoms occurs. This means the rapid administration of antibiotics and fluids through IV route which helps the medicines to go directly into the blood stream. A 2006 study showed that the risk of death from sepsis increases by 7.6% with every hour that passes before treatment begins.

In case of **Antibiotics**, several antibiotics are prescribed to cure the illness and firstly Broad Spectrum Antibiotics are prescribed against most common type of bacteria's and germs. It is also administered by IV route only.

Along with Antibiotics, IV Fluids are also required to be administered as it alone wont treat sepsis. The body needs extra fluids to help keep the blood pressure from dropping dangerously low, throwing the patient into shock.

Normal saline is one commonly given fluid. It is a crystalloid fluid. These are fluids that contain minerals, such as sodium, and are water soluble, or dissolve in water. These add fluid to the blood system.

Note: Since all patients are different and have different mode of symptoms of sepsis and not every treatment is suitable for every patient.

LAUGH OFTEN

BE ADVENTUROUS

BIKE MORE EAT BETTER SEE BIG

DREAMS REMEMBER SPECIAL MOMENTS MAKE FRIENDS

BE HEALTHY HAVE FAITH

ENJOY LIFE SPEND MORE TIME WITH DEAR ONES

STAY FIT SO THAT YOU CAN

KEEP AWAY FROM SEPSIS

Approved By: Sergey Zaets

E-signature: Zaets

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