

Possible role of intravascular hemolysis in the pathogenesis of oxidant stress after sublethal ionizing and non-ionizing radiative doses affect

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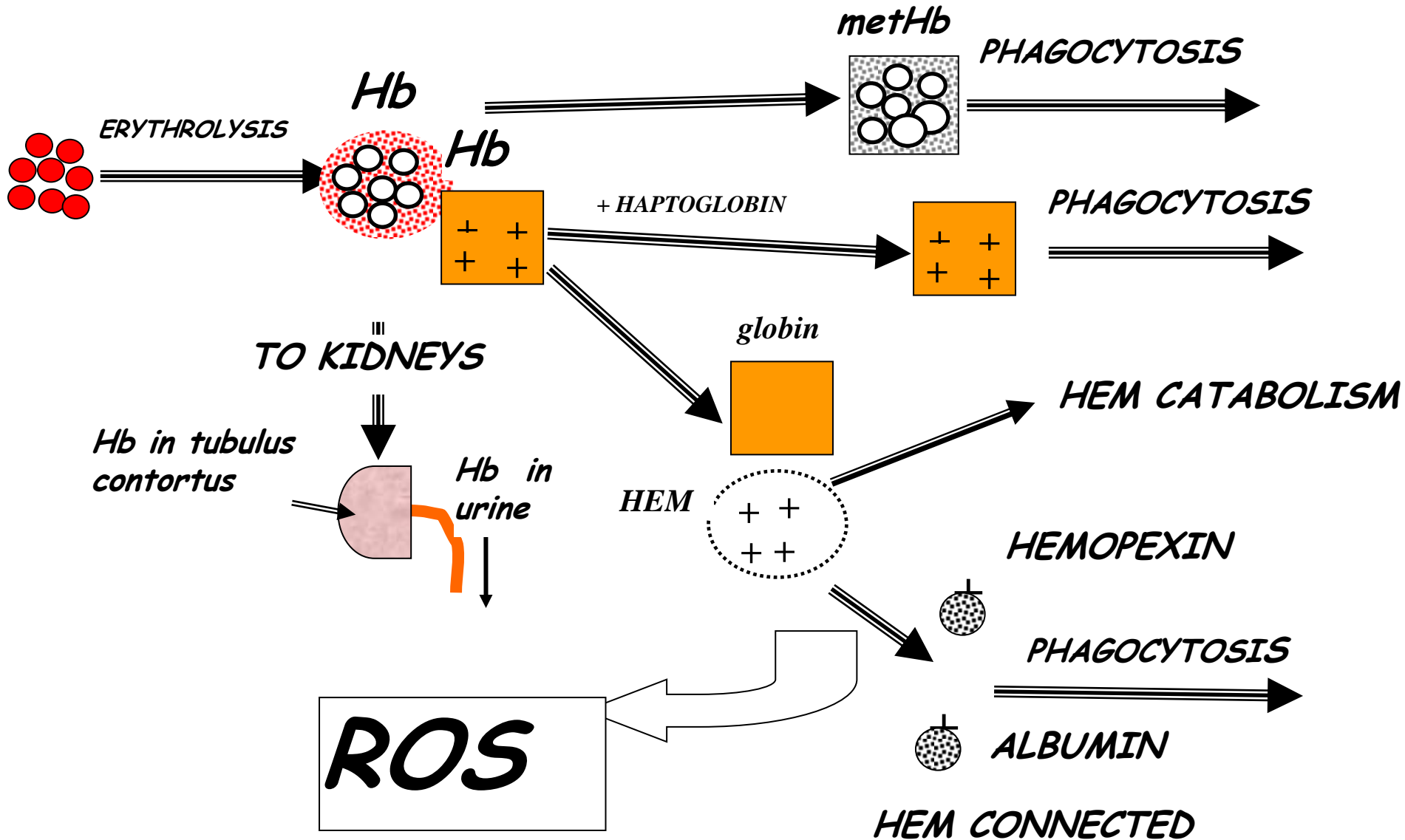
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A dramatic change in the radiation environment or a sudden electromagnetic disturbance of the environment in most mammals is accompanied by stress. This can be considered as a non-specific reaction to the effect named.

The question raised:

- Does this event lead to an increase in the level of reactive oxygen species (ROS) in plasma as promoters of oxidative stress?*

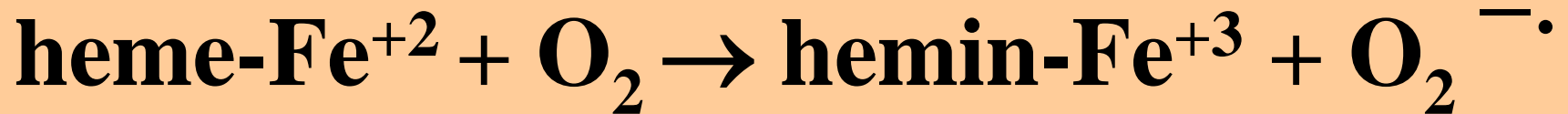
DEGRADATION HEMOGLOBIN



*There are two possible ways to form
ROS:*

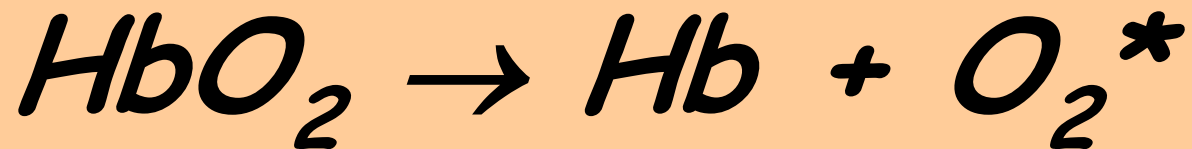
1) heme iron oxidation

*(oxygen is reduced to the
superoxide anion radical) :*



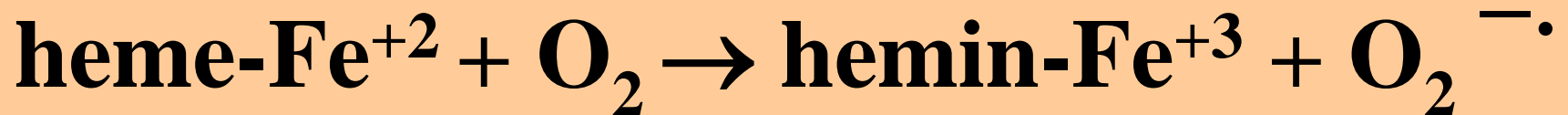
*There are two possible ways to form
ROS:*

*2,1) (hypothetical) formation of
singlet oxygen in the dissoci-
ation of extra-erythrocyte
hemoglobin:*



There are two possible ways to form ROS:

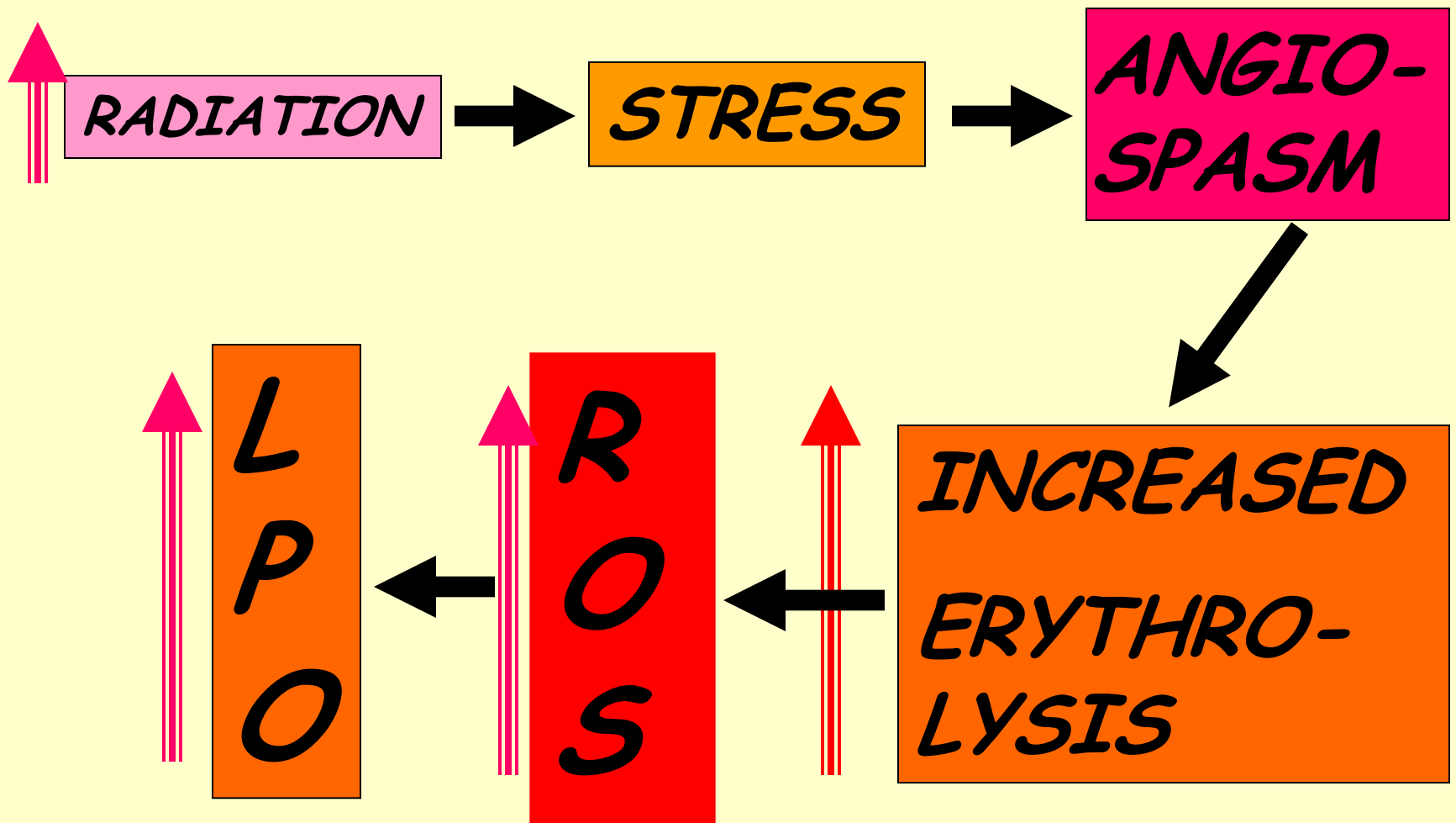
2.2) excess of heme redox-active iron appears in the plasma, regardless of the state of the released oxygen. \Rightarrow formation of ROS on the first named path:



final result

- *Increase to form ROS \Rightarrow
the intensification of
lipid peroxidation
(LPO)*

In all:



To confirm the hypothesis, it is necessary to prove directly or indirectly the following:

1. Under the beam and immediately after irradiation, there is an intensification of intravascular hemolysis.

To confirm the hypothesis:

2. Increased intravascular hemolysis is accompanied by an increase in the level of ROS in the blood plasma.

To confirm the hypothesis:

3. Increased intravascular hemolysis is a non-specific response to radiation and, by its nature, is associated with the deformation stress of red blood cells.

To confirm the hypothesis, it is necessary to prove directly or indirectly the following:

If the hypothesis is correct, a new additional direction of the protector's search is opened.

to benefit from the hypothesis:

- *The search for protectors should be aimed at drugs that lower vasoconstriction during stress, as well as at increasing the rate of utilization (neutralization) of free hemoglobin and heme in plasma.*