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Letter to the Editor

THE COMPLEX RELATIONSHIP BETWEEN FGF2 AND SEPSIS

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INTRODUCTION

Sepsis is a life-threatening condition caused by the body's response to infection, which leads to systemic inflammation, tissue damage, and organ failure (1). Fibroblast Growth Factor 2 (FGF2), also known as basic fibroblast growth factor (bFGF) and FGF-β, is an essential growth factor cytokine involved in many biological activities such as angiogenesis, wound healing, cell growth, and differentiation. Additionally, it plays a key role in tissue regeneration and repair (2).

FGF-2 is important in the laboratory for differentiation of many hematopoietic stem cells *in vitro*. The protein degrades rapidly in culture with an effective half-life of less than 10 hours. FGF signals through multiple specific receptors and appears to show limited species specificity. This protein is so routinely used that concentration and source are usually not carefully considered. There are several FGF2s (about 16) that are used for the culture of human and mouse stem cells and for the nascent industry of cultured meat, fish, fats, and dairy products.

DISCUSSION

FGF2 plays a key role in the maintenance, proliferation, and differentiation of various stem cell types (3). The role of FGF2 in sepsis is complex but interesting and is still being studied by scientists around the world. It is not yet clear how FGF2 can influence some pathophysiological parameters in infections.

FGF2 could intervene in helping the formation of new vessels in sepsis, where there is vascular dysfunction with tissue hypoxia. In addition, FGF2 can potentially promote the formation of new blood vessels and thus play a role in cancer and metastasis. The action of FGF2 on angiogenesis could also affect the inflammatory response. In fact, this growth factor influences different cells of the immune system, including macrophages and neutrophils, by modulating the inflammatory response. This effect depends on various factors, including the concentration, timing of administration, and tissue reaction. In infectious states, including septic shock, FGF2 plays a protective role in organs, including the kidneys and heart, by inhibiting apoptosis and promoting cell survival.

Recombinant human FGF2 is a 17 KDa protein comprised of 145 amino acids. It is recommended primarily for the proliferation, maintenance, and differentiation of induced pluripotent stem cells, embryonic stem cells, and mesenchymal stem cells (4). Recombinant FGF2 is highly bioactive and is used to support the maintenance of human embryonic stem cells and proliferation and differentiation of induced pluripotent and mesenchymal stem cells. It is highly pure, with a core structured region and N-terminal extension, and is free of carrier proteins.

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The effects of FGF2 on inflammation, tissue repair, and angiogenesis nominate it as a potential therapeutic molecule in sepsis. However, besides being beneficial, FGF2 is also a pro-inflammatory factor, and therefore, its use should be considered with caution (5). Treatment of sepsis with FGF2 in animal models has shown that this protein acts on tissue protection and repair, reducing organ damage and increasing survival of the rodent. In contrast, other evidence indicates that FGF2 can worsen the state of sepsis and lung fibrosis by fueling inflammation.

CONCLUSIONS

FGF2 is a growth factor implicated in angiogenesis, tissue repair, and cellular protection. These effects suggest that this molecule has therapeutic potential in sepsis. However, since FGF2 is also pro-inflammatory, its therapeutic use requires careful consideration of timing, dosage, and the specific context of its use to avoid potential adverse effects on the organism. However, further studies are needed to fully elucidate the role of FGF2 in sepsis and in other physiopathological states.

Conflict of interest

The author declares that they have no conflict of interest.

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