

## REVIEW ARTICLE

# The Role of Cytoglobin in Cancer

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### ABSTRACT

Cytoglobin (Cygb) is a new member of the globin protein family, after the discovery of other globin proteins such as hemoglobin (Hb), myoglobin (Mb), and neuroglobin (Ngb). Cygb is expressed throughout mammalian tissue and present in cells. Since its discovery, many studies have been conducted to understand the functional role of Cygb but so far remains Cygb has been shown to play many respiratory roles of normal cells including oxygen storage, destruction of reactive oxygen species (ROS), terminal oxidase activity, and antifibrotic activity. Recent research reports of Cygb having several implications for cancer. In most type of cancer cells, Cygb expression is regulated by hypermethylation, indicating epigenetic control. In cancer cells, Cygb downregulation occurs which indicates a possible role as a tumor suppressor gene. In some malignancies the opposite occurs, Cygb upregulation arises likely associated with the presence of resistance to hypoxia.

**Keywords:** Cygb; oxidative stress; fibrosis; cancer

### ABSTRAK

Sitoglobin (Cygb) merupakan anggota baru keluarga protein globin, setelah ditemukannya protein globin yang lain seperti hemoglobin (Hb), mioglobin (Mb) dan neuroglobin (Ngb). Cygb diekspresikan di seluruh jaringan mamalia dan terdapat di dalam sel. Cygb telah terbukti berperan penting pada pernapasan sel normal, diantaranya untuk penyimpanan oksigen, pemusnahan reactive oxygen species (ROS), aktivitas oksidase terminal, dan aktivitas antifibrotik. Penelitian terbaru melaporkan Cygb memiliki beberapa implikasi pada kanker. Pada sebagian besar sel kanker, ekspresi Cygb diregulasi oleh hipermetilasi, menunjukkan kontrol epigenetik. Pada sel kanker terjadi down regulation Cygb yang menunjukkan kemungkinan peran sebagai gen penekan tumor. Pada beberapa keganasan terjadi sebaliknya, upregulasi Cygb terjadi kemungkinan dikaitkan dengan adanya resistensi terhadap hipoksia.

**Kata Kunci:** sitoglobin; ROS; fibrosis; kanker