



## Programa Multicêntrico em Bioquímica e Biologia Molecular da SBBq

### PROVA DE SUFICIÊNCIA EM INGLÊS- PMBQBM –EDITAL 1/2017

NOME:

IES:

DATA:

Esta prova de suficiência em inglês consiste na interpretação do texto abaixo, adaptado de Wikipedia e J Mol Med (2012) 90:233–244. São formuladas 6 questões a serem respondidas em português, com base nesse texto.

É permitido o uso de dicionário de inglês.

Texto:

Post-translational modification (PTM) refers to the covalent and generally enzymatic modification of proteins during or after protein biosynthesis. Proteins are synthesized by ribosomes translating mRNA into polypeptide chains, which may then undergo PTM to form the mature protein product. PTMs are important components in cell signaling.

Post-translational modifications can occur on the amino acid side chains or at the protein's C- or N- termini. They can extend the chemical repertoire of the 20 standard amino acids by modifying an existing functional group or introducing a new one such as phosphate. Phosphorylation is a very common mechanism for regulating the activity of enzymes and is the most common post-translational modification.

S-nitrosylation, the reversible, covalent addition of a nitrogen monoxide (NO) moiety to the thiol side chain of cysteine (Cys), has emerged as an important regulatory mechanism in nitric oxide-related signaling. Both proteins and low-molecular-weight thiols, including in particular glutathione, are subject to S-nitrosylation, generating S-nitroso-proteins (SNO-proteins) and S-nitrosoglutathione (GSNO), respectively. Initial studies of the function of nitric oxide as a signaling molecule in smooth muscle demonstrated a role for cGMP as a second messenger. However, evidence accumulated over the past two decades has demonstrated that nitric oxide exerts its ubiquitous influence on signal transduction and other aspects of cellular function largely through cGMP-independent S-nitrosylation of proteins.

In mammals, cellular S-nitrosylation is coupled to nitric oxide synthesis carried out principally by three isoforms of nitric oxide synthase (NOS): neuronal NOS (nNOS or NOS1), inducible NOS (iNOS or NOS2), and endothelial NOS (eNOS or NOS3). S-nitrosylation results from the reaction of Cys thiols with nitric oxide-derived species, such as N<sub>2</sub>O<sub>3</sub>, by oxidation of a SNO radical anion



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(RSNO $\cdot$ -) or by transnitrosylation, which is the transfer of the NO group from an S-nitrosothiol (SNO) to an acceptor Cys thiol. A growing body of research indicates an essential role for homeostatic regulation of cellular SNOs in normal physiology, which is maintained, in part, by the opposing actions of enzymes involved in either addition or abstraction of NO from SNOs. Dysregulated S-nitrosylation has been implicated as a cause or consequence of a broad range of diseases, including asthma, cystic fibrosis, Parkinson disease, heart failure, and stroke, and the role of nitrosylases and denitrosylases in governing levels of S-nitrosylation under both physiological and pathophysiological conditions is increasingly appreciated.

Specificity determinants in multiple analyses of the role of protein S-nitrosylation in the context of cellular signal transduction, it has emerged that this posttranslational modification exhibits a high degree of spatiotemporal precision. Selectivity is conferred in part by the interaction of substrates with sources of NO groups including NOSs and NO donors (including GSNO and SNO-proteins) and through SNO motifs that facilitate *in vivo* S-nitrosylation of only a small subset of cysteines within proteins.

### QUESTÕES:

1. O que se entende por modificação pós traducional e qual a mais frequente?
2. Em que parte da proteína a modificação pós traducional pode ocorrer?
3. O que se entende por S-nitrosilação e quais os seus substratos?
4. Quais as enzimas que sintetizam NO?
5. Quais as duas vias descritas no texto pelas quais age o NO?
6. No texto, cite as patologias associadas com a des-regulação do NO.