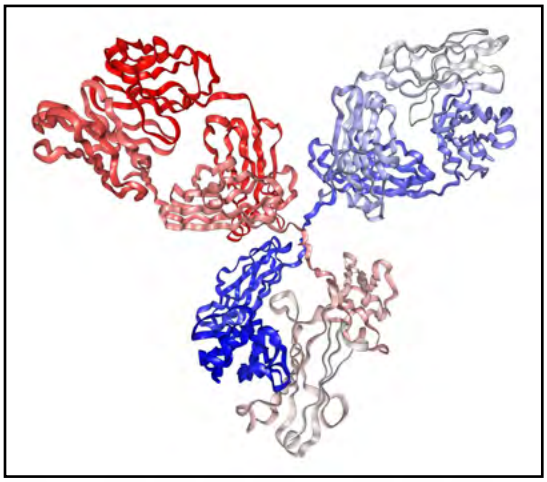
Destabilization and Functionality Transformations of Proteins Through Metals Adsorption and Molecular Integration

Proteins are known to contain a number of active sites which have been documented to interact with both transition metals and alkali earth metals. The complexity of biochemistry, coupled with recombinant antibody technology, produce an ever-changing landscape of delocalized electrons and capacity to adsorb and bind to ions in solution. In more simplistic terms, how things combine together can change depending on the process in which it is made. Brooks Applied Labs has harnessed the power of size exclusion chromatography coupled to UV/Vis and inductively coupled plasma mass spectrometry (SEC-UV/Vis-ICP-MS) to elucidate the interaction of transition and alkali earth metals on your proteins.



Upon adsorption of a transition metal on an active site associated with a protein, the electrons will inherently interact differently in the surrounding vicinity. The changes that occur can destabilize surrounding chemical bonds (inducing fragmentation or destabilization), alter the functionality of the protein, or have no impact whatsoever. Unfortunately, each protein will be different which necessitates quantitative experimentation via reflexive testing to ascertain if certain metals and elements will, in fact, have an interaction. Due to the limited published research in the field as well as knowledge dissemination to pertinent scientists, this important quality concept is often overlooked until an out of specification occurs.

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The issue of transition and alkali earth metal interactions with proteins is confounded as environmental conditions can dictate their integration into the protein. An excellent example of this problem is use of sulfur bearing amino acids in growth media. Selenium is known to form seleno-analogues of amino acids which are then integrated into the protein. However, selenium has slightly different chemical properties than that of sulfur to produce changes in bond angles and possibly functionality as well as titer.

There are no guarantees all biosynthetic processes will integrate metals into proteins or adsorption of transition and alkali earth metals will have negative impacts. However, knowledge eliminates assumptions and mitigates risk throughout the production and storage cycles of mAb treatment regimes. In order to ensure the viability of your systems as well as the patient's well being, please contact a Brooks Applied Labs representative before a costly oversight occurs.

"Our lives depend on you."

For more information, please visit our website at www.brooksapplied.com or call 206-632-6206.