An Immunoadsorption Device for Myoglobin Removal

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Object

Myoglobin is the key element in rhabdomyolysis induced AKI, which can be removed by hemofiltration. When emergent catastrophic events happen, i.e., earthquake and flood, the electricity and water supply systems are often damaged so that the hemodialysis machines cannot work. The present study constructed a device based on immunoadsorption to remove myoglobin effectively.

Methods

We screened out 2 pieces of antigenic peptides which were named D-12 and L-12, then we got 2 kinds of polyclonal antibodies by immunizing rabbits. And we chose anti D-12 antibody as ligand to couple resin carrier because its higher titer and affinity. The resin carrying anti D-12 antibody was then the adsorbent. We connected tubes with the device to form a circulation system. Then we test the removal capability of this device.

Results

Anti D-12 is better than anti L-12 antibody by purity analysis, titer analysis, specificity analysis. So we chose anti D-12 antibody as ligand to couple resin carrier and the resin was filled into a glass column to make an adsorption device. Then we connected the adsorption device with some tubes to set up a circulation system. A sample solution of 4000ug myoglobin was added into the system. When the solution pass through this system, a total of 909.23ug myoglobin was removed, the clearance rate was 22.73%. Meanwhile, the blank control device(filled with resin without antibody) can only remove 83.90ug myoglobin with a clearance of only 2.02%(Fig.1). Sample solutions of myoglobin and other two common proteins(albumin and lysozyme) were added into fast protein liquid chromatograph(FPLC) to determine the adsorption rate. We found adsorption rate of myoglobin(46.35% ± 10.24%) was higher than that of albumin(5.47% ± 1.17%) and lysozyme(6.22% ± 0.96%), $p<0.01$ respectively.(Tab.1)

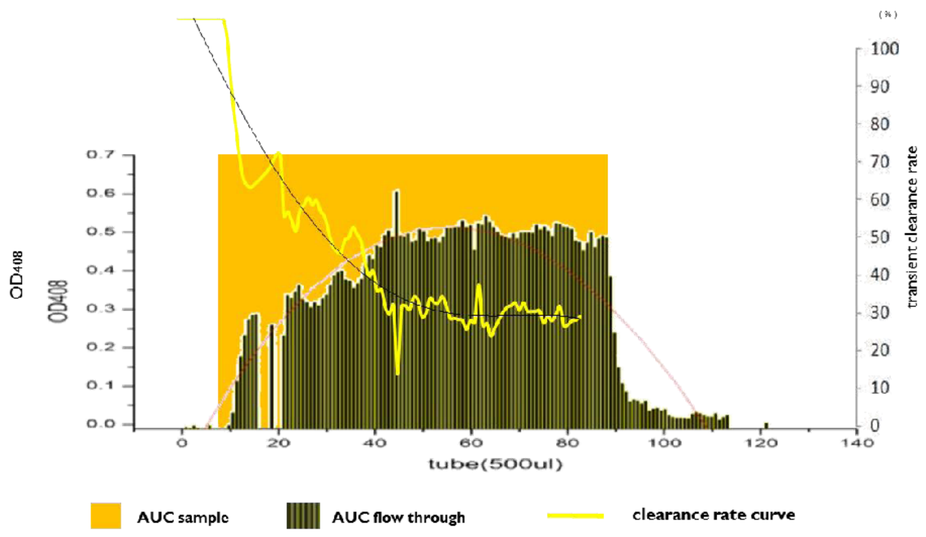

Fig. 1. Adsorption tests of myoglobin

Tab. 1. Adsorption rates of three proteins

protein	adsorption rate(%)
myoglobin	46.35 ± 10.24
albumin	5.47 ± 1.17**
lysozyme	6.22 ± 0.96**#

**compared to myoglobin, $p<0.01$, #compared to albumin, $p>0.05$

Conclusions

In this study, we obtained the polyclonal antibody through screening antigenic epitope, producing antigenic peptides, immunizing, purifying. By coupling the antibody with resin, we constructed an immunoadsorption device. This device can remove myoglobin effectively.

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