

## RESEARCH NOTE

### RED CELL ALLOANTIBODIES IN LAO BLOOD DONORS

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**Abstract.** Data of the prevalence of red cell alloantibodies in blood donors will assist in improving safe blood supply for patients needing transfusion. The purpose of this study was to determine prevalence of red cell alloantibodies in Lao blood donors. Antibody screening and identification by multiple phase indirect antiglobulin standard tube assay were performed in serum samples from 1,181 blood donor individuals following routine work at the Lao Red Cross National Blood Transfusion Center. The overall prevalence of alloantibodies was 3.90%. All of the antibodies found were naturally occurring antibodies. Anti-P<sub>1</sub> was the most common with a frequency of 1.95% followed by anti-Le<sup>a</sup>, anti-Le<sup>b</sup>, anti-Le<sup>a+b</sup>, anti-M, anti-P<sub>1</sub> plus anti-Le<sup>a</sup>, anti-P<sub>1</sub> plus anti-Le<sup>a+b</sup> with the prevalence of 0.59%, 0.42%, 0.42%, 0.17%, and 0.08%, respectively. This is the first report about prevalence of red cell alloantibodies among Lao blood donors. The information obtained from this study will be useful for safe blood transfusion and preparation of in house antisera.

**Keywords:** blood donor, red cell alloantibodies, Lao PDR

#### INTRODUCTION

Information regarding the prevalence of red cell alloantibodies in blood donors assists in preparing blood components for patients requiring blood transfusion. Therefore, the prevalence of red cell alloantibodies in the Lao population will be useful for providing better blood transfusion service in the Lao PDR, one of the Southeast Asian countries.

The Lao Red Cross National Blood Transfusion Center is a Government organization, and controls policies and standards of blood transfusion services in the Lao PDR. Donated blood is typed for ABO and RhD blood groups, and screened for four infection markers, namely, HIV, HBV, HCV and syphilis. Hence, there is no information concerning alloantibodies among blood donors.

In this study, unused donor serum samples at the Lao Red Cross National Blood Transfusion Center, Vientiane, Lao PDR were screened for antibodies and samples with a positive result were further investigated to identify each antibody de-

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tected. The study was approved by Lao National Ethics Committee for Health Research, No.325/NECHR and Human Research Ethics Committee, Khon Kaen University, Thailand, No. HE532464.

## MATERIALS AND METHODS

### Subjects

Blood donor samples collected during three periods: September to November 2010, January to February 2011, and January to February 2012 were included in this study. Unused serum samples were kept at -20°C until tested.

### Method

Antibody screening and identification were conducted using saline and 2-stage papain/multiple phase indirect antiglobulin tube test (Roback *et al*, 2008). Detection of antibodies was confirmed by corresponding antigen typing (Roback *et al*, 2008). Screening and panel cells were purchased from the Thai Red Cross National Blood Center, Bangkok, Thailand.

### Statistical analysis

Data for prevalence of alloantibodies was analysed using STATA software version 10.0. Paired *t*-test was employed for testing of statistically significant difference, with a *p*-value < 0.05 considered significant.

## RESULTS

There were 1,181 blood samples, consisting of 360 (30.5%) females and 821 (69.5%) males. Red cell alloantibodies were detected in 46 donors (3.9%), 12 (1.0%) among females and 34 (2.9%) among males.

All red cell alloantibodies were detected by both techniques. All samples reacted at room temperature and 29 samples were positive but with weaker reaction at 37°C

using the saline antiglobulin technique. The papain technique also showed positive reactions in all 46 samples only at the antiglobulin phase, indicating naturally occurring antibodies.

Single antibodies were found in 42 samples (anti-P<sub>1</sub> *n* = 23), anti-Le<sup>a</sup> (7), anti-Le<sup>b</sup> (5), anti-Le<sup>a+b</sup> (5), anti-M (2)), and 3 contained multiple antibodies (anti-Le<sup>a</sup> plus anti-P<sub>1</sub> (2) and anti-Le<sup>a+b</sup> plus anti-P<sub>1</sub> (1)). (One positive sample was omitted from antibody identification due to insufficient volume.) Anti-P<sub>1</sub> had the highest frequency (54%), followed by Lewis antibodies (42%) and then anti-M antibodies (4%).

## DISCUSSION

There is no statistically significance in the incidence of alloantibodies among females and males. Usually, females tend to develop alloantibodies more frequently than males as a result of pregnancy. These results are likely due to the fact that alloantibodies are naturally occurring, so females and males has equal opportunity to be sensitized by natural antigens, such as food, bacteria, and vaccines (Harmening, 2005).

The alloantibodies prevalence in Lao blood donors (3.9%) is statistically different from that of Thai blood donors, being lower than northeastern Thai blood donors (10.08%, *p* = 0.0067) (Rompasuk *et al*, 1994), but higher than southern Thai blood donors (0.89%, *p* < 0.0001) (Narkpetch, 2008). This may due to the more similar environment and living conditions of people in Lao PDR and northeast Thailand.

The high frequency of anti-P<sub>1</sub> antibodies could be related to the high frequency of P<sub>1</sub> antigen-negative blood group (81%) in the Lao population (Keokhamphoui *et al*, 2012), allowing for a higher chance of

natural sensitization in P<sub>1</sub>-negative individuals. This can be induced by P<sub>1</sub> antigen-like substances present in such parasites as liver flukes, *Clonorchis sinensis*, *Opisthochis viverrini*, and *Lumbricoides terrestris* (Harmening, 2005). Laos has a high prevalence of trematode infection (Sithithaworn *et al*, 2006; Chai *et al*, 2007; Sayasone *et al*, 2009), and studies have reported the finding of anti-P<sub>1</sub> antibodies in P<sub>1</sub>-negative patients infected with liver fluke (Bevan *et al*, 1970; Ben-Ismail *et al*, 1980).

Lewis antibodies (anti-Le<sup>a</sup>, anti-Le<sup>b</sup> and anti-Le<sup>a+b</sup>) present in Le(a-b-) blood group was the second common alloantibody found in Lao blood donors, similar to the findings in Thais (Romphruk *et al*, 1994, 1999). This is also due to the high frequency (50%) of Le(a-b-) blood group among Lao blood donors (Keokhamphoui *et al*, 2012) in which naturally occurring alloantibodies can be easily induced by antigen-like substances (Harmening, 2005). It is of interest to note that Lewis antibodies is the most frequent alloantibodies found in southern Thai blood donors, followed by anti-P<sub>1</sub> antibodies (Yeela and Buathong, 2004; Narkpetch, 2008) as the liver fluke infection is not common among the southern Thai population.

In summary, this is the first report of the prevalence of alloantibodies among Lao blood donors. The information obtained from this study will be useful for prevention of transfusion complications (Matson *et al*, 1955; Hunter, 1960; Arndt *et al*, 1998) and in the preparation of in-house antisera.

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