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NEW BLOOD GROUP: DISCOVERY AND FUNCTIONAL SIGNIFICANCE

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The human blood type is determined by the presence or absence of the A and B antigens on red blood cells, and the presence or absence of the Rh factor protein, thus the combination of all these antigens make 8 different groups for example A+, A-, B+, B-, O+, O-, AB+, and AB-. However lately researchers from NHS Blood and Transplant (Bristol), NHSBT's International Blood Group Reference Laboratory (IBGRL) and the University of Bristol identified the genetic background of the previously known but mysterious AnWj blood group antigen. The discovery of a new blood group, MAL, has solved a 50-year-old mystery. Recently discovered a new blood group called EMM negative, which is also the rarest blood type in the world, found in a 68 years old man lived in Rajkot, India. The discovery of EMM negative blood in India was the 11th case in the world. It is not easy to find new blood group. Nevertheless there are many challenges to starting a rare blood group donor program in India, including the cost of rare antisera, the ethnic and racial diversity of the population, and the lack of access to facilities.

Er blood group: Discovered by scientists from NHS Blood and Transplant and the University of Bristol, this is the 44th blood group system. The discovery was published in Blood in October 2022. The Er blood group includes the antigens Er4 and Er5, which are extremely rare. These antigens have been linked to cases of hemolytic disease of the fetus and newborn, where the mother's immune system attacks the unborn child's blood.

MAL blood group: Scientists have also discovered a new blood group called MAL. This blood group was discovered by a team led by NHS Blood and Transplant. The small protein MAL was difficult to

identify, so multiple lines of investigation were needed to establish this blood group system. The discovery of MAL helps solve a 50-year-old mystery and improves care for rare patients. The discovery of MAL makes it easier to find compatible blood donors and provides better care for patients who are uncommon.

EMM negative blood group: A unique blood group was discovered in India in 2022. A 65-year-old man from Gujarat was identified with this blood type, which is the rarest in the world. People with this blood type cannot donate or receive blood from anyone else (Singh, Lavina et al. Struggle of a senior citizen to find blood for transfusion led to discovery of an extremely rare blood type in India – The EMM blood group Transfusion and Apheresis Science, Volume 62, Issue 2, 103584)

The newly discovered variations within the blood group system, Er4 and Er5, are extremely rare, but they have been implicated in cases of haemolytic disease of the foetus and newborn, when the mother's immune system attacks their unborn child's blood. Two patients whose history was studied had sadly lost their babies due to this disease. Nicole Thornton, Head of Red Cell Reference at NHSBT's International Blood Group Reference Laboratory, said: "Most people will have what we consider to be the 'regular' form of Er but a small number of rare individuals have altered forms - including the new ones we identified in this study. "Discovering the genetic basis of blood groups allows us to develop new tests to identify those with uncommon blood groups, with the aim of providing the best possible care for even the rarest of patients.

"This discovery solves the 30 year plus mystery of the genetic background of this blood group system but the most important consideration for us, in investigating these cases, was to be able to provide answers to two mothers who tragically lost their babies. "The more we know about such rare blood group variations, along with the ability to be able to test for and identify them, the better care we are able to offer to such patients in the future."

Dr Vicki Chalker, NHSBT's Chief Scientific Officer, said: "The International Blood Reference Laboratory team are incredible 'blood detective' specialists working on complex systems to help patients. They have discovered a new blood group system and helped families understand the reason for such tragic loss of their child."