colleagues⁴ is preliminary, they should be recognized for contributing to the foundation on which new treatments can be built. With increasing numbers of patients being diagnosed with PAH, the pressure to find effective treatments remains high.

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Commentary: A new treatment strategy for pulmonary arterial hypertension

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Despite remarkable improvements in understanding the pathobiology¹ and medical treatment for pulmonary arterial hypertension (PAH), it remains to be a severe and progressive disease. Pathologically, PAH is associated with a severe arteriopathy leading to small vascular occlusion, increased pulmonary artery pressure, right ventricular failure, and death. Current therapies are mainly targeted to 3 pathways: prostacyclin, nitric oxide, and endothelin. These therapies are very effective and have markedly improved the prognosis of patients with PAH, including idiopathic PAH. However, these therapies are not to cure PAH but to improve pulmonary hemodynamics by dilating pulmonary small vessels. When all medical treatment fails, lung transplantation remains to be the last hope.

In this issue of the *Journal*, Miao and colleagues² report a rat experimental study to develop a new treatment strategy for PAH.³ The purpose of this study was to select a suitable

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CENTRAL MESSAGE

The combination of proangiogenic and vascular stabilization factor transfection may promote angiogenesis and vascular maturation and thus may be a new treatment for pulmonary arterial hypertension.

combination of angiogenic and vascular stabilization factors to improve the proliferation and maturity of neovascularization of lung tissue. The contrast medium filling time and right pulmonary artery root diameter and hemodynamic parameters in hepatocyte growth factor + angiopoietin-1 (Ang-1) and vascular endothelial growth factor + Ang-1 groups were significantly decreased compared with the vehicle group. The authors concluded that hepatocyte growth factor + Ang-1 transfection and vascular endothelial growth factor + Ang-1 transfection alleviate PAH by promoting maturation and stability of new blood vessels,

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which may be potential candidates for PAH treatment. The authors are to be congratulated for completing this well-designed animal study.

A monocrotaline (MCT)-induced pulmonary hypertension rat model has been widely used for studies on pulmonary hypertension, and the authors use this model in the present study.³ Endothelial injury and accumulation of inflammatory cells caused by MCT appear to have important roles in developing pulmonary hypertension. However, this model does not produce neointimal lesions, which are often observed in patients with severe PAH. Furthermore, MCT was given 2 weeks before the treatment, and the evaluation was done 2 weeks after the treatment. The scenario is quite different from clinical setting, in which PAH, including idiopathic PAH, is a disease that progresses over months and years.

Despite the aforementioned limitations, the result of this study is encouraging in the sense that the combination of angiogenic and vascular stabilization factors may be a new treatment strategy toward curing this devastating disease. Further studies using a large animal model are expected.

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