

Using rice grains as factories for producing medicines

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Guest Column

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Human serum albumin (HSA) is a soluble protein that functions

primarily as a carrier protein for steroids, fatty acids, and thyroid hormones, and plays an important role in stabilizing the extracellular fluid volume. HSA is widely used clinically to treat serious diseases and in the pharmaceutical industry. The market demand for HSA is estimated to be more than 600 tons per year worldwide, with 180 tones in China alone.

Currently, commercial production of HSA is primarily based on collected human plasma, which is limited in supply but of high clinical demand, not the least in China. It was reported that the shortage of human plasma led to a rapid increase in its demand. Furthermore, there is an increasing public health concern with plasma-derived HSA (pHSA) with its potential risk for transmission of blood-derived infectious pathogens such as hepatitis and HIV. To eliminate the potential risk of viral contamination, regulatory agencies have encouraged pharmaceutical companies to use non-animal-derived sources for pharmaceutical production. Thus, the development of a low-cost method for the production of recombinant HSA (rHSA) is essentially a safer and potentially unlimited alternative to pHSA.

In recent years, various plasma product alternatives have been developed in the world. Companies from Europe, America and Japan have spent a lot of capital to accelerate the commercial production of recombinant albumin. In the international markets, the replacement of blood products by recombinant human serum albumin is gaining popularity. The expression systems of bacteria, yeast and transgenic animals/plants or other systems have been used to produce recombinant human serum albumin (rHSA), however, none of them have been successfully commercialized due to various disadvantages.

Tab	le (below):	Ac	dvantage	es and	disa	advantages	of	different	exp
s. No	System	0 versil cost	Production time cale	Scale-up capacity	Product quality	Glycosylecion	Contamination risks	Storngecost	
1	Bacteria	Low	Short	High	Low	None	Endotoxins	Moderate	
2	Yeast	Median	Medim	High	Medinn	Incorrect.	Lowrisk	Moderate	
3	Mammalian cell culture	High	Long	Very low	Wery high	Connect	Viruses, prions and oncogenic DNA	Expensive	
1	Transgenic animals High	High	Very long	Low	Veryhigh	Conrect	Viruses, prions and oncogenic DNA	Expensive	
5	Hant cell cultures	Medim	Median	Medinn	High	Minor differences	Lowrisk	Moderate	
6	Transgenic plants	Very low	Long	Very high	High	Minor differences	Lowrisk	Inexpensive	

Wuhan Healthgen Biotechnology Company has developed an Oryz HiExp platform to solve the problems that other expression systems are experiencing. Oryz HiExp has many advantages, including high expression level, cost-efficiency, simplicity of processing, high quality, enhanced safety and is also environmental friendly.

Figure (below): The process of molecular pharming

Wuhan Healthgen Biotech used the technology of molecular

systems

pharming to successfully produce recombinant Human Serum Albumin (OsrHSA), recombinant alpha-1 antitrypsin (OsrAAT), recombinant acidic fibroblast growth factor (OsraFGF) and recombinant basic fibroblast growth factor (OsrbFGF). The expression level ranges from 20-to-150μg per grain. Healthgen biotechnology will willingly provide the competitive products and expression platform services to all its customers.