



## Cell-Free Protein Expression

### CellFree Sciences (CFS) Products and Kits for Cell-Free Protein Expression

Producing proteins at will, often a bottleneck in post-genome studies, has become a reality with the advent of the robust wheat germ cell-free protein expression system. CellFree Sciences' ENDEXT® wheat germ cell-free system permits both high throughput protein screening and microgram- to milligram-scale protein production overnight. Protein synthesis protocols for the ENDEXT® system have been optimized for a wide range of proteins. They have also been incorporated into robotic protein synthesizers, versatile Protomist® DT II and mass-producing Protomist® XE. Being eukaryotic and free from physiological constraints that hamper *in vivo* systems, the wheat germ cell-free system allows synthesis, with or without additives, of a broad spectrum of protein and protein complexes ranging from 10 kDa to 360 kDa in well-folded and soluble forms.

CIL offers a wide variety of products for cell-free protein expression. Cell-free protein expression methods offer several advantages over expression using *E. coli* or other *in vivo* expression systems. These advantages include increased speed, ability to express toxic proteins, ease of amino acid type selective labeling and an open system that allows cofactors, chaperones, redox molecules and detergents to be easily added to the expression system. Cell-free methods also allow co-expression of multiple proteins and are amenable to automation.

CIL is proud to distribute a wide range of products from CellFree Sciences (CFS). CIL also offers algal-derived amino acid mixes and conveniently packaged sizes (25 mg, 50 mg, 100 mg, etc.) of individual crystalline amino acids.

### Amino Acid Mixes for Cell-Free Protein Expression

Catalog No.	Description
CLM-1548	Algal amino acid mixture (16AA) (U- <sup>13</sup> C, 97-99%)
DLM-2082	Algal amino acid mixture (16AA) (U-D, 98%)
NLM-2161	Algal amino acid mixture (16AA) (U- <sup>15</sup> N, 98%)
CNLM-452	Algal amino acid mixture (16AA) (U- <sup>13</sup> C, 97-99%; U- <sup>15</sup> N, 97-99%)
DNLM-819	Algal amino acid mixture (16AA) (U-D, 98%; U- <sup>15</sup> N, 98%)
CDNLM-2496	Algal amino acid mixture (16AA) (U- <sup>13</sup> C, 97-99%; U-D, 97-99%; U- <sup>15</sup> N, 97-99%)
ULM-2314	Algal amino acid mixture (16AA) (unlabeled)
DLM-6819	"Cell Free" amino acid mix (20AA) (U-D, 98%)
NLM-6695	"Cell Free" amino acid mix (20AA) (U- <sup>15</sup> N, 96-98%)
CNLM-6696	"Cell Free" amino acid mix (20AA) (U- <sup>13</sup> C, 97-99%; U- <sup>15</sup> N, 97-99%)
DNLM-6818	"Cell Free" amino acid mix (20AA) (U-D, 98%; U- <sup>15</sup> N, 98%)
CDNLM-6784	"Cell Free" amino acid mix (20AA) (U- <sup>13</sup> C, 97-99%; U- <sup>15</sup> N, 97-99%; U-D, 97-99%)
ULM-7891	"Cell Free" amino acid mix (20AA) (unlabeled)

The CFS wheat germ cell-free system was used to produce a large number of human proteins that are listed in the Human Gene and Protein Database (hgpd.lifesciencedb.jp). Expressed proteins were detected in almost all cases when CFS' wheat-germ extract and reagents were used.<sup>1</sup>

Please contact CFS directly (tech-sales@cfsciences.com) if you would like to use CFS's lab services to prepare a pEU plasmid with your target gene sequence, characterize the yield and solubility of your expressed protein, or produce a prescribed amount of protein using the wheat germ cell-free system.

- Goshima, N.; Kawamura, Y.; Fukumoto, A.; Miura, A.; Honma, R.; Sato, R.; Wakamatsu, A.; Yamamoto, J.; Kimura, K.; Nishikawa, T., *et al.* **2008.** Human protein factory for converting the transcriptome into an *in vitro*-expressed proteome. *Nature Methods*, 5, 1011-1017.

Profiles for 16 Amino Acid Mixture (16 AA)		Profiles for 20 Amino Acid Mixture (20 AA)	
<i>Approximate percentages, subject to lot-to-lot variability.</i>			
L-Alanine	7%	L-Alanine	6%
L-Arginine	7%	L-Arginine	6%
L-Aspartic acid	10%	L-Asparagine	5%
L-Glutamic acid	10%	L-Aspartic acid	8%
Glycine	6%	L-Cysteine	3%
L-Histidine	2%	L-Glutamic acid	9%
L-Isoleucine	4%	L-Glutamine	5%
L-Leucine	10%	Glycine	5%
L-Lysine	14%	L-Histidine	1%
L-Methionine	1%	L-Isoleucine	3%
L-Phenylalanine	4%	L-Leucine	9%
L-Proline	7%	L-Lysine	12%
L-Serine	4%	L-Methionine	1%
L-Threonine	5%	L-Phenylalanine	4%
L-Tyrosine	4%	L-Proline	5%
L-Valine	5%	L-Serine	4%
		L-Threonine	4%
		L-Tryptophan	3%
		L-Tyrosine	3%
		L-Valine	4%

CIL does not provide protocols for formulation of amino acid mixtures, as the formulations may vary depending on application and reaction scale. For first-time amino acid formulations, the pH should be checked prior to use.