Totipotent Prostembryona Factor®

TEKHO MARINE BIOTECH

TPF-H01 / TPF-EX05 / TPF-101

Totipotent Prostembryona Factor ® (TPF)

TPF exosomes, growth factors & efficacy applications

TPF-H01 medical functional dressing

TPF-EX05 skin care & anti-aging repair

TPF-EX05 scalp care & hair health function

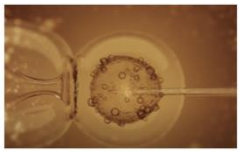
Packaging 2.0

TPF-101 functional food ingredient

International invention patent & trademark

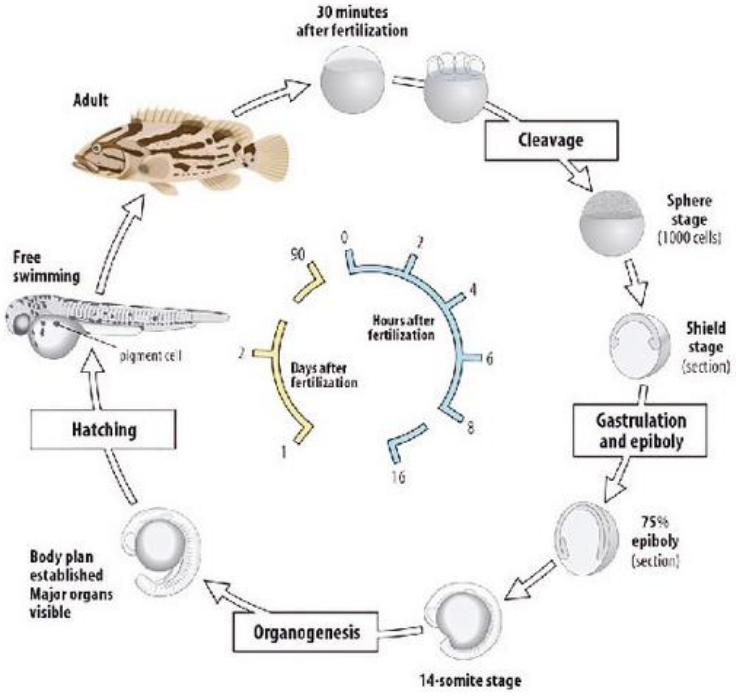
Active Ingredient
Totipotent **P**rostembryona **F**actor®

- Derived from precious deep-sea fish fertilized roes (**embryonic stem cells**) through multiple low-temperature patented extraction processes.
- **Natural complex peptides (exosomes, growth factors, cytokines)** that has successfully obtained the **INCI NAME**, and the **invention patent of USA/ Japan/ Taiwan**.



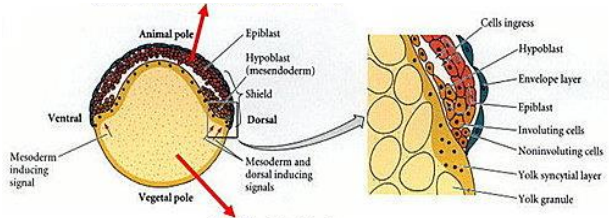
- Various tests have confirmed that TPF has excellent efficacy and safety when used in the fields of beauty care, hair health, functional food and medical dressings.
- TPF is a nano-sized composite ingredient that can be completely absorbed.
- Adopts pharmaceutical grade ultra-low temperature vacuum freeze-dried technology, without added preservatives, has convenient storage and transportation functions, and ensures optimal biological activity.

Active Ingredient
Totipotent **P**rostembryona **F**actor®



Fish embryos development

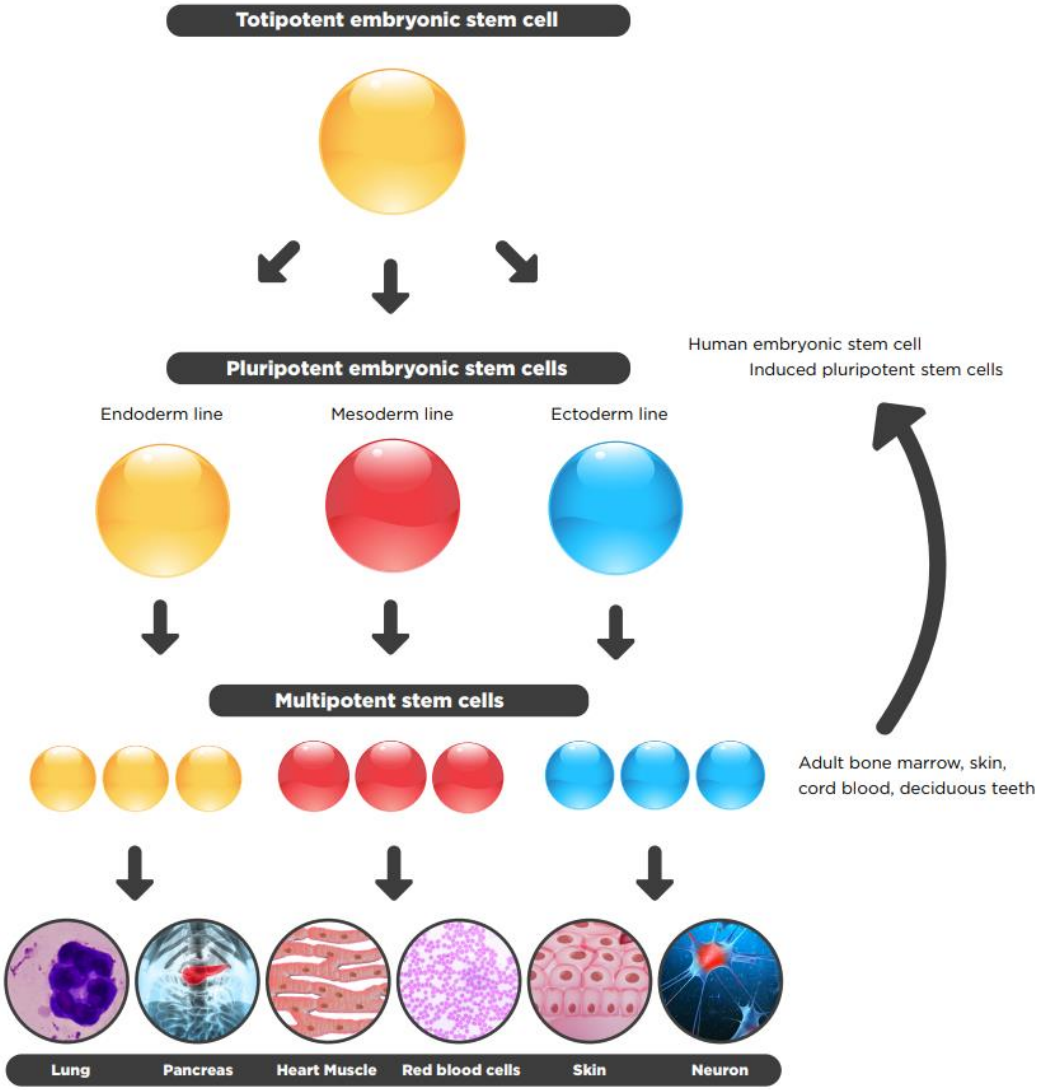
Cell differentiation and development
(stem cells and growth factors)



Nutrient supply side
(yolk part)

Embryonic stem cells secrete large amounts of
√ **Exosomes** √ **Growth Factors** √ **Cytokines**
Promote cell proliferation & differentiation & repair

Active Ingredient
Totipotent **P**rostembryona **F**actor®



Prostembryona
→Pro: super
→Stem: stem cell
→Embryona: embryonic

\The BEST + FIRST Choice/

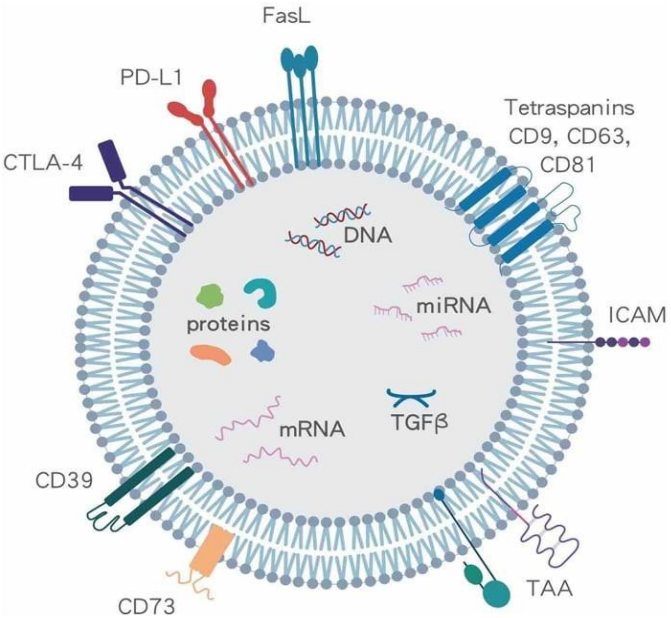
Fish

Embryonic Stem Cell

Exosomes of **TPF**

- Exosomes are intercellular signaling regulators that can act throughout the body and are used in skin repair, regeneration, anti-inflammation, anti-aging and barrier function.

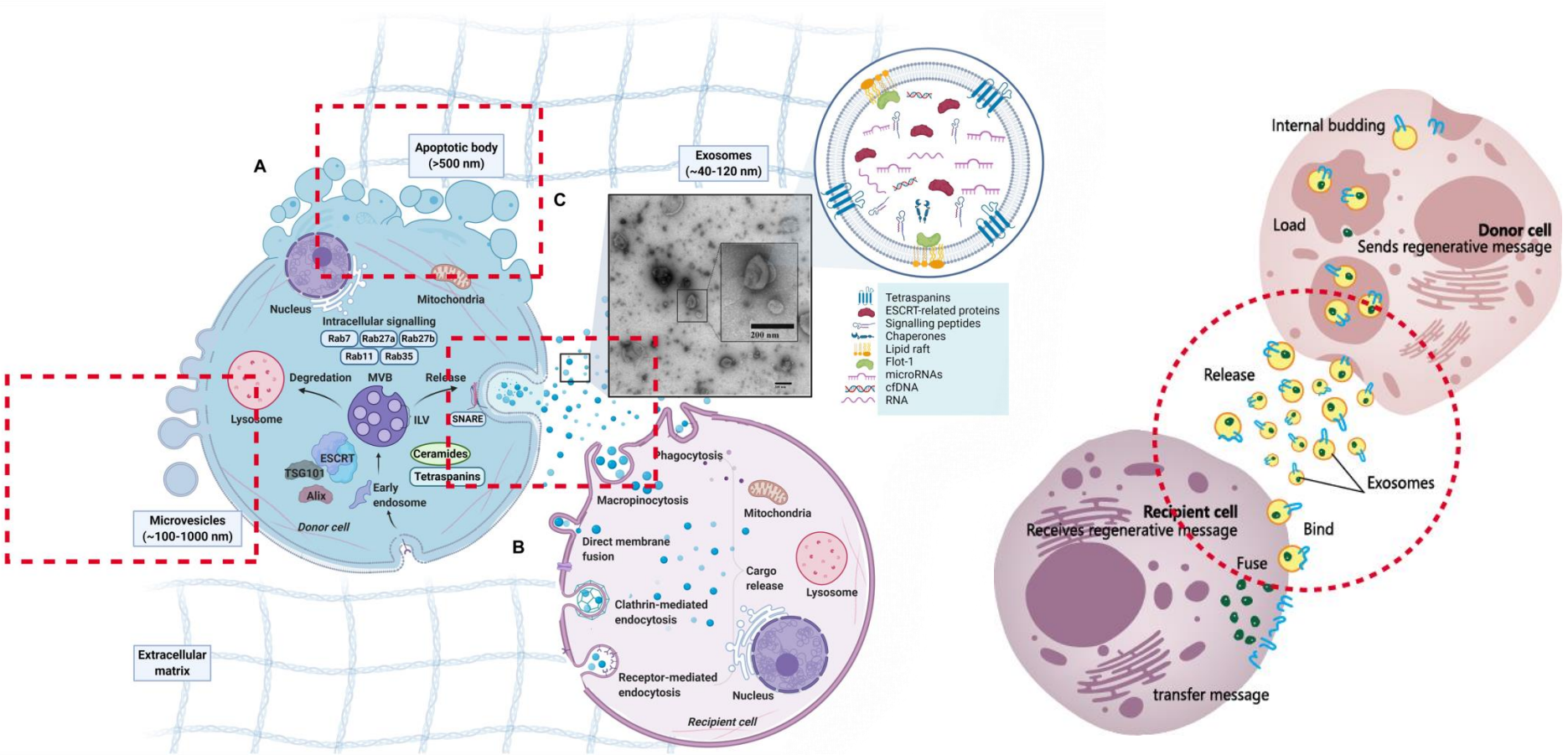
- The composition and function of exosomes depend on the source cells, and TPF is derived from embryonic stem cells. Therefore, TPF has the highest-level and diverse exosomes. Among its many functions, it mainly promotes tissue repair and regeneration.



TPF size: 1-200 nm
Exosome size: 30-150 nm
Microvesicle size: 100-1000 nm
Growth Factors size: 5-100 nm

Exosomes of **TPF**

Exosome production



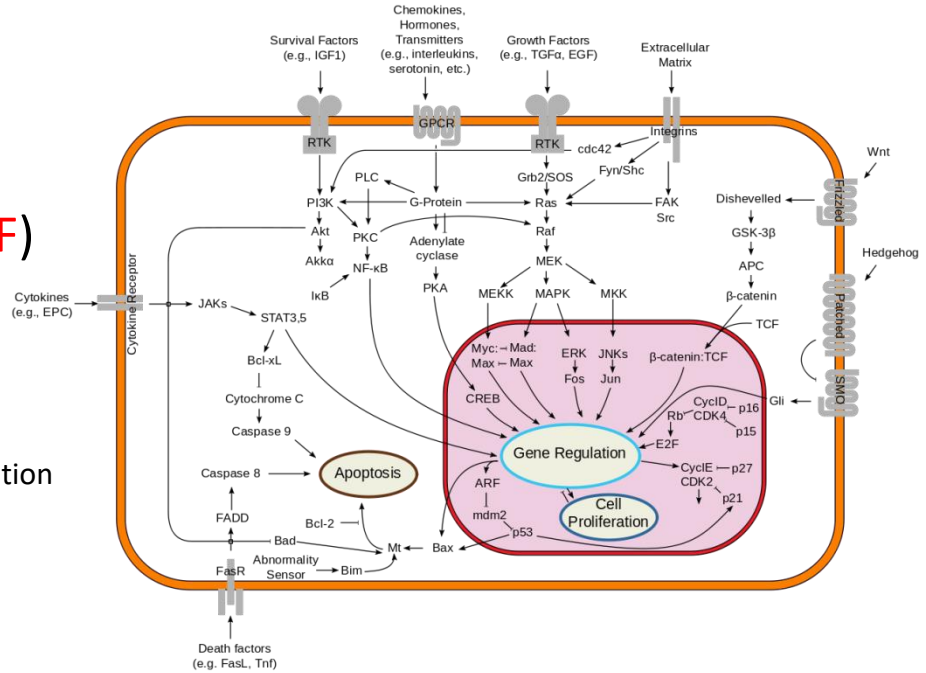
Growth Factors of **TPF**

- Small molecule proteins transmit and regulate various activities and functions between cells, also stimulate cell proliferation and cell differentiation.

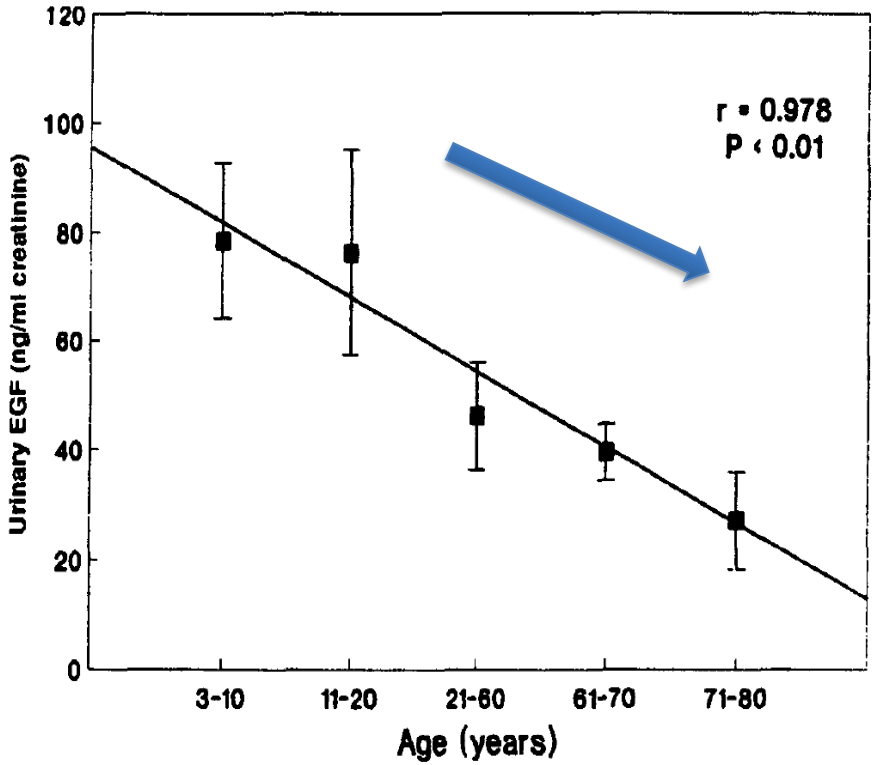
- Research on embryonic stem cells has confirmed that they secrete:
  - -Exosomes
  - -Vascular endothelial growth factor (VEGF)
  - -Insulin-like growth factor 1 (IGF-1)
  - -Epidermal growth factor (EGF)
  - -Keratinocyte growth factor (KGF)
  - -Angiopoietin-1
  - -Type 2 fibroblast growth factor (bFGF)
  - -Transforming growth factor (TGF-β)
  - -Hepatocyte growth factor (HGF)

etc. factors known to be related to cell proliferation and differentiation

Activates gene expressed proteins through cellular signal transduction.



Growth Factor secretion decreases with age



Test **EGF** concentration in urine from 3~79 years old healthy men and women (total 70 people) a day.

TPF's protein identification

Master	Accession	Description	Coverage [%]	# Peptides	# Unique Peptides	# AAs	MW [kDa]	Score Sequest HT: Sequest HT
Master Protein	Cont_P02769	Albumin OS=Bos taurus OX=9913 GN=ALB PE=1 SV=4	53	33	33	607	69.2	160.9
Master Protein	ADG29140.1	alpha actin [Epinephelus coioides]	27	11	4	377	41.9	9.48
Master Protein Candidate	Cont_P68138	Actin, alpha skeletal muscle OS=Bos taurus OX=9913 GN=ACTA1 PE=1 SV=1	27	11	4	377	42	9.48
Master Protein Candidate	AAW29030.1	alpha-actin, partial [Epinephelus coioides]	30	11	4	332	36.9	9.48
None	ACM41845.1	actin alpha skeletal muscle, partial [Epinephelus coioides]	29	10	4	305	33.8	9.48
Master Protein	Cont_P60712	Actin, cytoplasmic 1 OS=Bos taurus OX=9913 GN=ACTB PE=1 SV=1	52	14	2	375	41.7	8.99
Master Protein	AAR97600.2	beta actin [Epinephelus coioides]	54	14	2	375	41.7	8.43
Master Protein	ACL98132.1	betaine-homocysteine methyltransferase, partial [Epinephelus coioides]	28	3	3	205	23.1	5.03
Master Protein	ACH73063.1	ribosomal protein LP0-like protein, partial [Epinephelus coioides]	33	3	3	189	19.9	4.55
Master Protein	Cont_P63103	14-3-3 protein zeta/delta OS=Bos taurus OX=9913 GN=YWHAZ PE=1 SV=1	9	3	3	245	27.7	3.4
Master Protein Candidate	AIS72878.1	heat shock protein 60 [Epinephelus coioides]	23	8	8	578	61.2	3.34
Master Protein	7V98	A Chain A, kDa chaperonin	22	8	8	586	62.2	3.34
Master Protein Candidate	7V9R	E Chain E, kDa chaperonin	23	8	8	573	61.4	3.34
Master Protein	ACL98134.1	ran protein, partial [Epinephelus coioides]	13	1	1	106	12.1	3.03
None	AEG78341.1	actin, partial [Epinephelus coioides]	51	4	1	135	15.1	2.85
Master Protein	ADQ86024.1	proliferating cell nuclear antigen, partial [Epinephelus coioides]	19	5	5	188	20.6	2.45
Master Protein	Cont_P05787	Keratin, type II cytoskeletal 8 OS=Homo sapiens OX=9606 GN=KRT8 PE=1 SV=7	2	1	1	483	53.7	2.12
None	AEA39713.1	heat shock protein 90-beta, partial [Epinephelus coioides]	14	2	2	254	30.2	2.04
Master Protein	ACV04938.1	heat shock protein 90 [Epinephelus coioides]	11	6	6	727	83.5	2.04
Master Protein	AEG78402.1	40S ribosomal protein S18 [Epinephelus coioides]	9	1	1	152	17.7	2.01
None	AEG78412.1	actin, alpha skeletal muscle, partial [Epinephelus coioides]	18	3	0	159	17.6	1.7
Master Protein	AAW29031.1	vitellogenin, partial [Epinephelus coioides]	5	4	4	615	67.9	0
Master Protein	AEA39758.1	IK cytokine, partial [Epinephelus coioides]	22	1	1	136	15.7	0
None	AEG78376.1	elongation factor 1 alpha, partial [Epinephelus coioides]	14	2	2	224	24.3	0
Master Protein Candidate	ADG29151.1	UNVERIFIED: mitochondrial ATP synthase lipid-binding protein [Epinephelus coioides]	6	1	1	139	14.5	0
Master Protein	AEA39755.1	peroxiredoxin-6, partial [Epinephelus coioides]	12	1	1	153	17	0
Master Protein	AOW69105.1	elongation factor 1-alpha [Epinephelus coioides]	15	4	4	461	50.5	0
Master Protein	Cont_P35527	Keratin, type I cytoskeletal 9 OS=Homo sapiens OX=9606 GN=KRT9 PE=1 SV=3	3	1	1	623	62	0
Master Protein	AAW29020.1	UDP-glucuronosyltransferase, partial [Epinephelus coioides]	5	1	1	410	46	0
Master Protein	Cont_Q2UVX4	Complement C3 OS=Bos taurus OX=9913 GN=C3 PE=1 SV=2	1	1	1	1661	187.1	0
Master Protein	ACM41853.1	chaperonin subunit 7, partial [Epinephelus coioides]	15	1	1	119	12.8	0
Master Protein	Cont_Q2KJD0	Tubulin beta-5 chain OS=Bos taurus OX=9913 GN=TUBB5 PE=2 SV=1	4	1	1	444	49.6	0
None	Cont_Q3SZ57	Alpha-fetoprotein OS=Bos taurus OX=9913 GN=AFP PE=2 SV=1	1	1	1	610	68.5	0
Master Protein	Cont_Q9XSJ4	Alpha-enolase OS=Bos taurus OX=9913 GN=ENO1 PE=1 SV=4	4	1	1	434	47.3	0
None	AEG78394.1	heat shock protein 90, partial [Epinephelus coioides]	11	1	1	150	16.6	0
Master Protein Candidate	ACL98140.1	ubiquitin C variant, partial [Epinephelus coioides]	25	1	1	255	28.7	0
Master Protein	Cont_Q3SZR3	Alpha-1-acid glycoprotein OS=Bos taurus OX=9913 GN=ORM1 PE=2 SV=1	4	1	1	202	23.2	0
Master Protein	AER42692.1	60S ribosomal protein LP1 [Epinephelus coioides]	39	1	1	113	11.5	0
Master Protein Candidate	ACL98108.1	destrin, partial [Epinephelus coioides]	11	1	1	131	15	0
Master Protein Candidate	Cont_P02081	Hemoglobin fetal subunit beta OS=Bos taurus OX=9913 PE=1 SV=1	8	1	1	145	15.8	0
Master Protein	ADG29156.1	histone H2B [Epinephelus coioides]	21	2	2	125	13.8	0
Master Protein	Cont_P12763	Alpha-2-HS-glycoprotein OS=Bos taurus OX=9913 GN=AHSG PE=1 SV=2	7	2	2	359	38.4	0
Master Protein Candidate	AEG78435.1	ubiquitin C variant 3, partial [Epinephelus coioides]	18	1	1	268	29.9	0
Master Protein Candidate	AEG78418.1	Ubiquitin C variant 2 [Epinephelus coioides]	21	1	1	305	34.3	0
Master Protein	Cont_P02070	Hemoglobin subunit beta OS=Bos taurus OX=9913 GN=HBB PE=1 SV=1	8	1	1	145	15.9	0
None	ADG29185.1	eukaryotic translation elongation factor 1 alpha, partial [Epinephelus coioides]	3	1	1	305	33.3	0
Master Protein	ACL98131.1	MDP77-like protein, partial [Epinephelus coioides]	3	1	1	302	35.8	0
Master Protein	ABW04146.1	translation elongation factor 1-delta, partial [Epinephelus coioides]	4	1	1	248	27.2	0
Master Protein	Cont_P34955	Alpha-1-antiproteinase OS=Bos taurus OX=9913 GN=SERPINA1 PE=1 SV=1	6	2	2	416	46.1	0
Master Protein	AER42687.1	pyruvate kinase, partial [Epinephelus coioides]	6	1	1	195	21	0
Master Protein	Cont_P00761	Trypsin OS=Sus scrofa OX=9823 PE=1 SV=1	22	2	2	231	24.4	0
Master Protein	Cont_P04264	Keratin, type II cytoskeletal 1 OS=Homo sapiens OX=9606 GN=KRT1 PE=1 SV=6	15	6	6	644	66	0
Master Protein	WIM64307.1	small molecule GTP binding protein [Epinephelus coioides]	9	1	1	202	22.4	0
Master Protein	ACL98112.1	malate dehydrogenase 1b, partial [Epinephelus coioides]	13	1	1	171	18.8	0
Master Protein	ADZ99115.1	immunoglobulin kappa chain variable region, partial [Epinephelus coioides]	6	1	1	112	12	0
Master Protein	Cont_Q2HJ86	Tubulin alpha-1D chain OS=Bos taurus OX=9913 GN=TUBA1D PE=1 SV=1	7	2	2	452	50.3	0
None	Cont_P68103	Elongation factor 1-alpha 1 OS=Bos taurus OX=9913 GN=EEF1A1 PE=1 SV=1	2	1	1	462	50.1	0
Master Protein	AAM27203.1	40s ribosomal protein S27a [Epinephelus coioides]	10	1	1	156	18	0
Master Protein	Cont_P81187	Complement factor B OS=Bos taurus OX=9913 GN=CFB PE=1 SV=2	1	1	1	761	85.3	0
Master Protein	ADU33222.1	complement component c3 [Epinephelus coioides]	1	1	1	1657	184.4	0
Master Protein	AEG78375.1	cofilin-2 [Epinephelus coioides]	9	1	1	166	19	0
Master Protein	ABW04126.1	ATP synthase H+ transporting F0 complex subunit c [Epinephelus coioides]	6	1	1	139	14.4	0
Master Protein Candidate	Cont_P81948	Tubulin alpha-4A chain OS=Bos taurus OX=9913 GN=TUBA4A PE=1 SV=2	7	2	2	448	49.9	0

Protein that containing exosomes and growth factors

Accession	Description (Epinephelus spp)
AER42692.1	60S ribosomal protein LP1
AEG78435.1	ubiquitin C variant 3, partial
AEG78418.1	Ubiquitin C variant 2
AER42687.1	pyruvate kinase, partial
AAM27203.1	40s ribosomal protein S27a
AIS72878.1	heat shock protein 60
AEA39713.1	heat shock protein 90-beta, partial
ACV04938.1	heat shock protein 90
AEG78394.1	heat shock protein 90, partial
AAW29031.1	vitellogenin, partial

— Application of TPF —

TPF-H01 (functional dressing)

- **Promote the healing of burns, scalds and skin wounds**.

TPF-EX05 (Functional Cosmetics & Hair-Health Raw Material)

- **Comprehensive repair** effects such as moisturizing, brightening, and delaying skin aging.
- Effectively **promote hair growth and hair density**.

TPF-101 (Functional Food Ingredient)

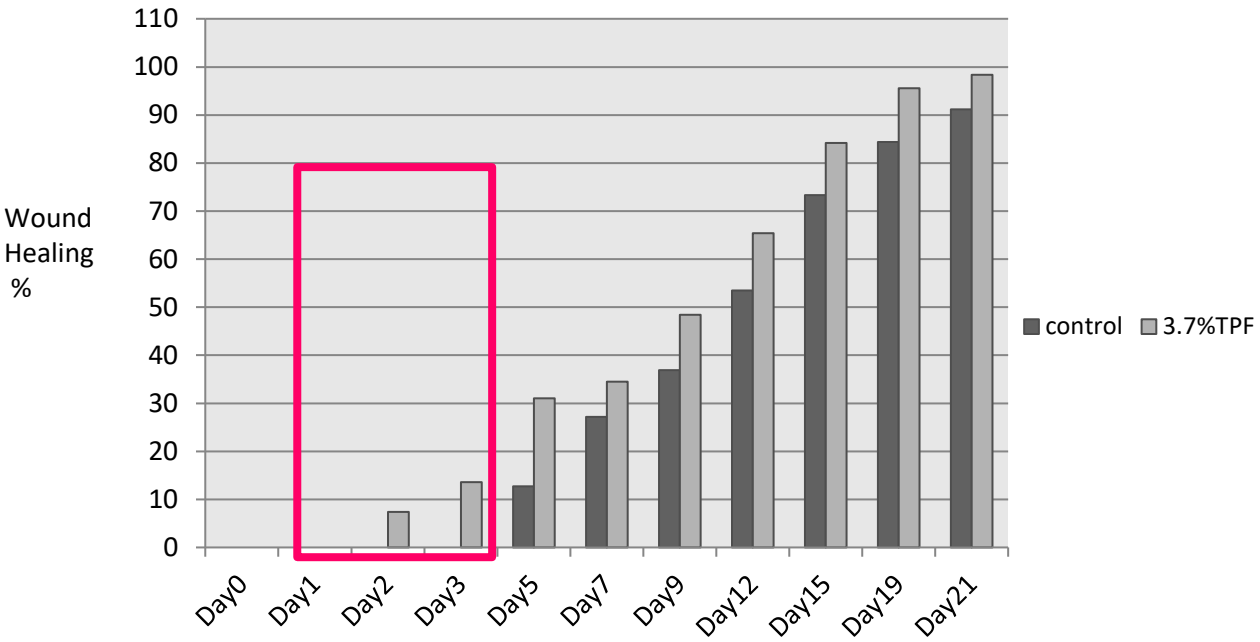
- Effectively **increase** the concentration of **IGF-1** (insulin-like growth factor) in blood.
- Effectively **reduce** the concentration of **ACE** (angiotensin-converting enzyme) in blood.
- Helps **body growth and delays aging**.
- Recognized by the Food and Drug Administration of the Ministry of Health and Welfare in Taiwan as an edible food ingredient.

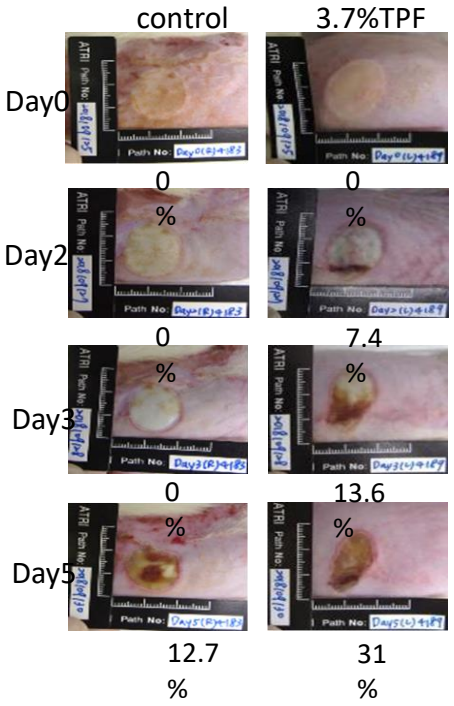
Medical functional dressing

TPF-H01

Animal Model - Burning wound healing (Agricultural Science and Technology Research Institute)

Deep Second Degree Burns
(92 ° C copper rod 12 seconds _2 cm round wound)





Promote skin wound healing 2 ~ 3 days earlier

Skin care & anti-aging repair

TPF-EX05

Active Ingredient for Skin Care Products - TPF

- Features：Extracted from precious deep-sea fish fertilized roes (embryonic stem cells) through biotechnology.

- The worldwide only natural multiple ingredient (exosomes, growth factors, cytokines) used in skin care materials, which is exclusively developed by Tekho Marine Biotech Co., Ltd.

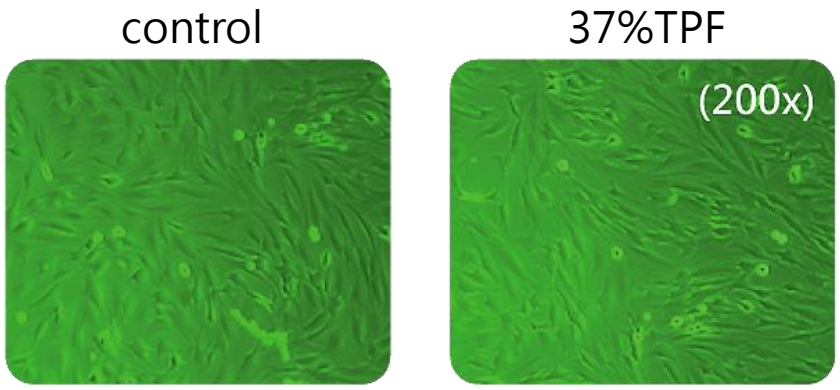
- Experiments have confirmed that TPF has the effects of moisturizing, brightening, anti-aging and promoting skin wound repair.

Physiological Action of Cells

TPF in vitro/in vivo test

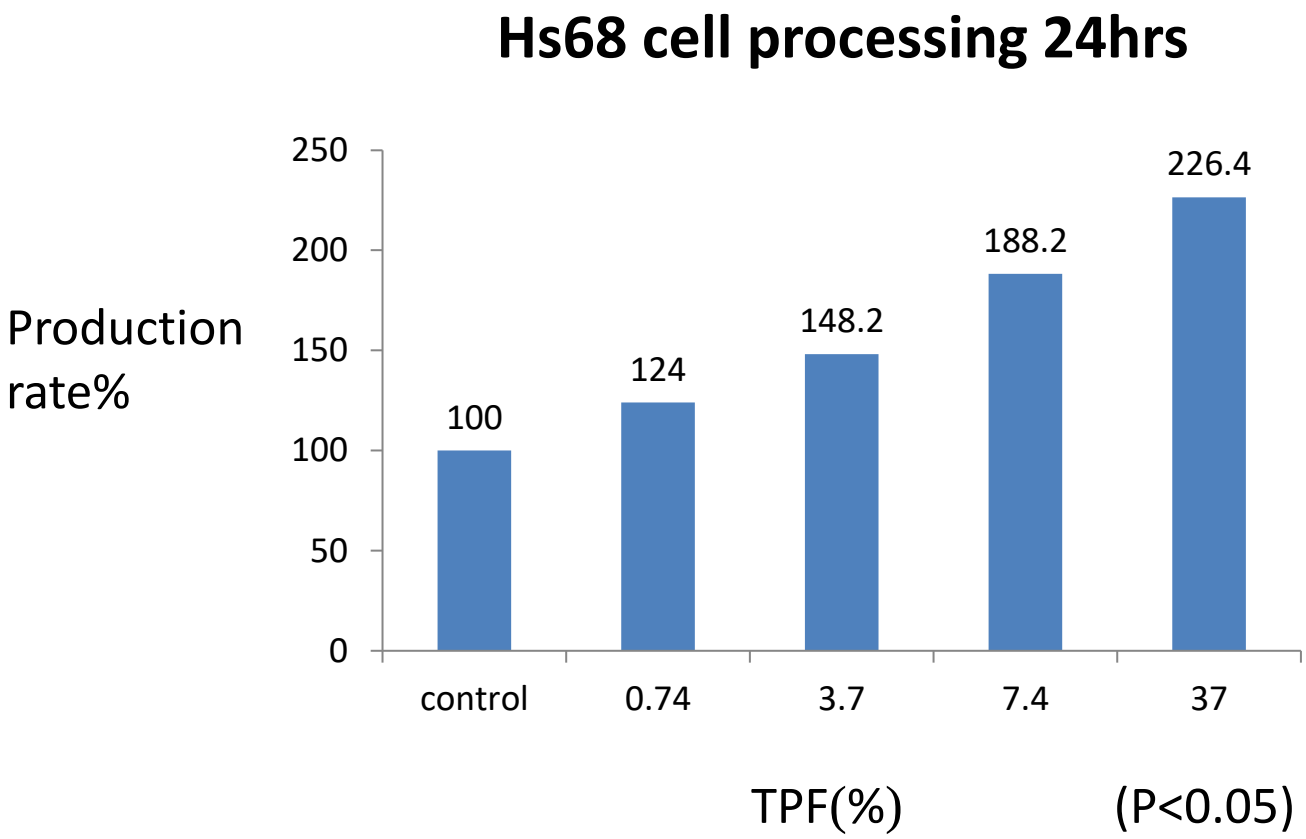
- Anti-oxidation (DPPH) test：IC_{50}=2.11mg/ml
  (Equivalent to 0.211%, it has a 50% scavenging rate for free radicals)

- Cytotoxicity test：37% TPF, Hs68 cells survival rate >90%



- Tyrosinase activity test：0.0125% TPF with B16, inhibition rate = 23.07%

Collagen production test (Hs68)



★ TPF possess anti-aging (elastic, firm, anti-wrinkle), brightening, moisturizing and accelerated-healing for all-round skin care.

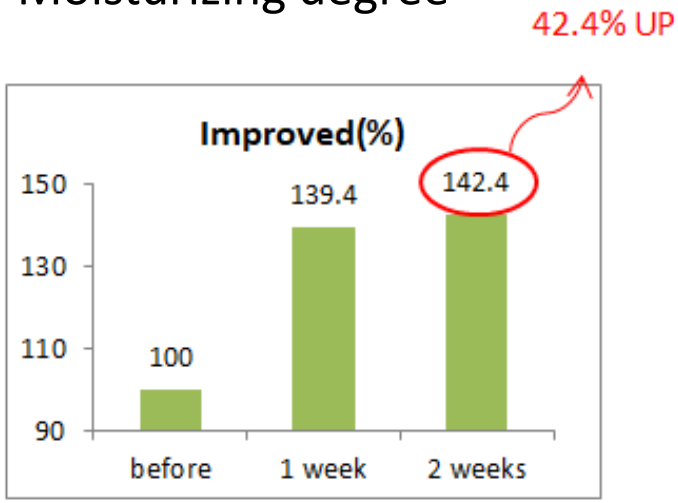
Human Skin Test

- TPF can not only act on epidermis layer but also on dermis layer, that stimulates fibroblast to secrete collagen, inhibition of melanin synthesis, and accelerated wound-healing. It shows the remarkable potential to exceed the limit of traditional cosmetic products which only act on skin epidermis layer and reach real anti-aging efficiency.

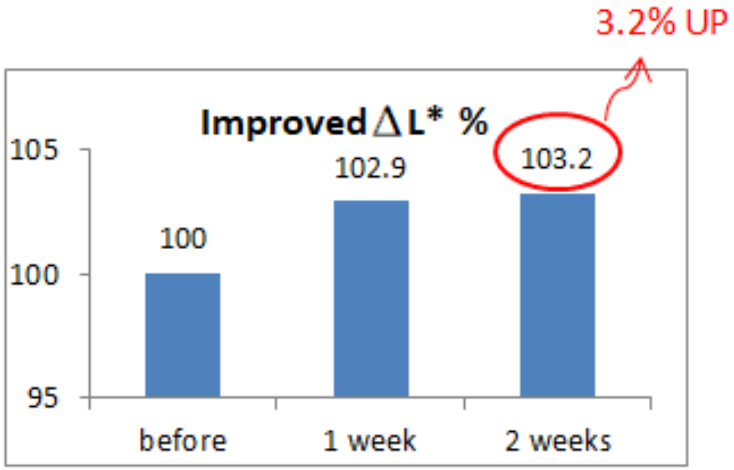
Form 1：Face Mask

- Period：2 weeks
- Frequency：1 per day
- Test Item：Improvement of moisturizing degree, elasticity and firmness

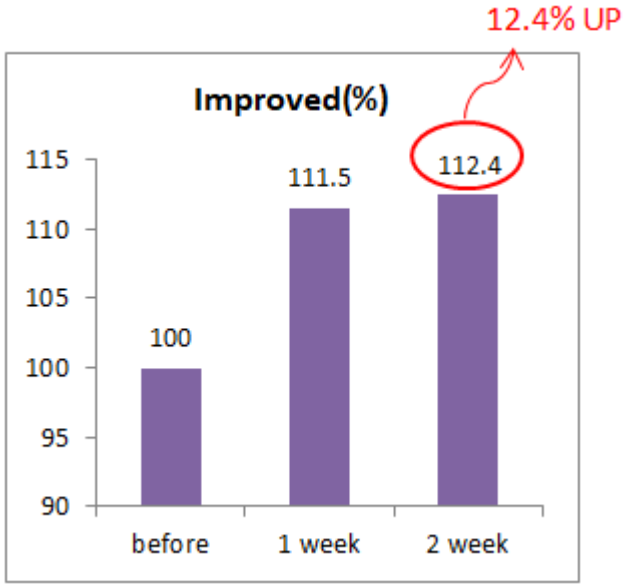
Moisturizing degree



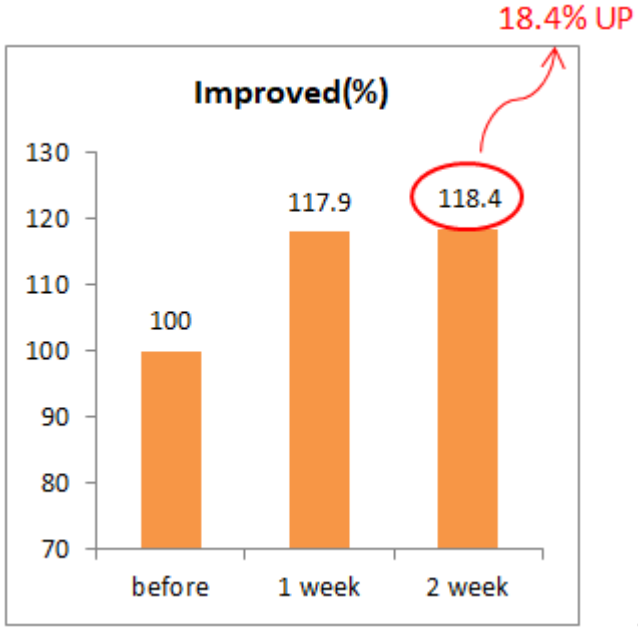
Whiteness



Elasticity

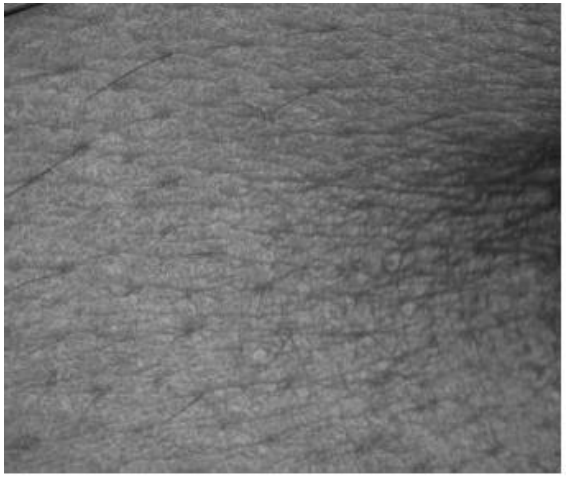


Firmness

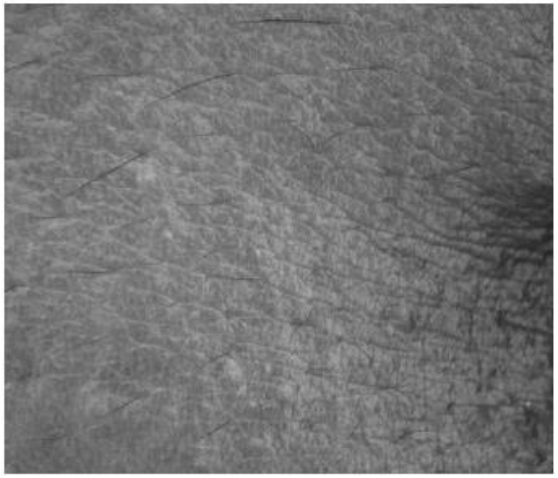


Form 2：Eye Gel

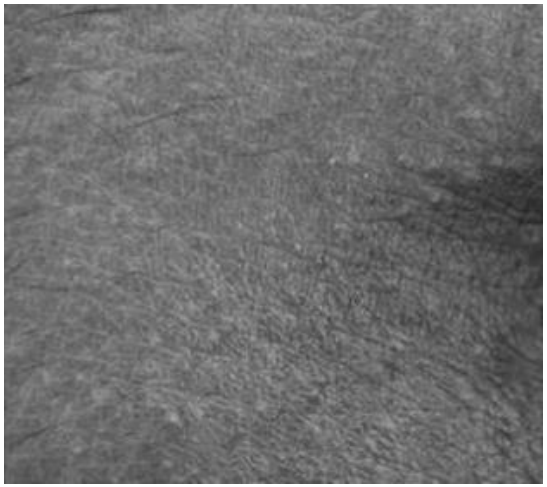
- Period：4 weeks
- Frequency：1 per day
- Test Item：Crow’s Feet



Before



2 weeks reducing 15%



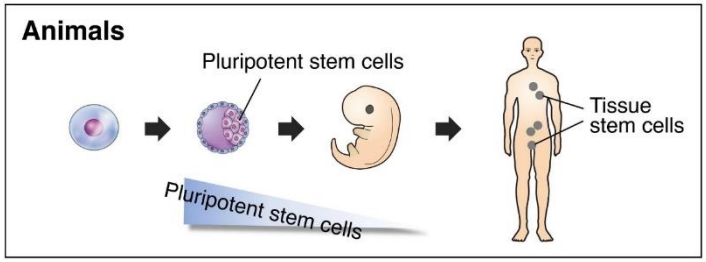
4 weeks reducing 17%

Safety of TPF

- TPF is derived from fertilized roes of deep-sea fish species. No organic solvents are used in the extraction process. It has undergone clinical skin patch safety testing and can be safely applied to human skin.

Test Item	Result
Aquaculture drug residue	Negative
Heavy Metal (As、Pb、Cd、Hg)	Negative
Total plate count	<100 CFU/g
E. coli	Negative
Assessment of cytotoxicity	safe
Skin patch safety test	safe

Biocompatibility with human being and the status of exosomes



\The BEST + FIRST Choice/

Fish

Embryonic Stem Cell

Human Stem Cell

Mammals Stem Cell

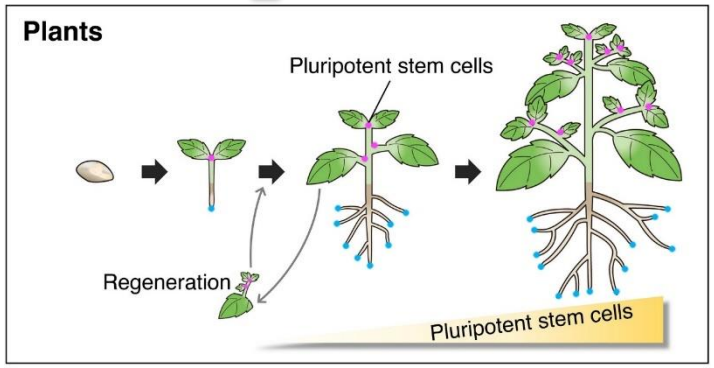
Infectious disease and ethics

Risk of zoonosis

Plant Stem Cell

Roe Extract

Plant Extract



★ The composition and function of exosomes depend on the source cell, mainly promotes tissue repair and regeneration.

TPF is Eco-friendly & Sustainable

- We are a friendly biological factory that is consistent with sustainable use and environmental protection.

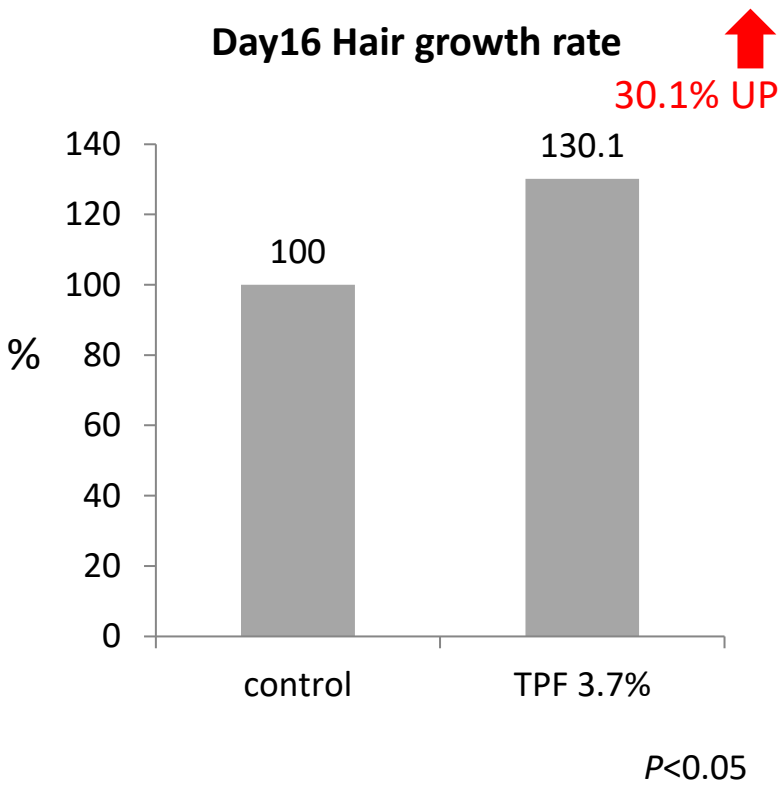
Scalp care & hair health function

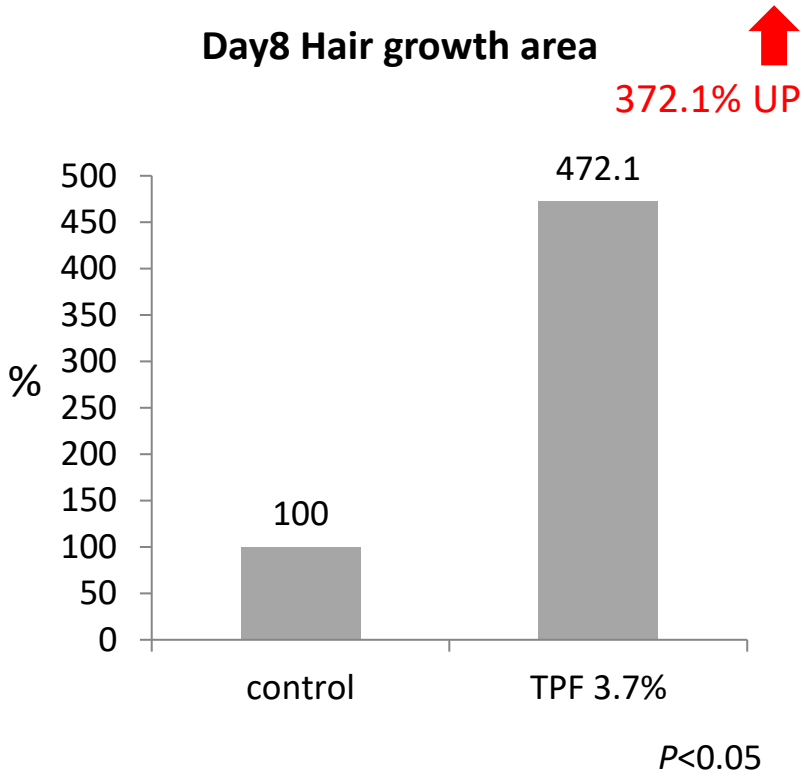
TPF-EX05

TPF Promoting Hair Growth Experiments

(Entrusted Agricultural Technology Research Institute)

1. Hair counting: length and area distribution





2. Hair growth comparison chart

	Day 4	Day 8	Day 12
Control			
	No hair shaft formed(pink skin)	Slight hair shaft formed(light grey skin)	Short hair
TPF 3.7% 👍			
	No hair shaft formed(pink skin)	More hair shaft formed(light grey skin)	Long hair

Experimental results show TPF promotes hair **growth and thickness**.
It has the potential to develop into scalp care products(nourish the scalp, strengthen hair roots).

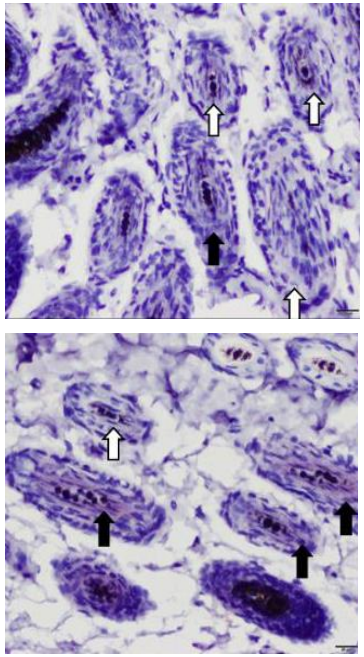
3. Immunostaining analysis:
VEGF-A (Vascular Endothelial Growth Factor)in hair follicles and hair shafts

- VEGF-A is regarded as the main product that promotes hair follicle germination and inhibits apoptosis.

VEGF-A expression

control

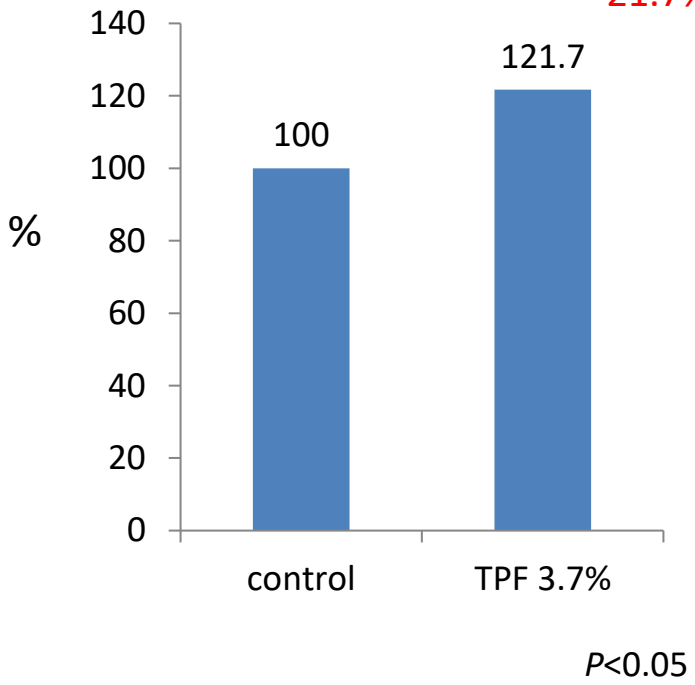
TPF
3.7%



White arrow: Non expressed
Black arrow: expressed

Day16 VEGF-A expression

21.7% upon



P<0.05

★ Tests confirm that TPF has the potential to stimulate hair germination.

Active Efficacy

Function	Efficacy
Promote hair growth	**Nourish scalp** / Improve hair **growth speed**
Enhance hair growth area	**Strong hair roots** / Promote hair **thickness**

TPF natural extract essence achieves hair health effects.

Comparison Between TPF and Market Materials

Item	TPF	Caffeine / Plant Extract
From	**Active** fertilized roe	Chemical composition/ plant extract
Ingredient	Stem cells：Exosomes, Growth Factors, cytokines, complex peptides	alkaloids、vegetable protein
Efficacy	nourish scalp、promote hair growth and thickness	nourishing/scalp care
Market visibility	Exclusive 	common
Price	Own price	popular price

— TPF Packaging 2.0 —

- Recommended dosage: reconstitution Lyophilized powder (original solution)

  1-4%

- Packaging: **Lyophilized powder with ampoule**

  TPF-EX05 reconstitution 10ml/each Vial (5 vials/box)

  TPF-EX05 reconstitution 50ml/each Vial (5 vials/box)

  Lyophilized powder with bottle

  TPF-EX05 reconstitution 250ml/bottle (25g bottle/box)

- How to use?

- Use pure or distilled water and pour into the vial, cap it and shake to dissolve until the marked volume is reached.
- Please refrigerate immediately after reconstitution, and use it once. It can be refrigerated for <72 hours.
- In order to prevent moisture absorption and oxidation after opening the bottle, it should be used once. Please be careful when using it in batches.

— TPF Packaging 2.0 —

- Pharmaceutical grade ultra-low temperature vacuum freeze-dried technology ensures optimal biological activity

- **No added preservatives / Stored at room temperature / Long shelf life / Convenient transportation**

Functional Food Ingredients

TPF-101

Physiological function of IGF-1

- Pituitary gland secretes HGH (Human Growth Hormone) to stimulate liver producing IGF-1 which decreases with age.
- According to research, maintaining sufficient amount of IGF-1 can **slow the aging** process.
  ★ Improve cell energy metabolism, build muscle mass, increase bone density, promote hair growth, improve skin elasticity, reduce fat accumulation, maintain a normal nervous system, boost the immune function etc.

Physiological function of ACE

- The main physiological function is to catalyze angiotensin Ⅰ to angiotensin Ⅱ that promote vasoconstriction and increase blood pressure.

Experiments have proven that TPF-101™ has the following effects:
√ Effectively increase ↑the concentration of IGF-1 in blood
√ Effectively reduce ↓the concentration of ACE in blood

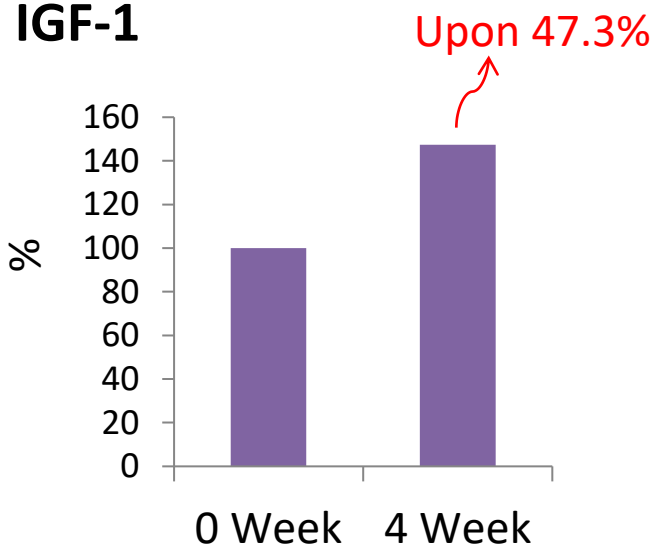
TPF-101™ Efficacy Test
Delaying Aging of Body Functions

(Entrusted Agricultural Technology Research Institute)

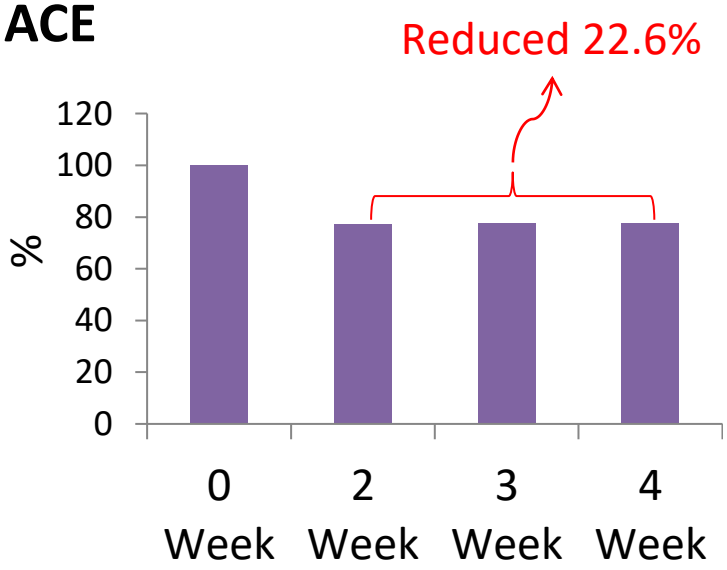
Rat feeding test

- Feeding period：4 weeks
- Biochemical Test：IGF-1【Aging-related indicators, the higher the age the lower the concentration】
  ACE【High blood pressure with aging, lower concentration can reduce blood pressure】

IGF-1



ACE



TPF-101™ Efficacy Test
Delaying Aging of Body Functions

Summary:

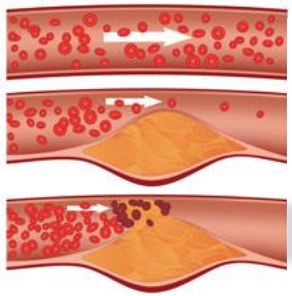
1. Since fertilized roe are rich in a variety of active peptides (e.g. exosomes, growth factors), regular intake of TPF-101™ has the potential to **slow the aging of body functions**.

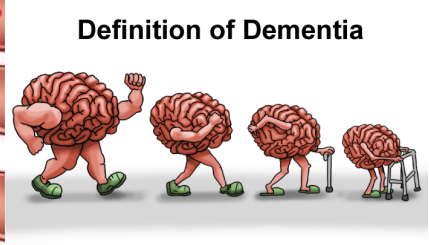
2. After long-term intake of TPF, the ACE concentration decreases (**lower blood pressure**) and reaches in a stable range.

PS There is no concern about excessive lowering of blood pressure under long-term intake.

Special Nutrients Contained in TPF-101™ (SGS)

Lecithin	EPA	DHA	Squalene	Sialic acid
Effectively help learning and memory. Slow down brain degeneration.	Clean blood vessels and lower blood fat.	Prevent cognitive decline and dementia.	Improve the active of SOD in your body. Enhance immunity, anti-aging and anti-fatigue.	N-Acetylneuraminic acid improve infant intelligence and memory, fight against Alzheimer's disease, improve human immunity and increase intelligence.





Active Efficacy (Test confirmed)

Function	Efficacy
Provide **special nutrients**	Supplement special nutrients required for body metabolism
Increase IGF-1 concentration	Promote growth and slow the aging of body functions
Decrease ACE concentration	Lower and stabilize blood pressure

TPF-101™ natural functional food

Comparison Between TPF-101™ and Market Materials

Item	TPF-101™	Antler	Yan Wo(Bird's nest)
From	**Active** fertilized roe	Sambar (deer)	Birds
Ingredient	Multiple peptides (exosomes, growth factors, cytokines) and special nutrients	IGF-1、hormones	EGF、sialic acid
Efficacy	Effectively increase IGF-1 and reduce ACE in blood to slow the aging of body functions	Anti-aging	Anti-aging, anti-oxidant
Market visibility	Exclusive	common	common
Particularity	Product of precious + necessary + complete elements and cell nutrients that can form a living body. (growth+repair)	Product of growth process(can be discarded)	Product of excretion (discarded matter)
Risk	No specific zoonosis associated with fish	Risk of zoonosis	

TPF-101™ Dosage & Packaging

- Feature: TPF-101™ is a natural component found in fertilized roes of deep-sea fish species. It is also a novel functional food raw material that extracted through patented biotechnology.

- Adopts pharmaceutical-grade, ultra-low temperature & freeze-dried technology without adding preservatives and ensuring optimal biological activity.

- TPF-101

  Recommended dosage: **0.2~1 gm/day**
  Packaging: **1kg powder/bag**

- TPF-101(Pure)

  Recommended dosage: **10-50 mg/day**
  Packaging: **lyophilized powder 100g/bottle**

— International Invention Patent Trademark Registration —

- TPF raw material has obtained exclusive international (US/Japan/China) cosmetic ingredient registration name (**INCI NAME: Fertilized Roe Extract**)→ **Mono ID:33531**

- TPF-101 has been approved by the Food and Drug Administration of the Ministry of Health and Welfare as an safe edible food to take.

Taiwan Invention Patent：No. M566077, No. I729355 (since 2021)
No. I808353 (since 2023)

USA Invention Patent：US 10,831,137,137,B2 (since 2020)

Japanese Invention Patent：Patent No. 6912830 (since 2021)

Registered Trademark: **Taiwan / USA / Japan / China**

THANK YOU!