

# F I L T O M   I N C .

February 2, 2015

## Our Company and Our Technology

Filtom is an innovative R&D company established in 2014 by two researchers: a mechanical engineer Mr. Satoshi Takeshita and a chemical scientist Dr. Tetsuro Oike.

Filtom explores a new-generation membrane technology called “PD separation”. It was first developed by Dr. Seiichi Manabe, a scientist and professor who dedicated his life to the research of new separation technologies, and who contributed so much to Filtom’s technological innovation.

PD separation method, is similar to our human body’s separation system, especially to the way kidney functions. Our kidney filters 1.8 Liters of urine a day, removing waste materials and infective particles, such as virus or bacteria, from our body and produces 180 ml of urine. There is no source of high energy, for instance, high pressure, electric energy of 100 voltage or atomic energy. It’s only 1.3 kPa pressure and bodily temperature that our kidney needs. A conventional filtration system, e.g. MF or NF, uses from 200 to 10000 kPa. The filtration system of a kidney does not depend solely on pore size, but also on pressure and velocity control of blood fluid. PD functions in a similar way, and its unique separation technique makes it possible to purify drinking water, foods, cosmetics material, even waste materials, such as sewage with very low energy equivalent to just one electric bulb. In future, it’ll also be possible to remove even prion - the ultimate infection. It is the final goal of our company and PD filtration is likely to be the long-awaited solution. (Patent Pending in Japan and Patent Provision for PCT)



# F I L T O M I N C .

## How PD filtration works

With PD filtration, it is possible to remove infectious particles (primarily viruses and bacteria) from raw materials, such as food or cosmetics, at a room temperature and with low pressure. This is achieved without compromising on the original taste and functionality, which are always negatively effected by the heating and chemical neutralization processes.

As an example, Placenta has become particularly famous recently because of its activated protein known as EGF (Epidermal Growth Factor).

Epidermal growth factor or EGF is a growth factor that stimulates cell growth, proliferation, and cell differentiation. A recent practical usage of it is a cosmetic material that can improve skin's metabolism. Placenta has a very high concentration of EGF, as well as hormones, immune molecules, lipids, and nucleic acids - hundreds of different compounds, but also contains infectious particles, such as bacteria. Many researchers have made efforts to remove these infections through conventional filtration systems, such as Micro Filter (MF) or Nano Filter (NF). However this has been impossible due to clogging caused by many large sized solid particles. PD system, on the other hand, is totally capable of doing this. The conventional systems heavily depend only pore size, yet the PD filtration system uses not just pore size, but also pressure control and fluid velocity control similar to kidney's mechanism.

With PD, infectious particles in raw placenta are removed without clogging the filter. This allowed us to obtain purified placenta liquid with the active growth factor. This technological success can be further applied to various future research fields and product development that utilizes the PD filtering system, for instance, water purification and prion removal.



# F I L T O M I N C .

## Active placenta

Placenta liquid purified through PD separation has activated protein due to the following reasons. Conventional placenta products use heating or chemical neutralization processes to treat the raw placenta liquid. Activated protein is easily sterilized and destroyed as a result of such treatment. As for PD separation, its system has little influence to activated protein and does not compromise its stability.

Concentration of Activated protein\* ( pg /mg )

Activated protein	EGF	IGF	TNF	FGF1	TGF
Heating process	0	0	0	0	0
PD system (FILTOM)	11.03	80.13	18.60	18.59	467.0

\*Exists in a unit volume of total protein

# F I L T O M I N C .



Features of Filtom's PLACENTA C6 series cosmetics.

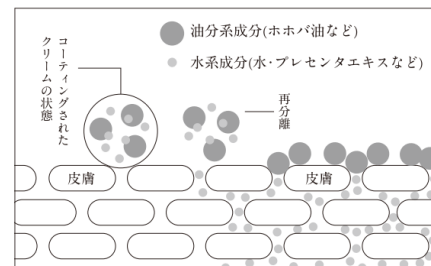
## 1. The world's purest placenta.

PLACENTA C6 is made of the pure placenta supplied to our factory directly from a pig factory in Fukuoka, Japan. The pig farm undergoes a rigid control to avoid any infections and keep the animals healthy. The placenta is then processed with PD filtering system to remove infectious particles at the ISO Sterility Assurance level (SAL) of 1/1000000, while performance-wise PD's performance significantly exceeds SAL requirements. A conventional heating process achieves only the level of 1/10~1/1000.



## 2. Water release emulsion.

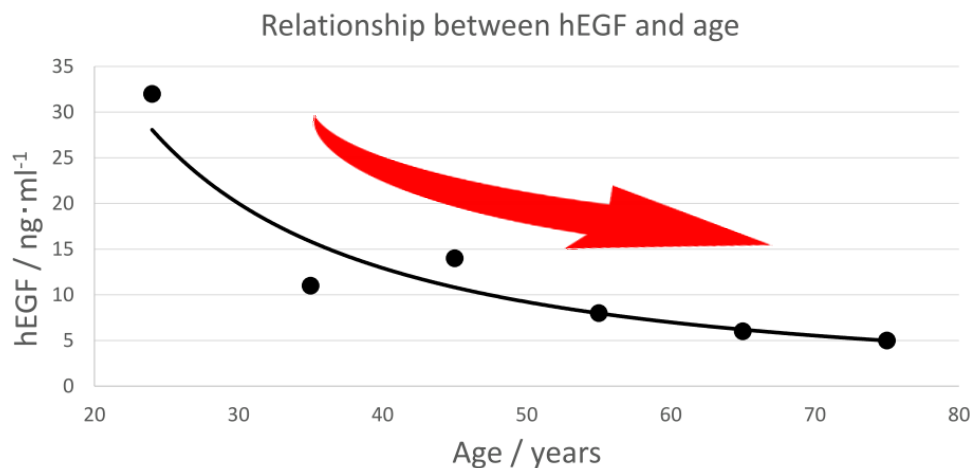
The PLACENTA C6 cream changes itself on our skin. A typical emulsion has large sized micelle with surface activating agent to keep stabilize the emulsion. Yet the new style Water release emulsion can release water solution on our skin to bring the activated protein inside the skin.



# F I L T O M I N C .

## Why does our skin age?

Our skin regenerates in a 45 days cycle. We call it turn-over time. For the skin to regenerate, the activated protein EGF, Epidermal Growth Factor, is of the most importance as it rebuilds the cells using amino acids as building blocks. As we age, EGF that our body generates naturally decreases, the regeneration process slows down and our skin starts getting old.



Ref. Age-related decrease of urinary excretion of human epidermal growth factor (hEGF), Masahito Uchihashi et al., Kobe University, School of Medicine Life Sciences, Vol.31, pp.679-683, 1982

## EGF is needed.

EGF is a growth factor that stimulates cell growth, proliferation, and differentiation by binding to its receptor EGFR. Human EGF is a 6045-Da protein with 53 amino acid residues and three intra-molecular disulfide bonds.(Wikipedia)

