

The logo consists of a red rectangular box with the text 'CTCVAC' in white, bold, sans-serif capital letters.

CTCVAC

**The Answer
Beyond
Animal Health Care**

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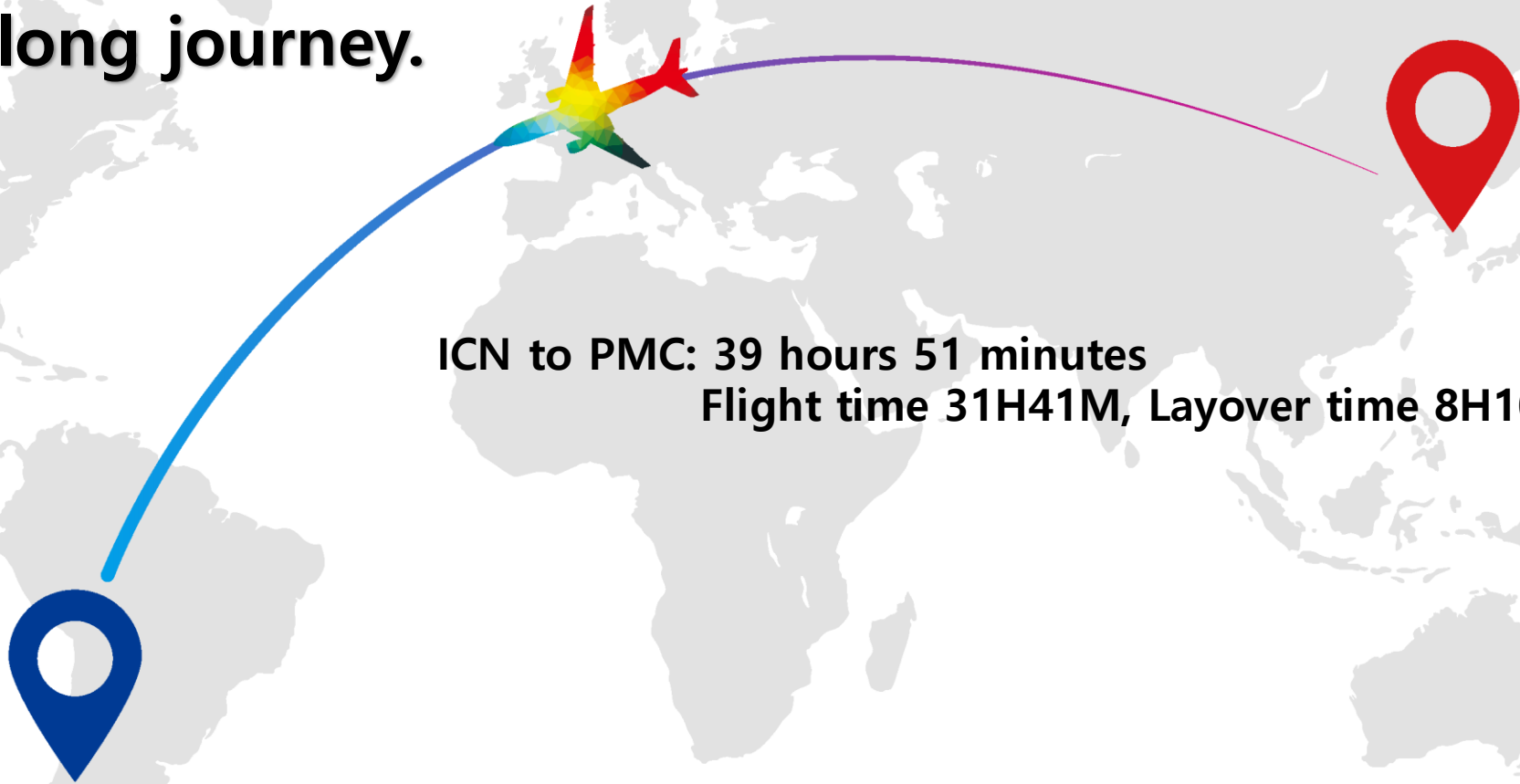
Development of New generation vaccines for challenging pathogen: *P. Salmonis*

R&D Division, CTCVAC

Director, D.V.M., Ph.D.

JUNG, Ho kyoung

It's been a long journey.



A BRIEF INTRODUCTION

I'm from South Korea.

The Opposite side from Chile, Northern hemisphere
Five words, represent Korea:

- Seoul
- Korean cuisine,
- K-POP
- Technology(SAMSUNG, LG, HUNDAI)
- Beautiful natural environment

SOUTH KOREA

CAPITAL CITY

★ SEOUL

POPULATION

51.75 MILLION

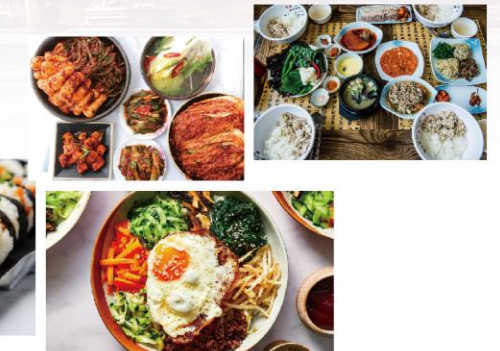
FLAG



LOCATION



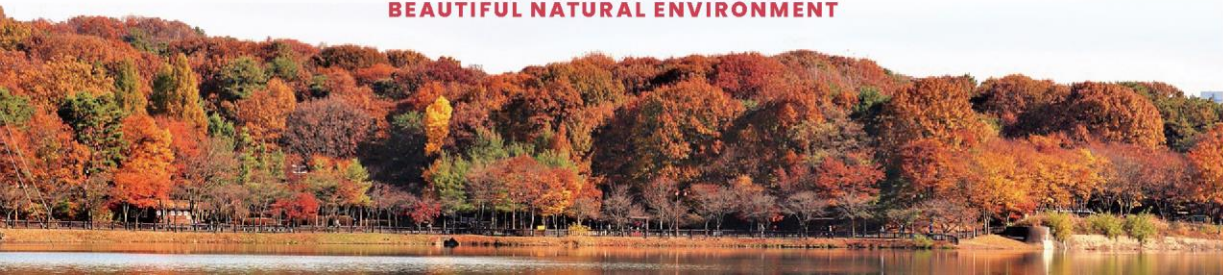
KOREAN CUISINE



TECHNOLOGY



BEAUTIFUL NATURAL ENVIRONMENT



K-POP



I'm a researcher.

**Developing vaccine for animal and aqua
Over 20 years experience
Vaccine development and application**

I work for CTCVAC in Korea.

- **Company name:** CTCVAC co., Ltd.
- **Year of Foundation:** April 2019
- **No. of Employees:** 42 Employees
- **Business Area**
 - Animal biological products
(Research, Manufacture and Sales)
- **Major Research**
 - Animal biological products(especially, Vaccine) and other Preventive strategies for Animal infectious disease

GMP-certified animal vaccine manufacturing facility.
Vaccine Research and Development Center
Expanded R&D network



For sale : 14 Products (as of Jan 2024)



Swine

- CSF Marker + Erysipelas live vaccine



Poultry

(Live)

- ND, IB, ND-IB

(Killed)

- FAdV(type 4), FAdV II(type 4,8)
- YBBEN(LPAI-IB-ND-EDS), YBB(LPAI-IB), YAP(LPAI-FAdV-aMPV)



Aqua(Fishery)

- DAJAVA killed vaccine (*Scuticella Miamiensis avidus* + *Tenacibaculum martimum*)
- Bac-DAJAVA killed vaccine (*Streptococcus* Ic, Ia, Edward)



Bovine

- HIPRA STARTVAC (Mastitis vaccine)



- **Purpose**

Manufacture of Veterinary Vaccine
(Swine, Poultry, Bovine, Fishery and Companion animal)

- **GMP certification**

Nov. 2016, EU/US GMP Guidelines applied

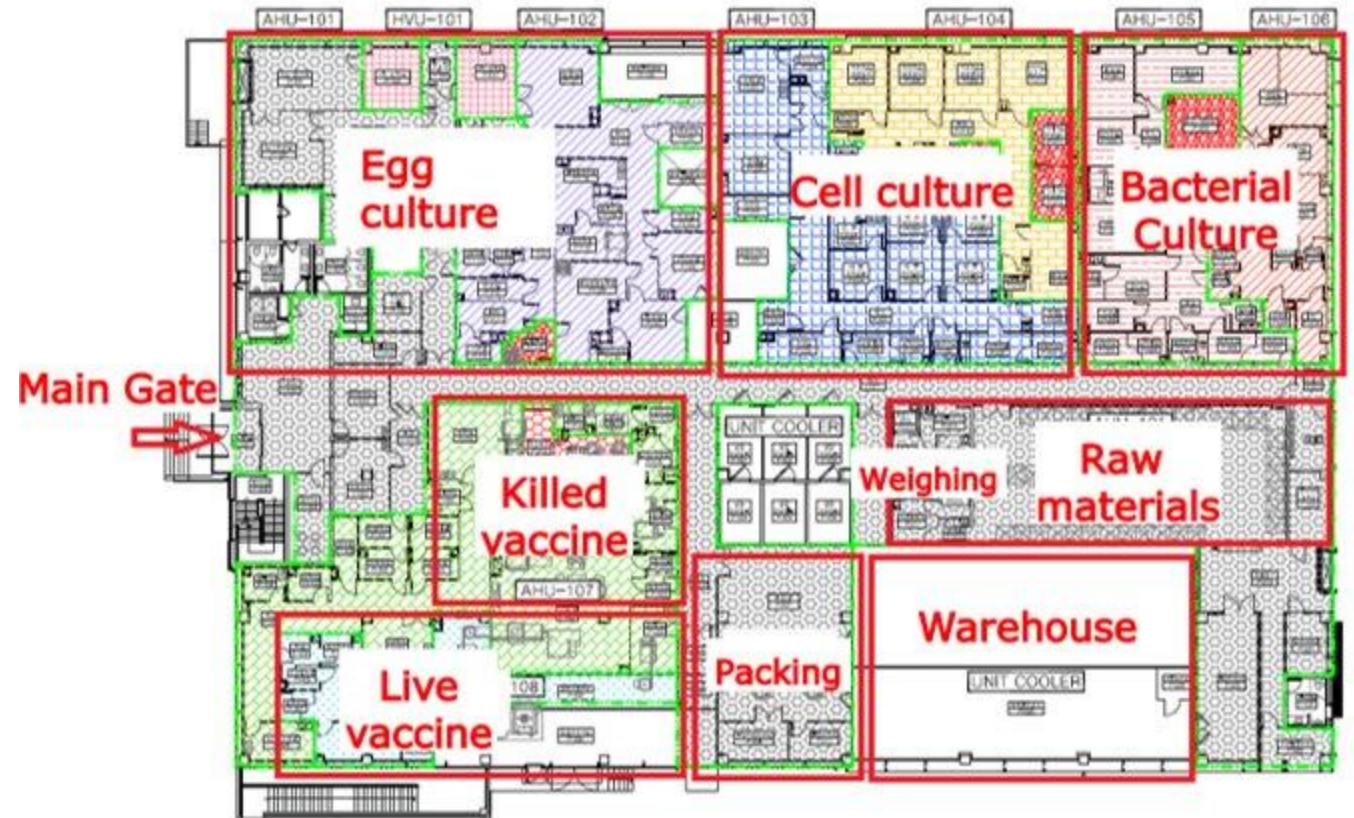
- **Total building Floor area**

5,958 m² (3 floors)

- **Production**

Antigen bulk: Virus from egg embryo, virus from cell-culture, Bacterial culture, Plasmid DNA, Purified recombinant protein

Finished Products: Live vaccine, Killed vaccine, Recombinant vaccine, DNA vaccine





Centrifuge



Vial roading



Incubator



Vial washer



Auto filling



Auto capping



Harvester



AHU



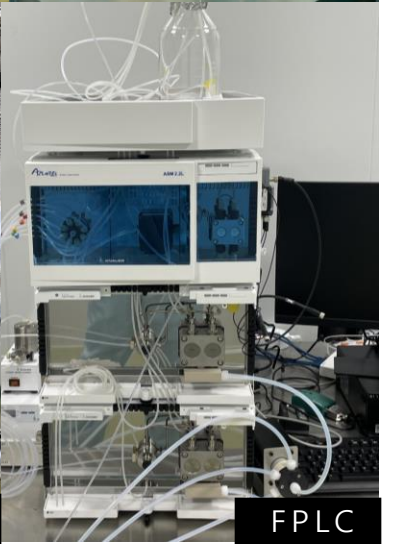
DW generator



Autoclave



Column



FPLC

- Main Facilities and Purification equipment for Aquatic

- Bacteria and Scutica cultures

Fermenter : 50L, 100L, 600L, 1,000L

Purification equipment : FPLC, UF/DF

High-density culture of strain such as *Streptococcus* spp., Edward's, *Vibrio* spp. and *Tenacibaculum maritimum*.

Scutica (*Miamiensis avidus*) culture by fermenter system.

- Virus culture

Roller bottle culture system for viral strain

100bottle/unit x 10unit = 200L

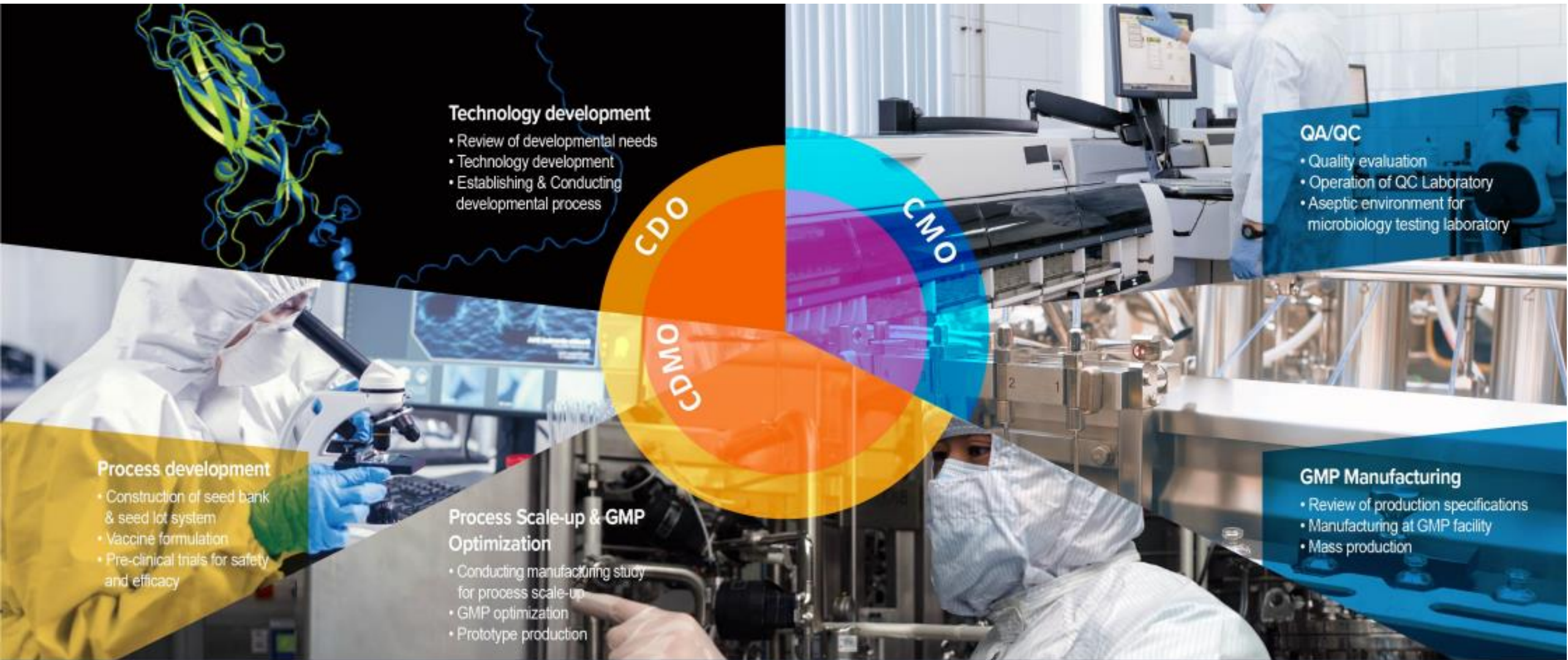
High titer culture technology for VHSV

- Freeze dryer for live vaccine production

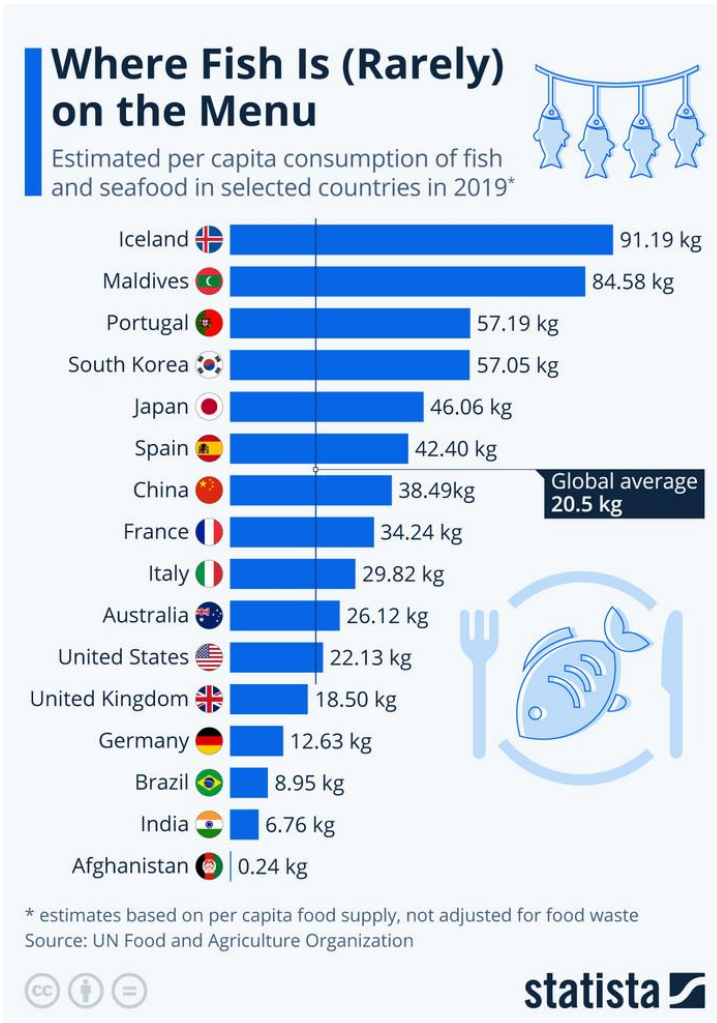


Fermenter

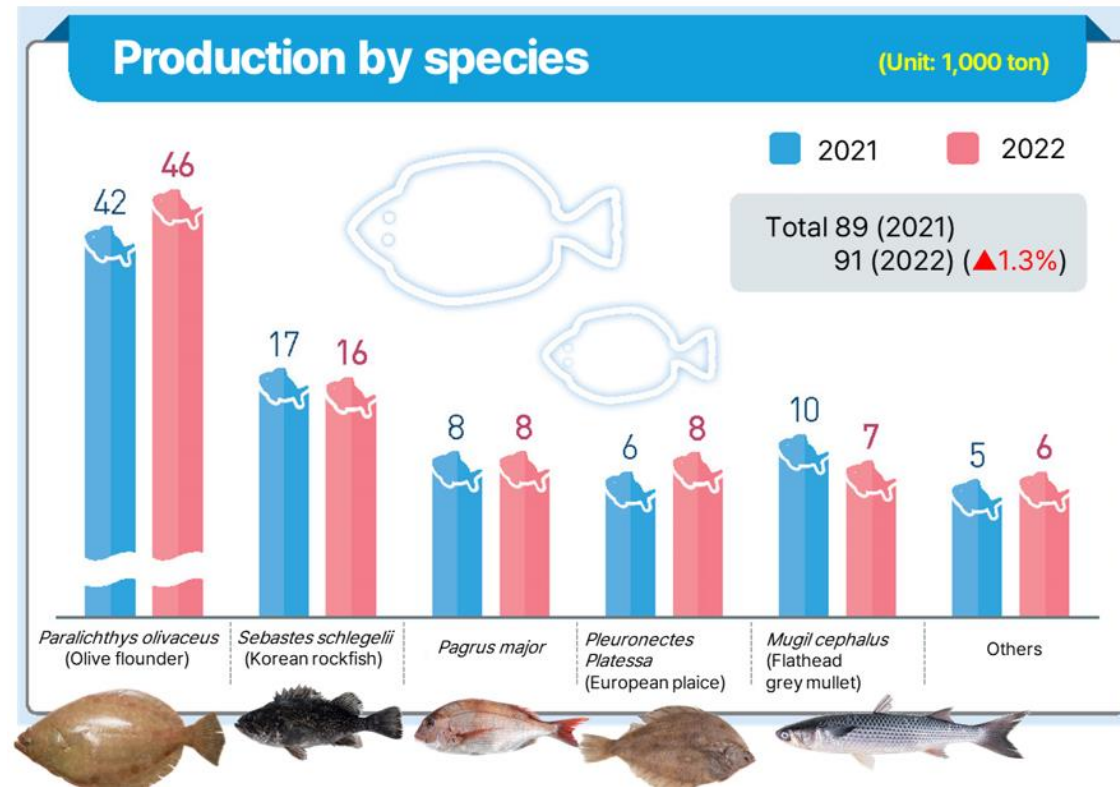
Expansion of business scope_CMO/CDMO/CDO



South Korea is the 4th largest consumer of seafood in the world



The Olive flounder (*Paralichthys olivaceus*) has ranked at the top of production among cultured finfish in S. Korea for more than 10 years.



10years

Vaccine Sales: 9 mill. USD in 2008 → 31 mill. USD in 2018 (+ 244%)
(6 mill. doses) (63 mill. doses) (+ 963%)

- Six vaccine manufacturers in Korea
- Number of shots until market
 - 1 shot 35%
 - 2 shots 52%
 - 3 shots 13%

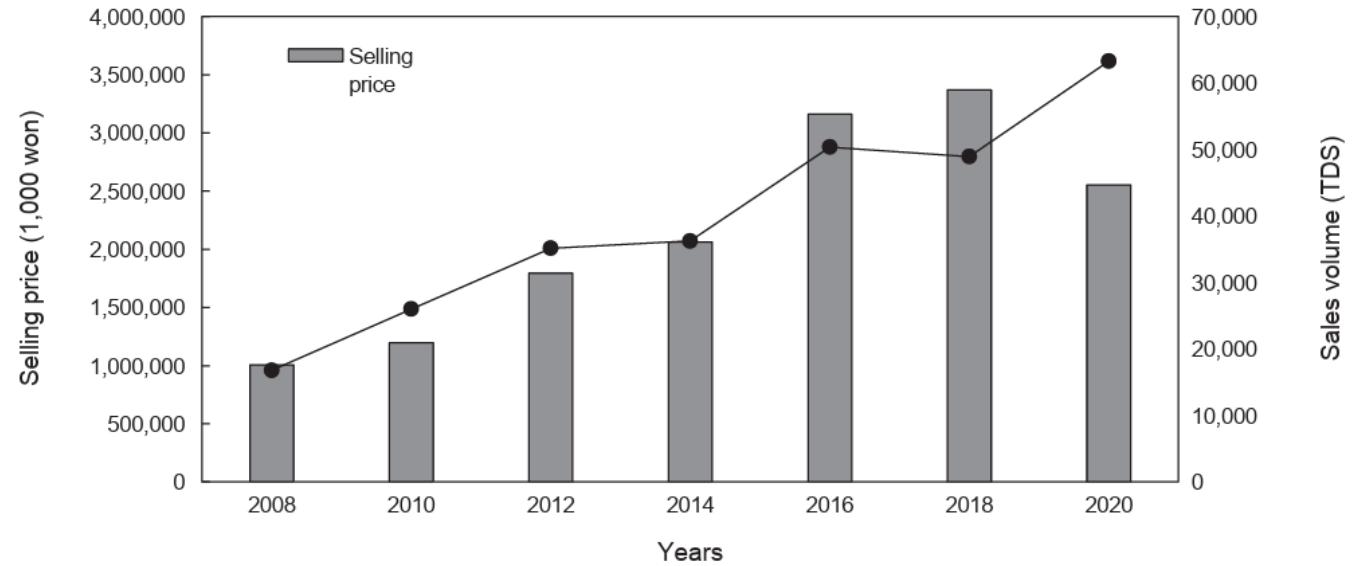


Fig. 2. Fish vaccine annual sales volume (Thousand doses, TDS) and selling price (Thousand won) in Korea from 2008 to 2020.

Ref.: Hyun-Ja Han, Tae-Ho Kim, Soo-Jin Kim, Myoung-Sug Kim, Mi-Young Cho, Hye Sung CHOI. Current status and future directions of fish vaccines in Korea. Korean J Fish Aquat Sci 54(4),369-376,2021



Vaccinated fish in Korea

Olive flounder



Starry flounder



Rock seabream



Table 1. Licensed product fish vaccines in Korea

Vaccine	Target pathogen (No. of pathogen)	Fish species	No. of product	Year of approval	Use
Bacteria	<i>Edwardsiella tarda</i> (1)	Olive flounder	2	2003, 2005	Immersion
	<i>Streptococcus iniae</i> (1)	Olive flounder	6	2006, 2007	Immersion
	<i>S. iniae</i> + <i>Streptococcus parauberis</i> (2)	Olive flounder	5	2009, 2010, 2012	Injectable
	<i>S. iniae</i> + <i>S. parauberis</i> + <i>E. tarda</i> (3)	Olive flounder	5	2010	Injectable
	<i>Listonella anguillarum</i> + <i>S. iniae</i> + <i>S. parauberis</i> + <i>E. tarda</i> (4)	Olive flounder	1	2010	Injectable
	<i>L. anguillarum</i> + <i>Tenacibaculum maritimum</i> + <i>S. iniae</i> + <i>S. parauberis</i> + <i>E. tarda</i> (5)	Olive flounder	1	2012	Injectable
	<i>Lactococcus garviae</i> + <i>V. harveyi</i> + <i>S. iniae</i> + <i>S. parauberis</i> + <i>E. tarda</i> (5)	Olive flounder	1	2015	Injectable
	<i>L. anguillarum</i> + <i>V. harveyi</i> + <i>S. iniae</i> + <i>S. parauberis</i> + <i>E. tarda</i> (5)	Olive flounder	1	2018	Injectable
	<i>V. harveyi</i> + <i>S. iniae</i> + <i>S. parauberis</i> + <i>E. tarda</i> (4)	Olive flounder	1	2010	Injectable
	<i>S. parauberis</i> 1a+1b/c (2)	Starry flounder	1	2019	Injectable
Parasite	<i>Miamiensis avidus</i> type I+ <i>Miamiensis avidus</i> type II (2)	Olive flounder	1	2019	Injectable
Parasite+ bacteria	<i>M. avidus</i> type I+ <i>M. avidus</i> type II+ <i>T. maritimum</i> (3)	Olive flounder	1	2019	Injectable
Virus	Viral hemorrhagic septicemia virus (VHSV) (1)	Olive flounder	1	2019	Injectable
	Red seabream iridovirus (Ehime-1/GF) (1)	Red seabream, yellow tail, rock seabream	1	2004	Injectable

Ref.: Hyun-Ja Han, Tae-Ho Kim, Soo-Jin Kim, Myoung-Sug Kim, Mi-Young Cho, Hye Sung CHOI. Current status and future directions of fish vaccines in Korea. Korean J Fish Aquat Sci 54(4),369-376,2021

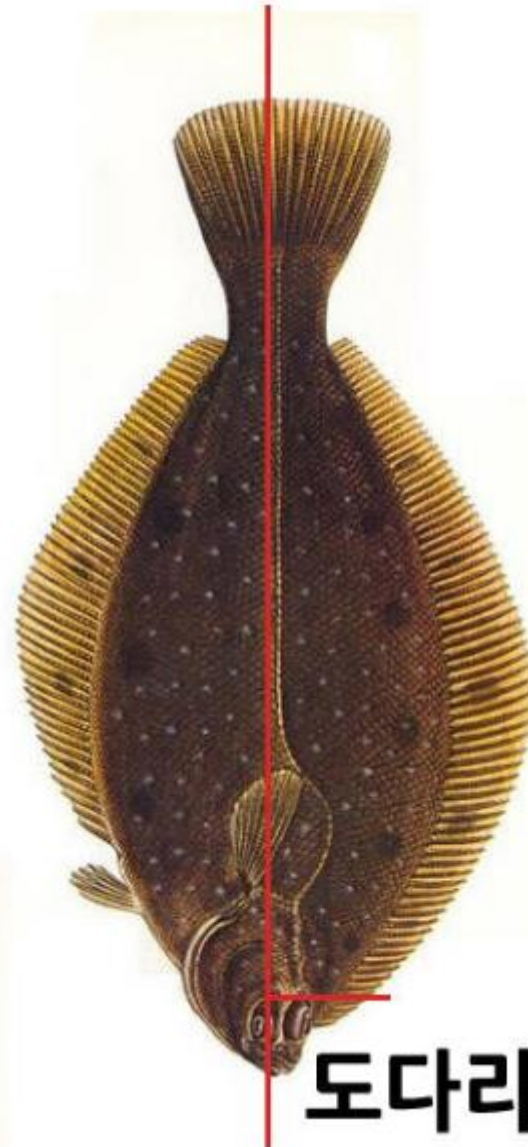
Olive flounder
: Paralichthyidae



Differentiation by
Eye Position:

Left

광어



Starry flounder
:Pleuronectidae

Right

도다리

1. Change in your surrounding
2. Health report in Chile
3. Pathogens and vaccine
4. Considerations for vaccine development
5. New generation vaccine for *Piscirickettsia salmonis* (SRS)

CHANGE IN YOUR SURROUNDING



=



Year 2024



Year 2015



Year 2012

5 February 2024

Elanco Announces Sale of Aqua Business for \$1.3 Billion

Share

Transaction reinforces Elanco's commitment to most significant value creation opportunities in pet health and livestock sustainability

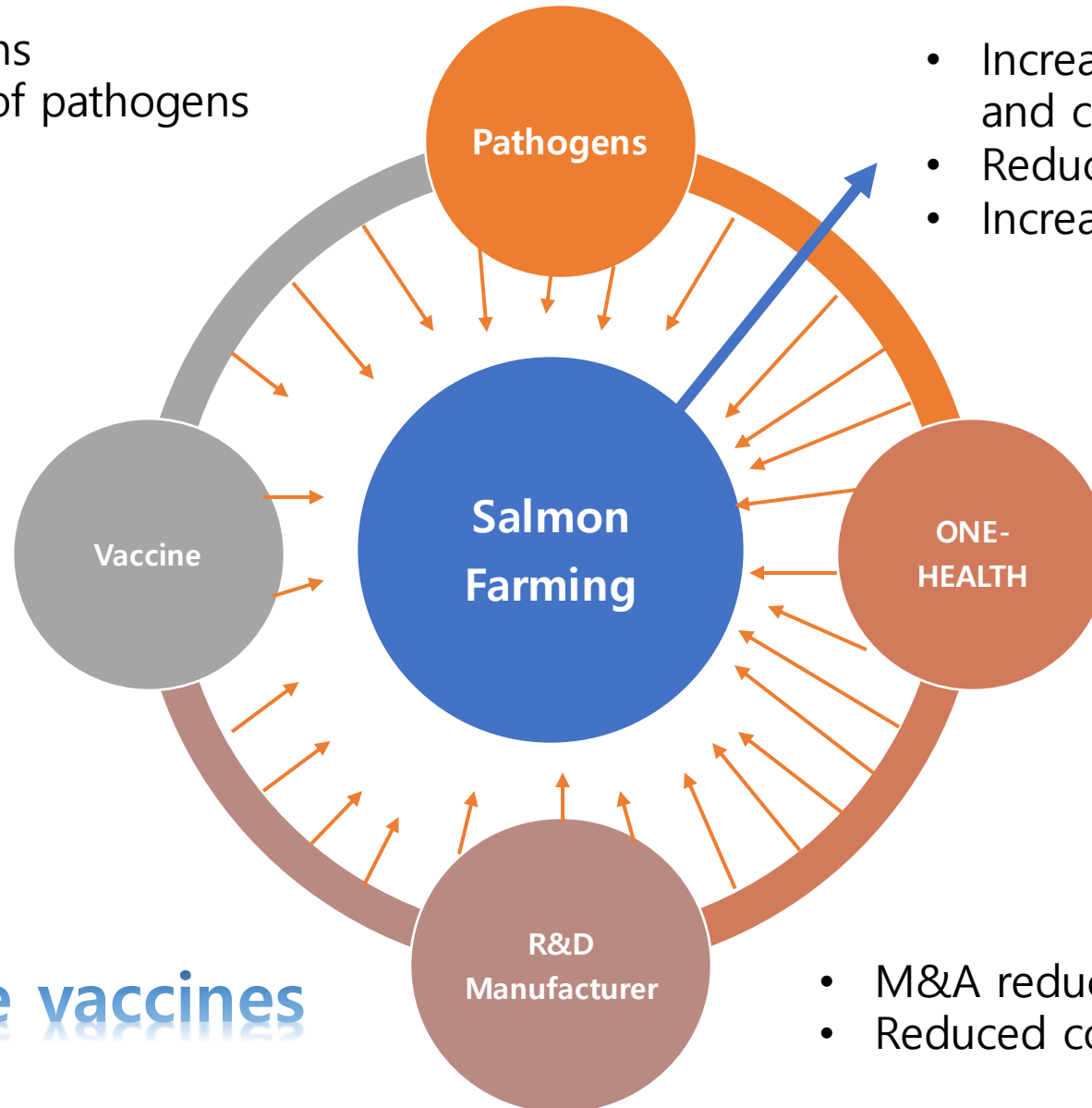
Enables company to accelerate debt paydown by \$1.05B to \$1.1B

GREENFIELD, Ind. (February 5, 2024) – Elanco Animal Health Incorporated (NYSE: ELAN) today announced it has entered into an agreement to sell its aqua business to Merck Animal Health (NYSE: MRK) for approximately \$1.3 billion in cash, which represents approximately 7.4x the estimated 2023 revenue of the Elanco aqua business.

- Manufacture facility: Canada and Vietnam
- Research center: Chile
- Products: Clynav, Imvixa, etc.

- Diversity of Pathogens
- Increased mutation of pathogens

- Reduced release of new vaccines
- No update to include the recent pathogens



- Increased production transparency and consumer awareness
- Reduced productivity due to disease
- Increased antibiotic use to treatment

- Increase bacterial resistance
 - Antibiotics
 - Vaccine
- Demand for antibiotic reduction in aquaculture

Needs

more effective vaccines

- M&A reduces the number of competitors
- Reduced competition in R&D

During the first half of 2023

Monthly mortality in Chilean salmon:

- Max. 1.24% (in May),
- Min. 0.65% (in June)
- Average 0.86%

In the case of **Atlantic salmon**, the most important cause of mortality reported was infectious (26.9%)

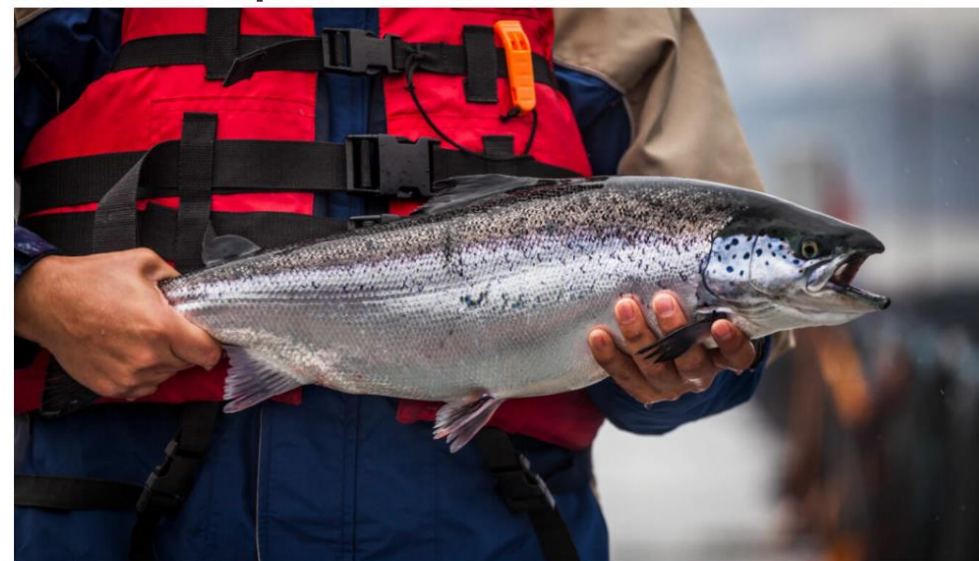
- 52.2% as Piscirickettsiosis (SRS)
- 32.9% as Tenacibaculosis

In the case of Rainbow trout; infectious cause (24.6%)

IPN was the most important with 68.8%, followed by Piscirickettsiosis with 17.7%.



Informe sanitario: buenas noticias con menor mortalidad para el salmón chileno



Chile: La mortalidad en la salmicultura chilena obtuvo un valor promedio mensual de 0,86%, cifra que es menor 0,4%. Sernapesca también reveló la mortandad por empresa en su informe sanitario.

Jonathan Garcés
PERIODISTA Y RESPONSABLE WEB

Bacteria

- *Piscirickettsia salmonis* (SRS)
- *Aeromonas salmonicida* (furunculosis)
- *Vibrio ordalii* (vibriosis)
- *Tenacibaculum* spp. (ulceration)

Virus

- Infectious Salmon Anemia Virus (ISAV)
- Infectious Pancreatic Necrosis Virus (IPNV)



3. Composición		15-09-2020
Composición por dosis		
Sustancias activas:		
Cada dosis contiene:		
<i>Aeromonas salmonicida</i> subsp. <i>salmonicida</i> , Cepa AL 2017	1,5 - 2,0x 10 ⁸ células	REGISTRO SAG N°2497-BP SERVICIO AGRÍCOLA Y GANADERO
<i>Vibrio ordalii</i> , Cepa AL 510	0,5 - 1,0x 10 ⁸ células	
Virus de la Necrosis Pancreática Infecciosa, Serotipo Sp., Cepa AL V103	0,15 - 0,25 AU	
Virus de la Anemia Infecciosa del Salmón, Cepa AL V301	0,4 - 0,45 HE-U	
Excipientes c.s.p.	0,05 mL	
-Adyuvante: Parafina líquida		
-Inactivante: Formaldehído		

IPNV, ISAV, *Vibrio ordalii*, *Aeromonas salmonicida*, 4 combined vaccine in Chile

ALPHA JECT® 6-2 Injectable vaccines

3. DEKLARASJON AV VIRKESTOFFER OG HJELPESTOFFER

1 dose (0,1 ml) vaksine inneholder:

Formaldehydinaktiverte kulturer av:	
<i>Aeromonas salmonicida</i> subsp. <i>salmonicida</i>	RPS ¹ ≥ 80 (Ph. Eur.)
<i>Vibrio salmonicida</i>	RPS ¹ ≥ 90 (Ph. Eur.)
<i>Listonella anguillarum</i> serotype O1	RPS ¹ ≥ 75 (Ph. Eur.)
<i>Listonella anguillarum</i> serotype O2a	RPS ¹ ≥ 75 (Ph. Eur.)
<i>Mortella viscosa</i>	RPS ¹ ≥ 60
Inferksjons pankreasnekrosevirus serotype Sp.	0,2 AU ²

ALPHA JECT® 5-1 Injectable vaccines

3. Composición

Cada dosis (0,1 mL) contiene:

Virus de la Necrosis Pancreática Infecciosa serotipo Sp (IPNV), Cepa AL V103	0,15 - 0,25 AU
<i>Piscirickettsia salmonis</i> , Cepa AL10005	0,075 - 0,11 mg proteína
<i>Vibrio ordalii</i> , Cepa AL 510	0,5 - 1,0 x 10 ⁸ células
<i>Aeromonas salmonicida</i> subespecie <i>salmonicida</i> , Cepa AL 2017	1,0 - 2,0 x 10 ⁸ células
Virus de la Anemia Infecciosa del Salmón (ISAV), Cepa AL V301	1,0 - 7,5 x 10 ⁷ TCID ₅₀

IPNV, ISAV, *Vibrio ordalii*, *A. salmonicida*, SRS 5 combined vaccine in Chile

ALPHA JECT® micro Injectable vaccines

ALPHA JECT micro 4

Aeromonas salmonicida - *Listonella (Vibrio) anguillarum* - *Vibrio salmonicida* Bacterin

Description:

A furunculosis, vibriosis and cold water vibriosis vaccine containing: formalin inactivated cultures of *Aeromonas salmonicida* subsp. *salmonicida*, *Listonella (Vibrio) anguillarum* serotypes O1 and O2 and *Vibrio salmonicida*.

Vibrio salmonicida, *V. anguillarum*, *A. salmonicida*, SRS 4 combined vaccine in Canada

A. salmonicida, *Vibrio salmonicida*, *V. anguillarum*, Winter ulcer, IPNV 8 combined vaccine in Norway and U.K.



Active ingredients

Salmon pancreas disease virus (SPDV) strain F93-125, ≥ 75 % RPP¹
 Infectious pancreatic necrosis virus (IPNV), ≥ 1.5 ELISA units²
Aeromonas salmonicida subsp. *salmonicida*, ≥ 80 % RPS60³

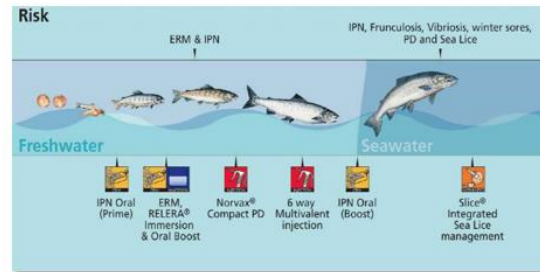
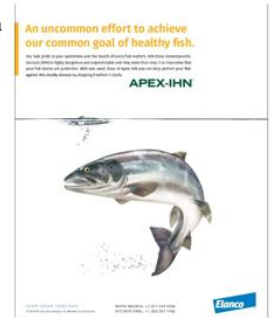
¹ RPP: relative percentage protection in a laboratory test in Atlantic salmon

² Antigenic mass measured in the final product

³ RPS: relative percentage survival at 60 % control mortality in a laboratory test in Atlantic salmon

SPDV, IPNV, *A. salmonicida* combined vaccine

IHNV DNA vaccine in use in Canada



Aquavac® IPN Oral

It is a recombinant, oral vaccine against Infectious Pancreatic Necrosis virus (IPNV) in Atlantic salmon (*Salmo salar*). Allows for protection of fry in the hatchery at a very early stage in the production cycle.

Norvax® Compact PD

It is an inactivated virus vaccine against Salmonid Alphavirus (SAV) for intraperitoneal injection in Atlantic salmon (*Salmo salar*).

Norvax® Minova 6

It is an inactivated, multivalent vaccine against furunculosis, classical vibriosis, coldwater vibriosis, wound disease and infectious pancreatic necrosis (IPN) for intraperitoneal injection in Atlantic salmon.



COMPOSICIÓN	
Cada dosis de vacuna (0,1 mL) contiene:	
<i>Piscirickettsia salmonis</i> , Cepa PS 2C	10 ^{8,5} - 10 ^{9,5} TCID ₅₀
Virus de la Necrosis Pancreática Infecciosa, Cepa Sp221A1a, Serotipo Sp	10 ^{7,0} - 10 ^{7,5} TCID ₅₀
Virus de la Necrosis Pancreática Infecciosa, Cepa Sp221Thc, Serotipo Sp	10 ^{7,0} - 10 ^{7,5} TCID ₅₀
<i>Vibrio ordalii</i> , Cepa V044-03	10 ^{7,0} - 10 ^{7,5} UFC
<i>Aeromonas salmonicida</i> atípica, Cepa AS-01	10 ^{7,0} - 10 ^{7,5} UFC
Proteína recombinante (hemaglutinina) de virus ISA, Cepa ISA01	5,4 - 8,1 µg
Proteína recombinante (neuraminidasa) de virus ISA, Cepa ISA01	5,4 - 8,1 µg
Excipientes c.s.p.	0,1 mL



ISA recomb., SRS, IPNV, *V. ordalii*, *A. salmonicida* 7 combined vaccine

IPNV vaccine



COMPOSICIÓN

Cada dosis de vacuna (6 mg) contiene:

<i>Piscirickettsia salmonis</i> , Cepa PS 2C	10 ^{8,0} - 10 ^{8,5} TCID ₅₀
Excipientes c.s.p.	6 mg

SRSV oral vaccine

When do we consider developing a new vaccine?

Outbreaks(or predictions) of new diseases
 Mutated pathogens emerge – in(or less)effective to existing vaccines

Bacteria

- *Piscirickettsia salmonis* (SRS)
- *Aeromonas salmonicida* (furunculosis)
- *Vibrio ordalii* (vibriosis)
- *Tenacibaculum spp.* (ulceration)

Virus

- Infectious Salmon Anemia Virus (ISAV)
- Infectious Pancreatic Necrosis Virus (IPNV)

anasac
Impulsando un mejor futuro

<p>Providean Aquatec 1</p> <p>SRS</p>	<p>Composition per 0.1 ml</p> <p><i>Piscirickettsia salmonis</i> (SRS): 1x10E7 - 1x10E8 pre-inactivation bacteria. Excipients csp: 0.1 ml. Inactivant: Formaldehyde. Non-mineral oil adjuvant</p> <p>Target species</p> <p>Salmo salar (Atlantic Salmon), <i>Oncorhynchus kisutch</i> (Pacific Salmon), <i>Oncorhynchus mykiss</i> (Rainbow trout)</p> <p>Use</p> <p>Inactivated vaccine against Salmon Rickettsial Syndrome (SRS). Stimulates active immunity against <i>P. salmonis</i></p>
<p>Providean Aquatec 3</p> <p>SRS+IPNV+ <i>V. ordalii</i></p>	<p>Composition per 0.1 ml</p> <p><i>Piscirickettsia salmonis</i> (SRS): 1x10E7-1x10E8 pre-inactivation bacteria. IPNV virus: 1x10E6⁵ - 1x10E7 DICT50, pre - inactivation. <i>Vibrio ordalii</i> : 1x10E7⁵ - 1x10E8 pre-inactivation bacteria. Excipients csp: 0.1 ml. Inactivant: Formaldehyde Non-mineral oil adjuvant</p> <p>Target species</p> <p><i>Salmo salar</i> (Atlantic Salmon), <i>Oncorhynchus mykiss</i> (Rainbow trout)</p>
<p>Providean Aquatec 2</p> <p>SRS+IPN</p>	<p><i>Piscirickettsia salmonis</i> (SRS): 1x10E7 - 1x10E8 pre-inactivation bacteria. IPNV virus: 1x10E6⁵ - 1x10E7 DICT50, pre - inactivation. Excipients csp: 0.1 ml. Inactivant: Formaldehyde. Non-mineral oil adjuvant</p> <p><i>Salmo salar</i> (Atlantic Salmon), <i>Oncorhynchus kisutch</i> (Pacific Salmon), <i>Oncorhynchus mykiss</i> (Rainbow trout)</p> <p>Inactivated vaccine against Infectious Pancreatic Necrosis (IPN) and Salmon Rickettsial Syndrome (SRS)</p>
<p>Providean Aquatec 4</p> <p>SRS+IPNV+Vibrio+ISA</p>	<p><i>Piscirickettsia salmonis</i> (SRS): 1x10E7 - 1x10E8 pre-inactivation bacteria. IPNV virus: 1x10E6⁵ - 1x10E7 DICT50, pre - inactivation. <i>Vibrio ordalii</i> : 1x10E7⁵ - 1x10E8 pre-inactivation bacteria. Infectious Salmon Anemia Virus: 1.5x10E5 - 1.8x10E5 TCID50 pre inactivation. Excipients csp: 0.1 ml. Inactivant: Formaldehyde. Non-mineral oil adjuvant</p> <p><i>Salmo salar</i> (Atlantic Salmon)</p>
<p>Providean Aquatec 5</p> <p>SRS+IPNV+ISA+ <i>V. ordalii</i>+ <i>A. salmonicida</i></p>	<p><i>Piscirickettsia salmonis</i> (SRS): 1x10⁷ - 1x10E8 pre-inactivation bacteria. IPNV virus: 1x10E6⁵ - 1x10E7 DICT50, pre - inactivation. <i>Vibrio ordalii</i> : 1x10E7⁵ - 1x10E7 pre-inactivation bacteria. Infectious Salmon Anemia Virus: 1.5x10E5 - 1.8x10E5 TCID50 pre - inactivation. Atypical <i>Aeromonas salmonicida</i>: 1x10E7⁵ - 1x10E7 pre-inactivation bacteria. Excipients csp: 0.1 ml. Inactivant: Formaldehyde. Non-mineral oil adjuvant</p> <p><i>Salmo salar</i> (Atlantic Salmon)</p>

R&D sector

- Selection of effective antigens
- Proliferation yield of antigens
- Vaccination protocol and programs

Targeted vaccine efficacy

- RPS in the LAB?
- RPS in the Filed?

Number of shots

Manufacturing

- Mass Production Process
- Purification tools
- Achieving low production costs

Fields

- Efficacy and safety
- The needs to use vaccines
- Forecasting vaccination demand and sales

Our Goals

- Developing a vaccine that can **drastically reduce antibiotic use**
- Development of a vaccine **with longer immunity** (than existing vaccines)

Our Challenge

- | | |
|----------------------------|---|
| T 1.
Progressing | Development of a Non-Bacterin Vaccine containing the concentrated antigen obtained from <i>P. salmonis</i> |
| T 2.
Progressing | Development of a DNA Vaccine containing the antigenic gene of <i>P. salmonis</i> |
| T 3.
Scheduled | Development of SRS Live Vaccine using R-MET technology |

T 1. Development of a **Non-Bacterin Vaccine** containing the concentrated antigen obtained from *P. salmonis*

- Prototype developed at a university in Chile
- The vaccine strain was isolated from salmon in Chile
- Non-Bacterial antigens produced through a special process
- Secure high purity of antigen by adding purification process
- Evaluation was conducted at a Chilean research institute using salmon farmed in Chile.
- Antigen concentration is optimized for Chilean aquaculture environment.



The best prototype of the vaccine provided an 88.5% protection and a mortality 5-6 days later than the bacterins available in the market. Photo: File Salmonexpert.

New prototypes of SRS vaccine developed

Scientists in Chile have developed candidates for prototypes of a vaccine against *Piscirickettsia salmonis*, commonly known as SRS.

Francisco Soto

PUBLISHED Wednesday 23. January 2019 - 12:20 LAST UPDATED Wednesday 23. January 2019 - 12:34



It is the latest achievement of Dr Alejandro Yáñez and colleagues at the Austral University of Chile (UACH), who have over the years developed culture media and antigens for diagnostic tests for SRS.

The disease is a particular problem in Chile, where the lack of a vaccine has led farmers to use far more antibiotics than in other salmon producing countries.

Yáñez told Fish Farming Expert's Chilean sister site, Salmonexpert, that he expects in the near future to be able to generate prototypes of a medium-scale vaccine for SRS, using candidates that in tests for intraperitoneal infection have shown excellent protection (measured by RPS90 – see panel, right), and with results much higher than those obtained from commercial vaccines based on bacterins.

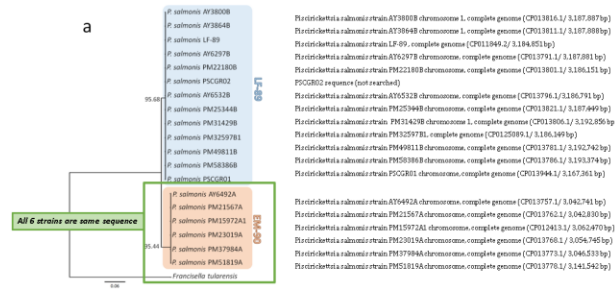
What is RPS 90?

RPS 90 is a comparative index that compares the mortality of the vaccinated fish with the controls when 90% of the controls

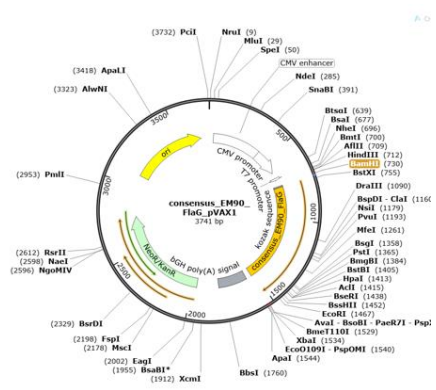
NEW GENERATION VACCINE AGAINST SRS

T 2. Development of a **DNA Vaccine** containing the antigenic gene of *P. salmonis*

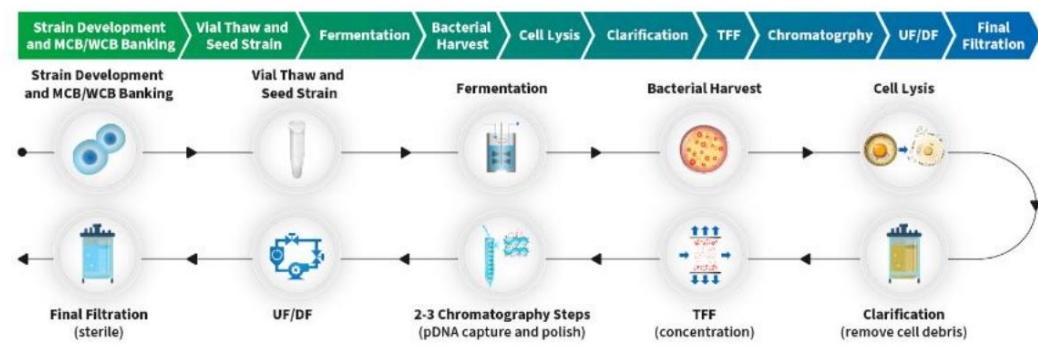
1. Target analysis



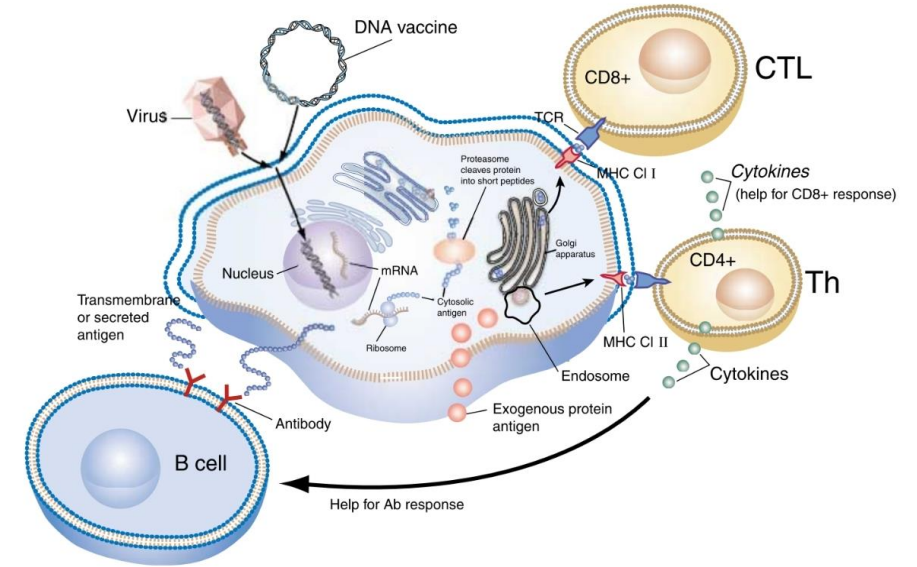
2. Vector design



3. Manufacturing



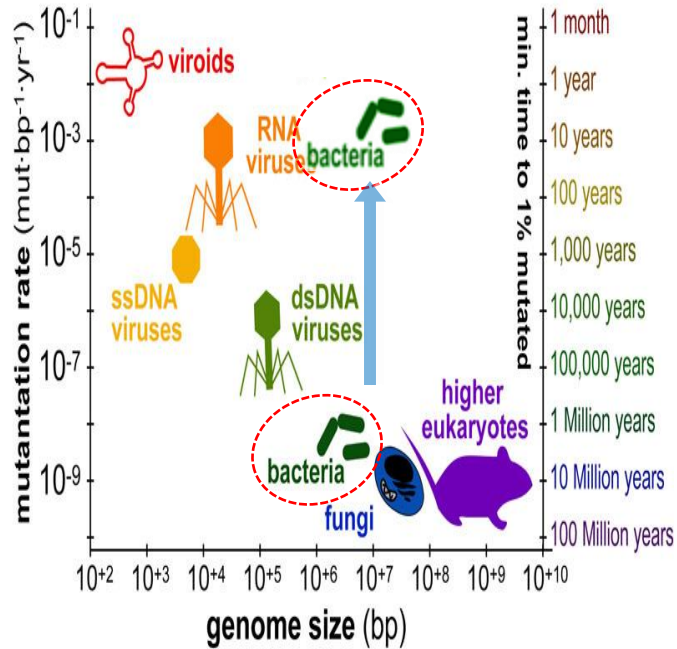
Mechanism of generation of CTL, Th, Ab



Liu MA. DNA vaccines: a review. J Intern Med. 2003 Apr;253(4):402-10.

T 3. Development of **SRS Live Vaccine** using R-MET Technology

Among the mutated strains, we need to find one suitable for a vaccine.



Mutation and Evolution

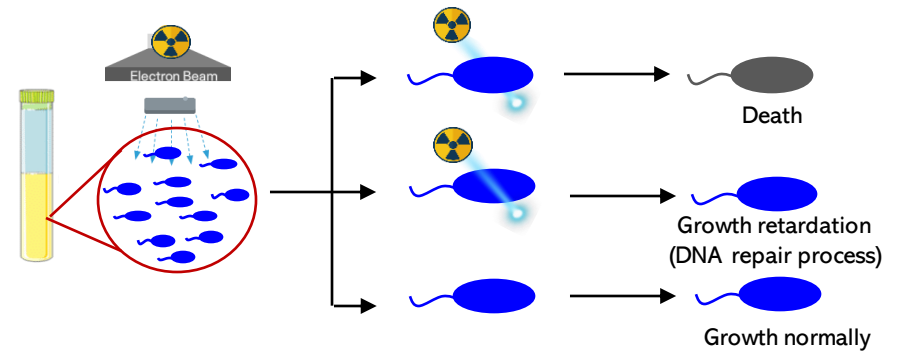
Natural mutation

- Mutation → 1 mutation per 10⁹ bp
- Evolution → 1% mutation for 10 million years

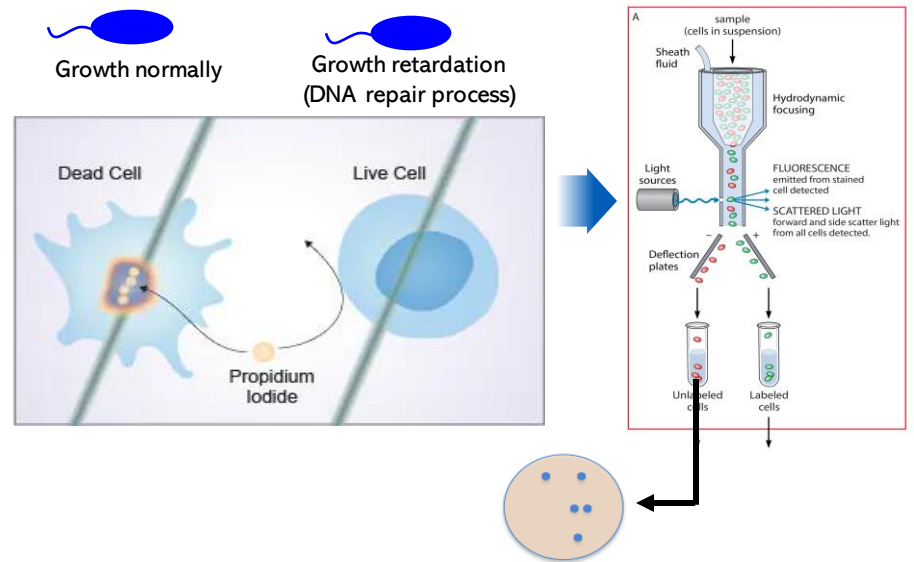
Mutation enhancer

- Mutation → 1 mutation per 10² bp
- Evolution → 1% mutation for 1 month

Selection strategy



Growth stop and retarded cell selection

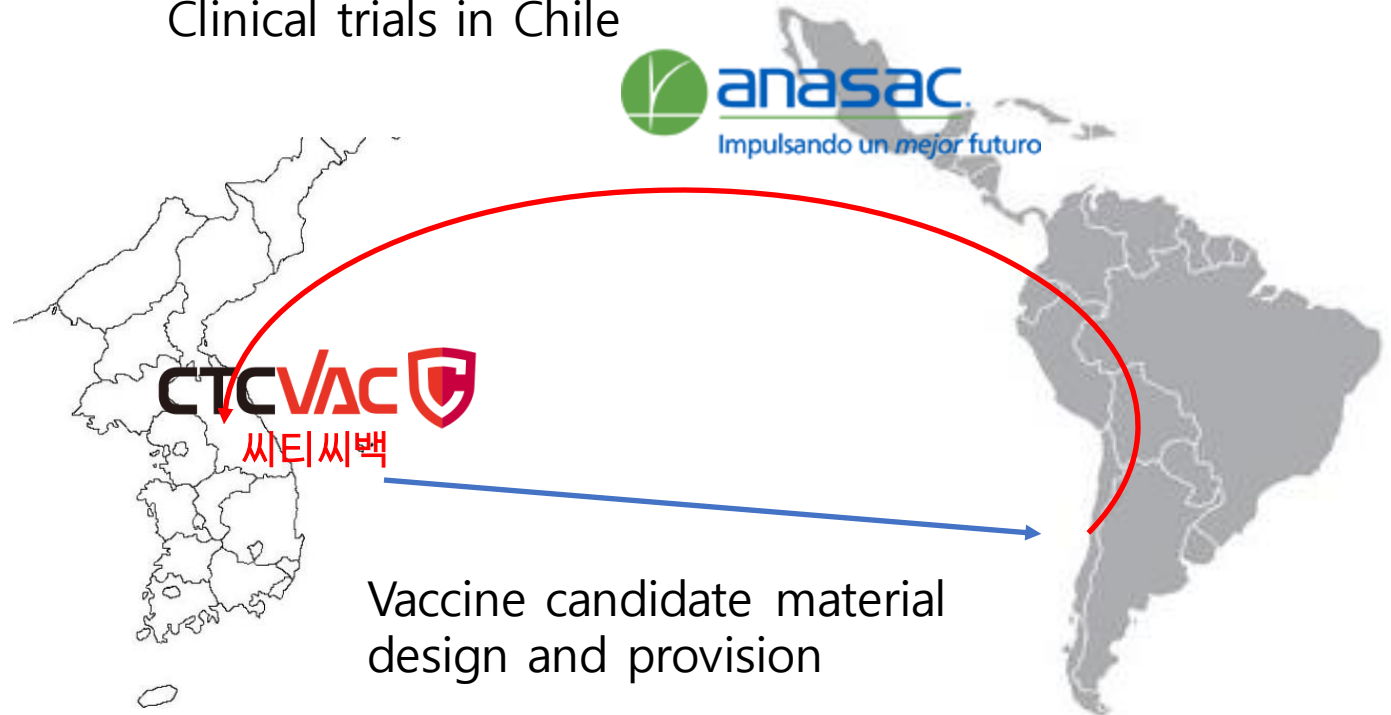


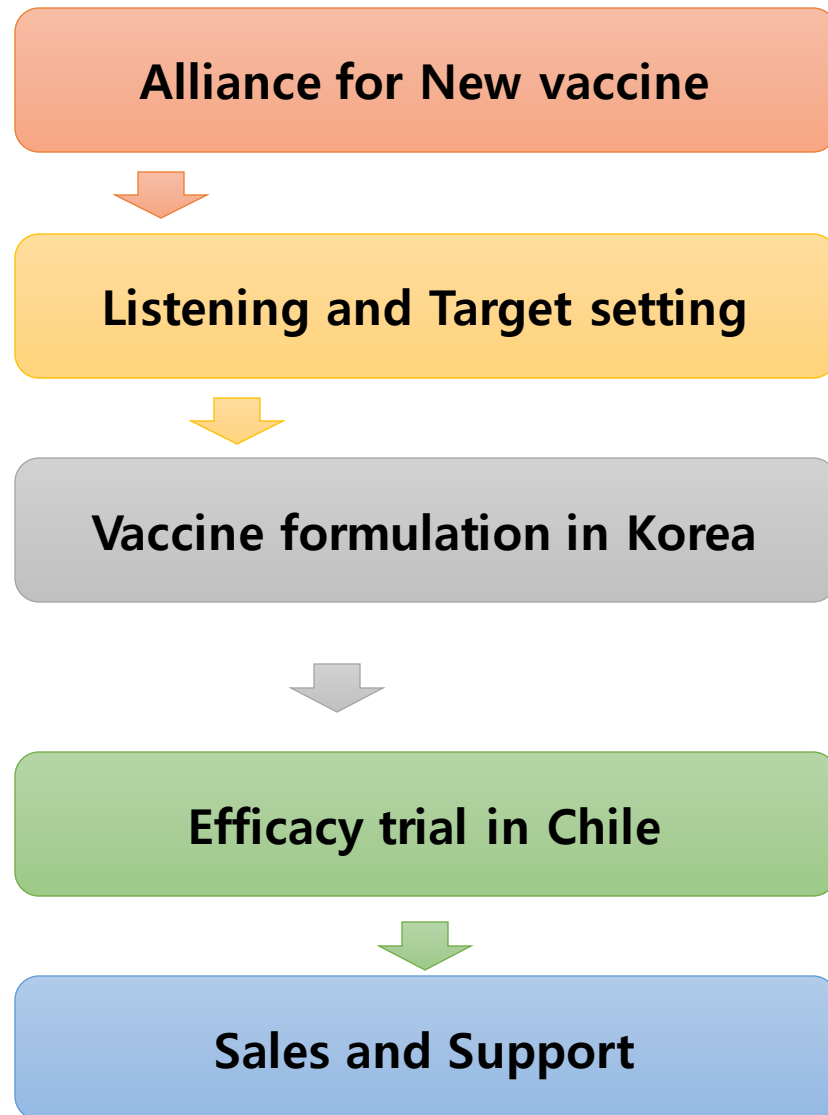
What kind of **NEW VACCINES** Do You Need? For the prosperity of the Chilean aquaculture industry!

Providing efficacy evaluation for Atlantic salmon,
Clinical trials in Chile



Meeting with Chilean Anasac officials regarding salmon vac.
(At the 2022 EuroTier exhibition in Hannover, Germany, Nov. 16, 2022)





- Organizing the Salmon Vaccine Development Alliance
- Distinguishing roles in development, evaluation, registration, and sales
- Listening to needs from the salmon farming field
- Analyzing pathogens from recent target disease cases
- Include **antigens based on the recent pathogens**
- Antigen combinations for **reasonable vaccine program** construction
- Developing in multiple formulation: DNA, Recombinant protein, Live attenuated antigen
- Customized **efficacy evaluation in Chilean salmon** farms
- Prioritizing immune sustainability and safety
- Responsible sales and technical support from our Chilean partners

Thanaks
Q&A

CTCVAC

The Answer
Beyond
Animal Health Care

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