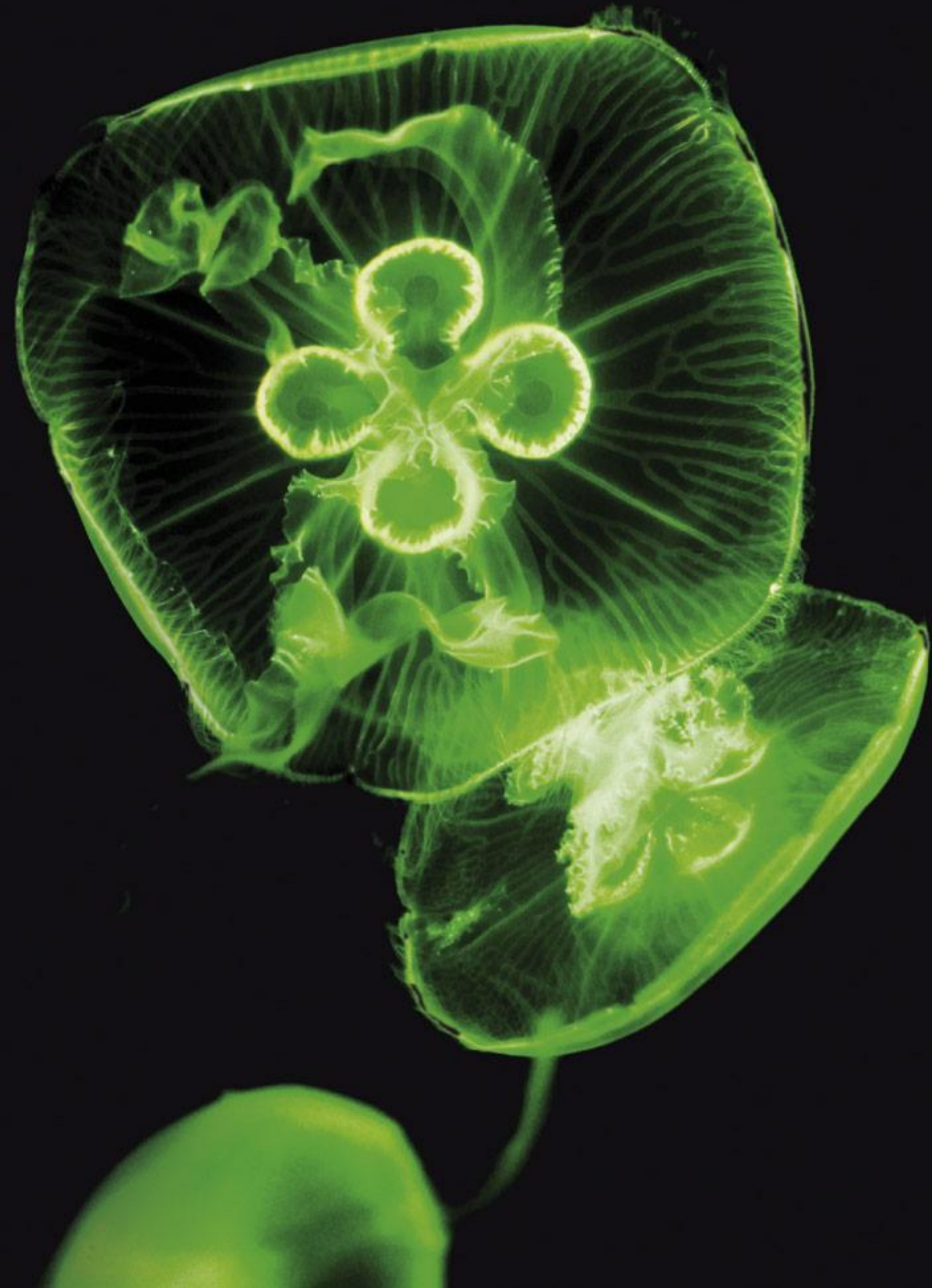




THE BIOTECH FOR NATURAL PRODUCTS



ATLANTIC FORUM
Coastal and Deep Sea Natural Resources

Azores, 21st September, 2012

1. BIOALVO: WHO WE ARE

- BIOALVO was founded in 2006 as a drug discovery company with own pipeline of drugs against neurological disorders
- Proprietary discovery technology based in yeast (GPS D2) + unique microbial natural extract libraries from Portuguese ecosystems (mostly marine)
- In late 2010 BIOALVO has repositioned its strategy using its assets to a broader range of industry/academia partners:
 - Pharma, Cosmetics, nutraceutical, industrial processes...
- In 2011 BIOALVO presents itself as ***“The Biotech for Natural Products”***
- **Today:** major focus in exploring the power of its assets:
 - technology to screen novel bioactivities for different industry/academia partner
 - providing access to its libraries for partners to screen in house or with us
 - developing its own new natural ingredients
(botox-like; anti-UV; anti-oxidant; neuroprotection)

1. BIOALVO: WHO WE ARE

OUR PAST IS
CONNECTED TO THE S

OUR IDENTITY IS
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OUR FUTURE
DEPENDS ON THE SEA



1. BIOALVO: WHO WE ARE

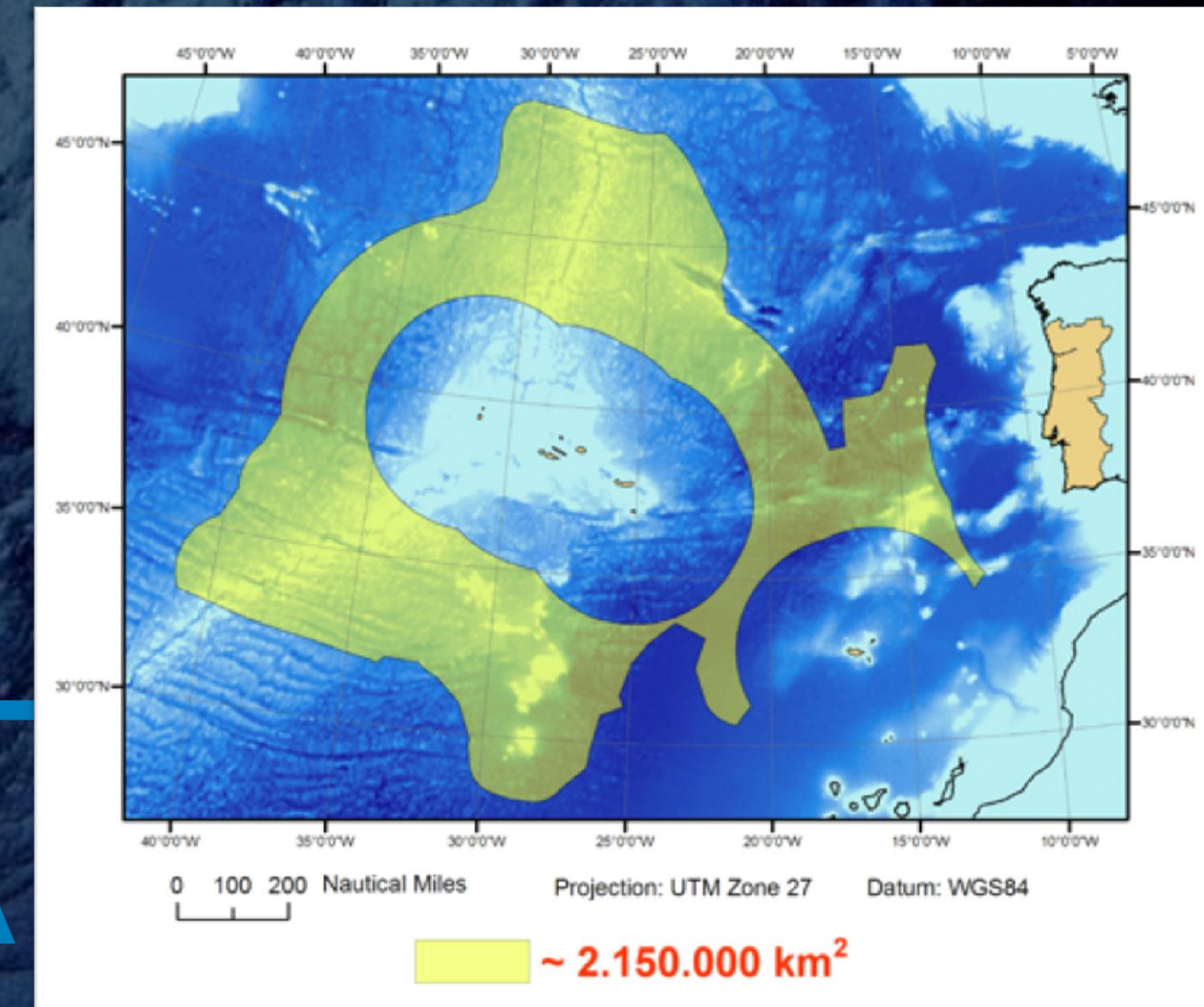
THE UNLIMITED BIOACTIVE POTENTIAL OF PORTUGUESE SEA

PORTUGAL has one of the largest continental shelves and is the central point between 3 major continents: America, Africa and Europe.

Marine microorganisms: Overcoming supply limitations associated with plant and animal derived natural products

Although oceans are 70% of the EARTH surface

LESS THAN 5% OF MARINE BIODIVERSITY IS
INCORPORATED INTO SERVICES AND PRODUCTS



2. WHAT DO WE BRING

LIBRARIES: DIFFERENT PRODUCTS FROM PORTUGUESE NATURE

There are clear evidences that the marine environment is becoming a top spot of bioactive compounds.

In this context, BIOALVO has developed or is developing 3 subsets with a total of **90 000** samples:

ONE OF THE BIGGEST COLLECTIONS.

2. WHAT DO WE BRING

LIBRARIES: DIFFERENT PRODUCTS FROM PORTUGUESE NATURE

PharmaBUG Library

A unique and exquisite marine bacteria collection of 140 individual new strains isolated from **hydrothermal vents in the Mid-Atlantic Rift**

Menez Gwen



Discovered in 1994 during the French expedition DIVA1
Localizes **840-870 m** deep being formed by small chimneys
Close to a recently formed volcano where temperatures can reach **265-281°C**

Lucky Strike



Described in 1993 under the FARA program
Localizes **1550-3000 m** deep and it expands for 65 km
Active chimneys are from the black smoker type with temperatures of **333 °C**

Rainbow



Discovered in 1997 during the mission FLORES
Localizes **2300 m** deep and also contains black smoker type chimneys
Expels fluids at **360 °C**

Saldanha



Localizes **2200 m** deep
Characterized by low temperatures and high levels of methane
Expels fluids rich in metal oxides and sulphates

2. WHAT DO WE BRING

LIBRARIES: DIFFERENT PRODUCTS FROM PORTUGUESE NATURE

PharmaBUG Library

A unique and exquisite marine bacteria collection of 140 individual new strains isolated from **hydrothermal vents in the Mid-Atlantic Rift**

bacteria_entry_number	bacteria_ID	o2_dependence	optimal_growth_temperature	colonies_morphology	cluster	enzymatic_activity
55		Aerobic	15-30	translucide white	A	pululanase (+)
54		Aerobic	15-30		E	amylase (+), pululanase (+), xyl
53		Aerobic	15-30		B	pululanase (++) , quitinase (+), l
52		Aerobic	15-30		A	NULL
51		Aerobic	15-30	translucide apricot	B	NULL
50		Aerobic	15-30	transparent	B	amylase (++) , pululanase (++)
5		Aerobic	15-30	opaque white	D	quitinase (+)
49		Aerobic	15-30	opaque white	A	pululanase (+), pectinase (+)
48		Aerobic	15-30	translucide apricot	E	protease (+++)
47		Aerobic	15-30		A	pululanase (+), quitinase (+), p
46		Aerobic	15-30		E	NULL
45		Aerobic	15-30		A	NULL
43		Aerobic	15-30	opaque cream	B	NULL
42		Aerobic	15-30		A	pectinase (+)
41		Aerobic	15-30		B	amylase (++) , pululanase (++)
40		Aerobic	15-30	opaque cream	A	NULL
4		Aerobic	15-30		D	NULL
39		Aerobic	15-30	translucide cream	A	amylase (+), pectinase (+)
38		Aerobic	15-30		A	NULL

- 484 extracts and continuously growing
 - 212 organic extracts
 - 272 aqueous extracts
- Validated bioactivities for pharmaceuticals, cosmetics and industrial applications

2. WHAT DO WE BRING

LIBRARIES: DIFFERENT PRODUCTS FROM PORTUGUESE NATURE

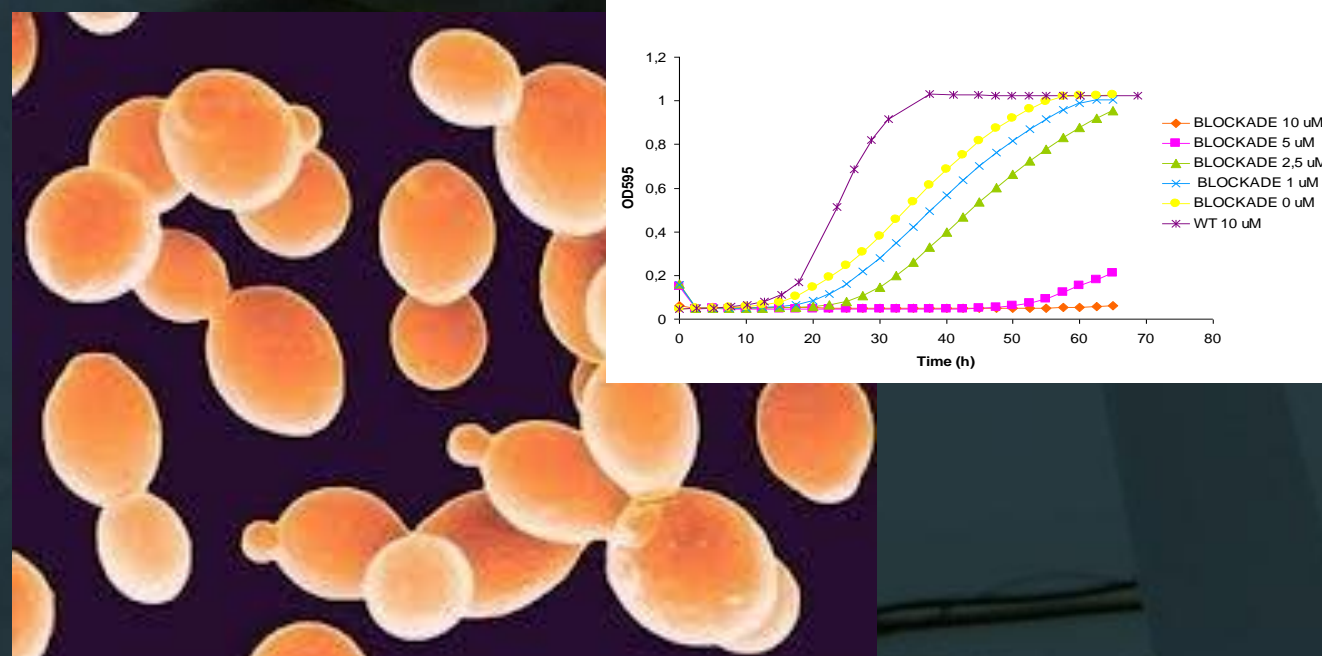
PharmaBUG Library
LUSOEXTRACT 2010

LUSOMAREXTRACT 2011

2. WHAT DO WE BRING

THE GPS D² TECHNOLOGY

BIOALVO, the Biotech for Natural Products, developed its own proprietary bioactive discovery platform technology based on *in vivo* assays performed in yeast.



- Applications designed include

- Anti-inflammatory
- Anti-UV (A/C)
- Anti-bacterial

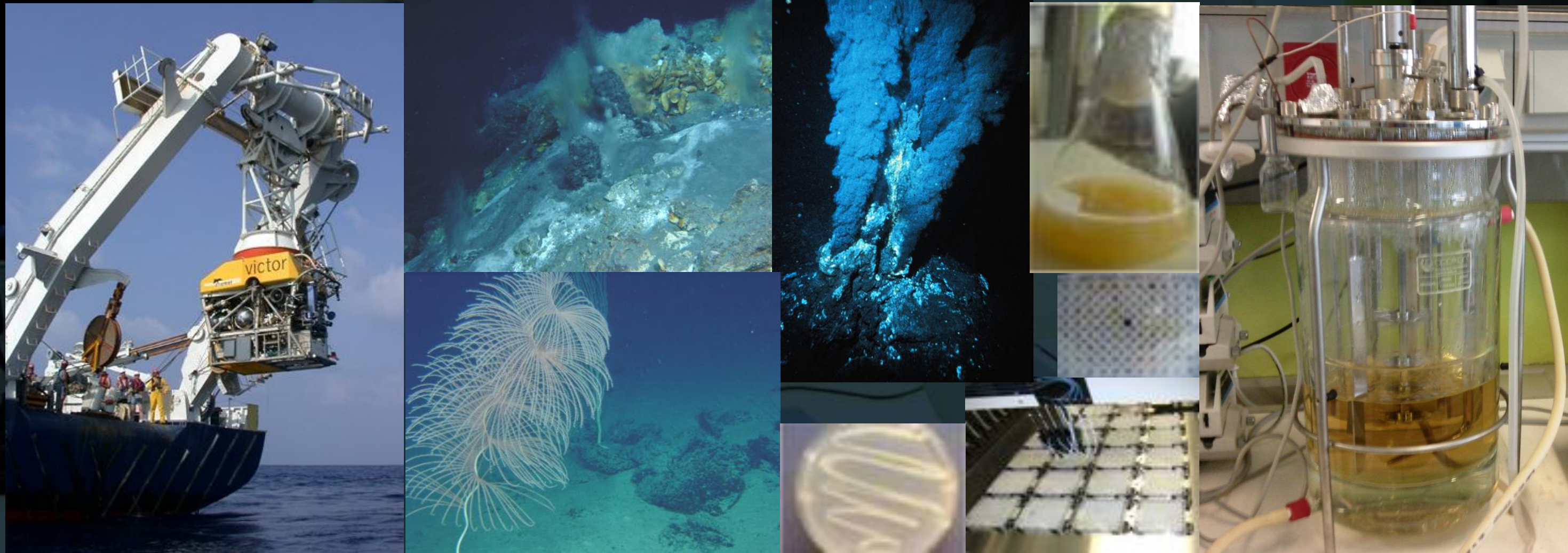


- Robotic Unit with capacity for screening around 10,000 cpds a week
 - performed over 200 screenings
 - operates for internal programmes as well as for clients
 - Perkin-Elmer Janus Liquid Handler; LiCONic STX40 incubator,

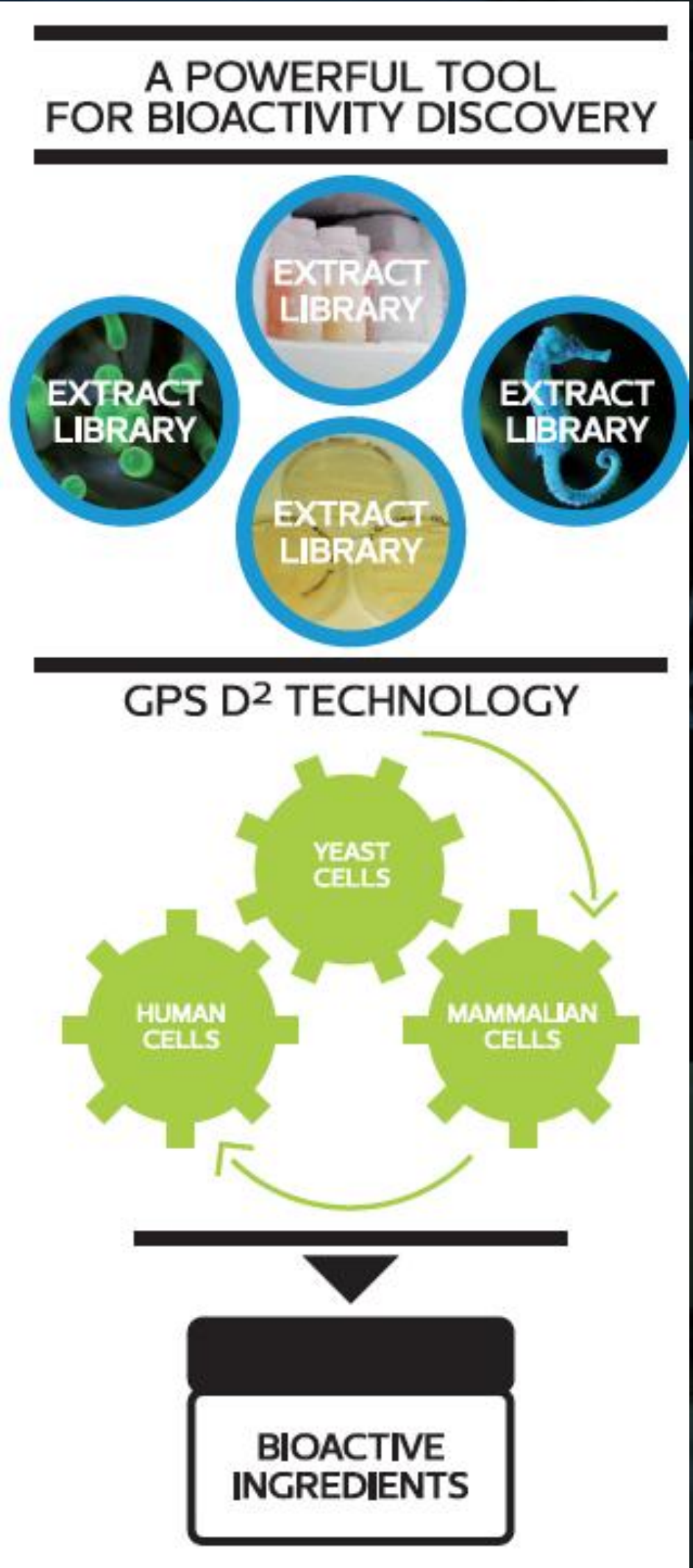
Perkin-Elmer VICTOR D plate reader

2. WHAT DO WE BRING: OUR ADVANTAGES

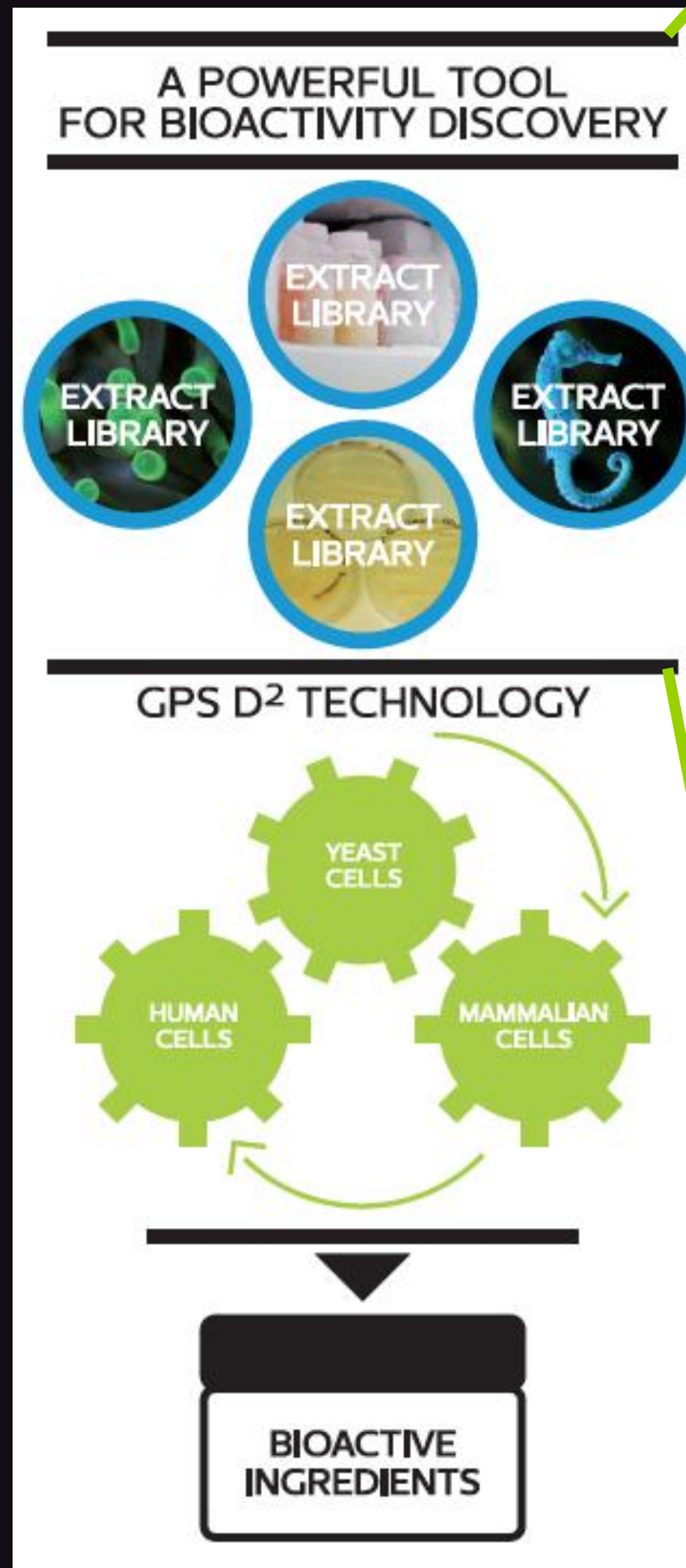
A UNIQUE COMBINATION



ONE-STOP SHOP FOR NEW BIOACTIVE IDENTIFICATION AND RESUPPLY



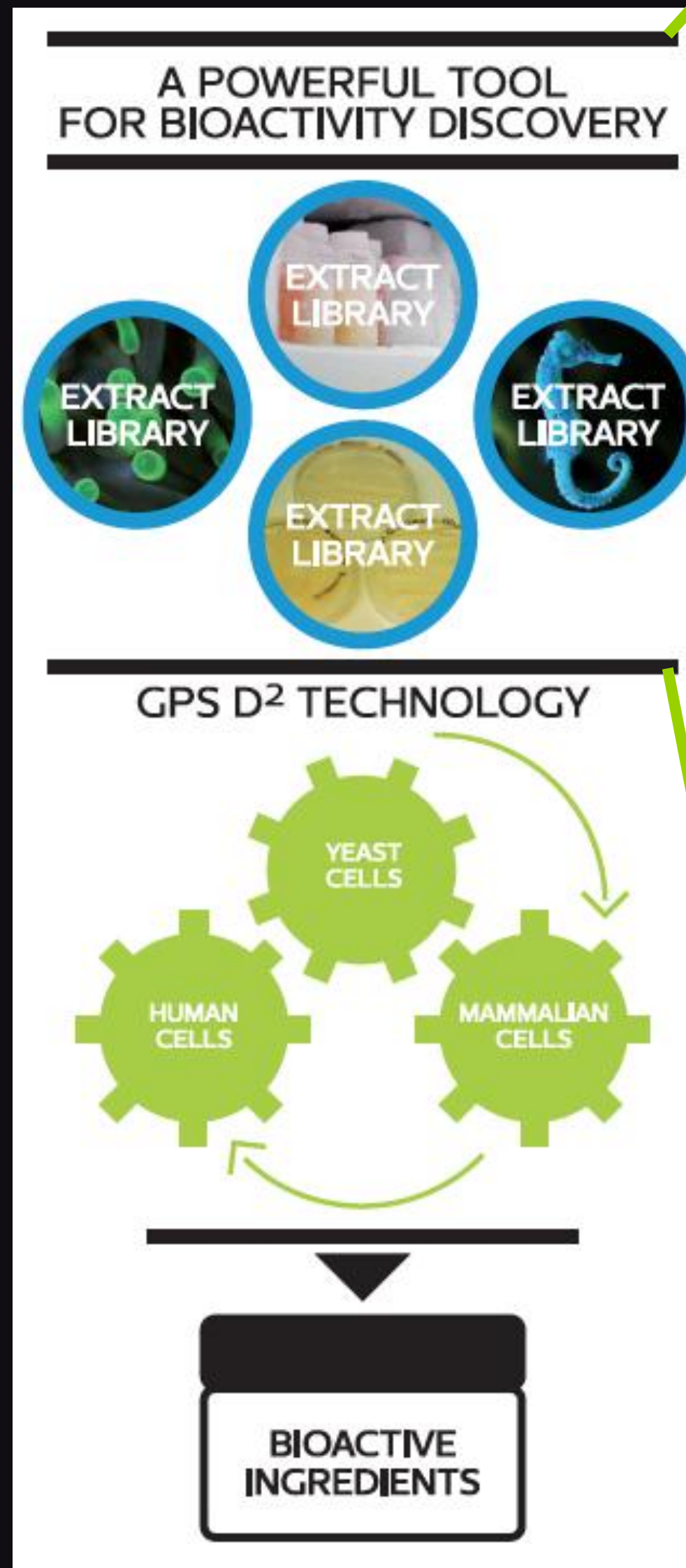
EXAMPLES



New Marine Botox: an ingredient from BIOALVO's libraries

- Being developed by LIPOTEC (BIOALVO's client)
- Strain isolated from the *Rainbow* hydrothermal vent (Azores islands), species undisclosed, located at 2290m depth.
- Local temperature is 3.8 °C.
- **Anti-wrinkle** activity:
 - Transient marine botulinum toxin natural bio-similar
 - **Exclusive and unique**
 - **New** Mode of Action
- Phylogenetically similar to other isolates

EXAMPLES



New Marine Anti-Infective: an ingredient from BIOALVO's libraries

- Being developed by Pharmaceutical company (BIOALVO's client)
- Strain isolated from the *Rainbow* hydrothermal vent (Azores islands), species undisclosed, located at 2296m depth
- Local temperature is 3.8 °C.
- **Anti-tuberculosis** activity:
 - Specific undisclosed *M.tuberculosis* target
 - **Specific bioactivity** identified using BIOALVO's GPS D² technology application
 - **Exclusive and unique**
 - **New Mode of Action**
- Phylogenetically similar to other isolates

3. EXPLORING NEW MARKETS

A MARKET OPPORTUNITY FOR NATURAL PRODUCTS

NATURAL PRODUCTS:
US\$ 40-60 BILLION ANNUAL

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A MARKET OPPORTUNITY FOR NATURAL PRODUCTS

NATURAL PRODUCTS:
US\$ 40-60 BILLION ANNUAL

MARINE BIOTECH:
US\$ 4.1 BILLION BY 2015,
MORE THAN 10% GROWTH RATE

3. EXPLORING NEW MARKETS

OUR CUSTOMER:

- Companies that wish to incorporate more “green”, natural & sustainable but also innovative solutions into their products and processes:

- Cosmetics
- Nutraceuticals
- Wholesale, textiles
- Household products
- Pharmaceuticals ...

- Driven by more informed and demanding final consumer = **GREEN is BETTER**

2. BIOALVO: PARTNERSHIP MODELS

- ✓ BIOALVO is a privately owned company:
 - ✓ Commercialization Oriented
 - ✓ RTD driven
- ✓ **BIOALVO looks for:**
 - ✓ Partners that have raw materials/libraries/ingredients that do not have yet a bioactivity assigned → GPSD² technology tool
 - ✓ Partners that have assays or desired bioactivity but have no samples → PharmaBUG Library (> 490 extracts)
 - LUSOEXTRACT Library (> 4000 extracts)
 - BIOLUSOMAR Library (under construction)
 - ✓ Partners that wish to share risk and development costs of novel ingredients → Joint-Development
 - ✓ RTD projects where BIOALVO can clearly gain funding advantages

BIOALVO's SUCCESSFULL PARTNERSHIPS





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