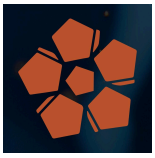


ART ^ NEUROSCIENCES

SEED 15 - BOLDAGE

0. CONTACT DETAILS

0.1 Surname and first name

NEUROSCIENCE AND PHYSIOLOGY LABORATORY: Esperanza Rodríguez Matarredona, Sara Morcuende Fernández, Beatriz Benítez Temiño, Maya Davis López de Carrizosa, Camilo Morado Díaz, Diego Baena López, Rafael González Brioso.

0.2 Contact e-mail address: matarredona@us.es

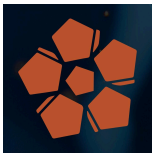
0.3 Let us get to know you a little bit through your participation in websites, blogs, social networks, etc.

0.4 What is your background and in which institution do you work?

We are biologists and pharmacists, we work in the Department of Physiology, in the Faculty of Biology, University of Seville.

0.5 Gender: Female, Male (group)

0.6 Age range: 20 – 60 years old (group)



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1. ESSENTIAL DIMENSION

1.1 Seed name

BOLDAGE

1.2 Seed summary

It is based on the group's research project that uses a compound of natural origin, boldin, extracted from the boldo tree, to improve cognitive, motor and metabolic alterations derived from ageing. Boldine is added as a supplement to the diet of experimental animals in order to increase the functionality of different physiological systems during ageing.

1.3 Metaphor. *Is there any metaphor that helps to explain this seed in a more intuitive way? An imaginative text can inspire as much as a poem.*

• A lying hourglass, representing stopped time.

• The morphology of neurons resembles that of trees, with their multiple branches. The nervous system also resembles a tree, where the spinal cord would be the trunk and the brain the crown. A tree that stays healthy, with branches spreading and growing, with new leaves appearing, would be a metaphor for a healthy brain in which new synapses are always forming.

• The boldo tree is an evergreen, which could be a metaphor for the effect of boldine on humans, making it more durable over time.

1.4 Keywords (separated by commas)

Healthy ageing, improvement, well-being, Nature, phytochemistry, tree, leaf, health, plasticity, neuroscience.

1.5 Scientific field (general)

Physiology, Neuroscience.

1.6 Scientific subfield (specific)

Neural plasticity, Nutrition.

1.7 Resources (File)

1.8 Resources (Links)

Link to Instragram with informative video about our group's activity in the BOLDAGE project.

2. ADDITIONAL DIMENSIONS

2.1 SYNAESTHETIC DIMENSION

This dimension seeks to associate certain sensory characteristics to the seed.

2.1.1 What colours does this seed suggest to you?

Brown, green, gold.

2.1.2 What sounds or music does this seed inspire you?

Forest sounds, bird trills, water.

2.1.3 What aromas would you associate with this seed?

Wood, freshly cut grass, wet soil.

2.1.4 What flavours does this seed evoke in you?

The taste of tea or an herbal infusion.

2.2 EMOTIONAL DIMENSION

This dimension seeks to explore the personal meaning of the seed.

2.2.1 What was your motivation to dedicate yourself to this field of research? What personal reasons lead you to suggest this seed?

Hope for a better future, both at the level of the individual and of society.

2.2.2 What metaphysical reflections does this seed provoke in you?

Man is a natural being who has forgotten his essence. Seeking to control its environment to avoid pain (disease, poverty, hunger, war), it has been creating artificial materials (plastic, cement) to manufacture sophisticated products, constructing alienating buildings and cities that make all men equal, destroying their uniqueness and making them forget their real needs. In this process, everything that nature offers us to escape from that same pain has been lost, such as the repairing capacity of countless compounds from the plant world.

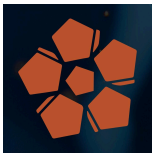
On the other hand, the idiosyncrasy of each human being, what makes him unique and differentiates him from all others, can be altered during the ageing process, when neurodegenerative processes alter the memory and even the personality of the individual. Maintaining brain function could reduce or even eliminate this loss, which occurs even before death itself.

2.2.3 What ethical reflection or challenges would you associate with this seed?

If nutritional supplementation with boldine achieves beneficial effects on the general physiology of the individual during ageing, the socioeconomic impact would be significant by improving the quality of life of older people, which would result not only in the reduction of the cost of medical care but also in the increase in the retirement age. achieving a more efficient and productive society. Therefore, our results would make a significant contribution to the lines of research focused on the search for new food or therapeutic options that mitigate the harmful effects of ageing and that are economical, safe and efficient. BOLDAGE's goals align with Sustainable Development Goal 3: Good Health and Well-being, aimed at ensuring healthy lives and promoting well-being for all at all ages.

2.2.4 What aesthetic dimensions does this seed suggest to you?

In our project we use mice of the C57/BL6 strain of advanced age (19-24 months) that will receive oral dietary supplement with boldine (alkaloid extracted from the boldo tree) for 5 months and the effect of this nutritional supplement is evaluated on:



ART ^ NEUROSCIENCES

I - Cognitive deficiencies and neuronal plasticity associated with ageing.

Cognitive function, assessed by tests of spatial memory, mainly dependent on the hippocampus, and non-spatial memory, dependent on various brain structures.

Hippocampal neurogenesis, determining the possible formation of new neurons.

Synaptic plasticity, analysing BDNF levels and synaptic coverage of hippocampal neurons.

Neuroinflammation, which will be studied in the hippocampus by evaluating markers of microglial and astroglial activation and inflammatory cytokines. This section will be complemented with an in vitro study with microglia cells in which it will be analysed whether boldine is capable of reducing inflammation caused by inflammatory agents such as lipopolysaccharide and interferon-ɣ.

II - Motor dysfunction associated with ageing.

Motor function, using motor tests to assess strength, endurance, and coordination.

Presence/absence of sarcopenia-related features. Parameters such as weight, fibrillar morphometry, fibrosis and inflammation, and mitochondrial abnormalities will be determined.

Función neuromuscular, evaluada por la supervivencia de las motoneuronas alfa en la médula espinal y los cambios en la morfología de las UNMs en los músculos esqueléticos.

Neuromuscular function, assessed by survival of alpha motor neurons in the spinal cord and changes in the morphology of UNMs in skeletal muscles.

III - Hepatic and metabolic alterations associated with ageing.

Fatty liver. The degree of hepatic steatosis will be determined by histological analysis through haematoxylin-eosin and Oil Red O stains. In addition, the main pathways involved in lipid metabolism (de novo lipogenesis and β-oxidation) will be studied by qPCR.

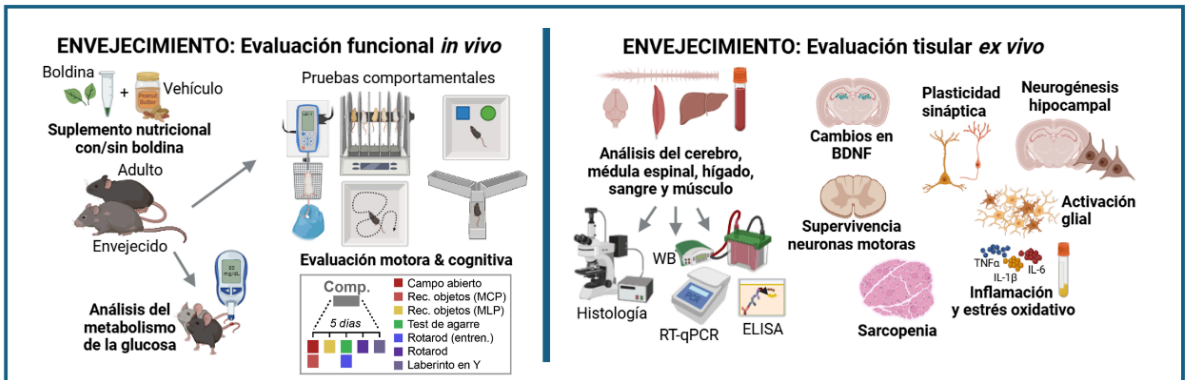
Glucose metabolism, monitoring plasma glucose and insulin levels.

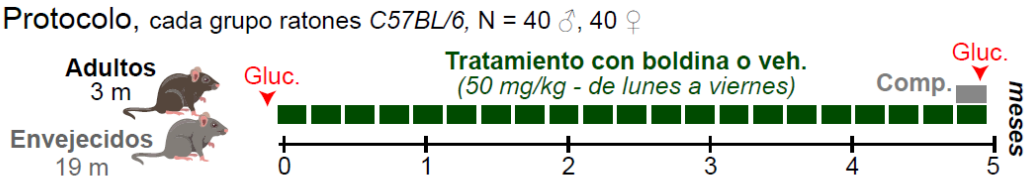
2.3 PROCEDURAL DIMENSION

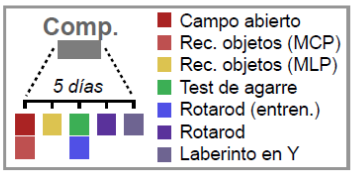
This dimension seeks to explore the scientific processes that are usually followed when investigating this topic.

2.3.1 Description of the research process

2.3.2 Research process diagram







2.3.3 Link to the descriptive video of the process

2.3.4 What tools are typically used in this field of research? Whether instruments, technologies, hardware or software.

Microscopy (epifluorescence and confocal) for the analysis of brain and muscle tissue; cryostat, for the tissue section; Y-shaped labyrinth for the assessment of spatial memory; open-field sand for analysis of locomotor activity; dynamometer to assess strength; RotaTod to determine motor coordination and balance; glucometer to measure blood glucose; Western blot and PCR equipment.

3. PERSONAL SUGGESTIONS

- Branching tree, whose branches, increasingly thin, end up transforming into neuronal extensions that synapse with other neurons.

- Video/animation in which a tree appears in the foreground, surrounded by grass. The camera zooms out and you can see that the surrounding forest is being replaced by increasingly tall homes and buildings, traffic, pollution... Until the tree is almost invisible. The image gradually zooms in again until an old woman is seen approaching the tree, which is again in the foreground, until she touches it and feels leaning against it.

4. INVOLVEMENT OF THE SCIENTIST ON THE CREATIVE TEAM

4.1 What role would you like to have in the process of co-creating the SciArt work?

Only as a "sower of a seed".