TOBeATPAIN E-Seminar 18th February 2020

George Sideris Lampretsas (ESR1) presented the paper "Human and mouse single-nucleus transcriptomics reveal TREM2-dependent and TREM2-independent cellular responses in Alzheimer's disease" from Zhou and colleagues 2020 on the role of microglia in neurodegenerative diseases and focussed on Alzheimer's disease (AD).

The main conclusións of the e-seminar paper are:

- that microglia expansion in AD is TREM2- dependent in early stages but in late stages, microglia is independent of TREM2 since there is no difference between microglia number of cells for TREM2+/+ and TREM2 -/- mice with AD. Proteomic analysis were performed in this study in order to improve the understanding. In this case, the proteomic evaluation revealed that some microglia-related proteins have a TREM2-dependent expression.
- This kind of study allows evaluation of the enriched pathways and this revealed that in AD the immune system is upregulated. Apart from a basic evaluation of pathways, proteomic technology allowed them to dicover which pathways enriched by phosphorilation were also enriched and they found that the neuropathic pain signaling in dorsal horn neurons was highly upregulated.

The most crucial result was the comparision between signatures of AD mouse model and human because these signatures were contary for homeostatics genes, being down regulated in mice and upregulated in humans. Also, an interesting observation in the study was the use of metabolic coordination of actrocytes with neurons and reactive oligodendocrytes in AD.

Finally, one of the main conclusions was that, in humans, the microglial response in AD caused by TREM2 variants is reduced.

The main conclusions explained in the e-seminar of this publication were:

(I) Amyloid β and TREM2 are a necessity for the development of the disease-associated microglial (DAM) in the mouse model used in the study (5xFAD);
(II) the most upregulated genes in the mice modelo f AD correspond to oligodendrocytes;
(III) (III) Human and mouse microglia present a different reaction to Amyloid and this could be because of a specific response in rodents;
(IV) microglia response is reduced in humans with a TREM2 variant.

After the presentation, there was a debate with several questions for clarification or discission that made the seminar interactive. This enhanced the learning skills of the speaker and the people preparing the e-seminar in order to understand questions from an audience, process the question and elaborate an answer.

From a personal point of view, these kinds of activities help the ESRs to develop a better understanding of scientific work, learn how to make a synthesis of a research paper, organize a discourse and improve communicative skills. Apart from doing the e-

seminar, watching it gives an insight into how to use all senses to understand a topic that can be far away from your main research topic and learn how others do in order to improve your own skills. For example, observing how other speakers discourse (velocity of speaking, tone of voice, pauses, etc) and deciding if you like this way or not and try to apply this to yourself in the future. This also applies for slide style and presentation preparation.

I consider that ESR1, George Sideris Lampretsas, did a good job in preparing the first e-seminar of TOBeATPAIN and this can be a initial point of reference for the quality of future e-seminars of the ITN.

Review by Fátima Gimeno Ferrer