

**Submission on behalf of The International Concussion and Head Injury Research Foundation (ICHIRF)
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Introduction

In April 2021, ICHIRF will enter the 7th year of research into the long-term effects of head impact in sport. This is the only study in the world that includes females over the age of 50 with a history of multiple concussions, combined with matched age/gender controls, and the option to volunteer for brain donation (managed by Queen Square Brain Bank).

ICHIRF (Company No. 9558535) was incorporated in April 2015 under the chairmanship of Lord Moynihan and is an owned subsidiary of the Concussion Foundation (Charity No. 1164229). The current research project focusses on the long-term effects of concussion by screening retired athletes (who are over the age of 50 and have a history of concussion) and comparing them with an age/gender matched group of controls. These volunteers are primarily recruited from horse racing, equestrian sport and football.

Donors

The project started screening volunteer in April 2016 and, in addition to foundation funding from the Injured Jockeys Fund and Godolphin Racing, ICHIRF is supported by the Racing Foundation, the Professional Footballers Association (PFA), the Irish Injured Jockeys, the British Association of Sport and Exercise Medicine (BASEM), the National Football League (NFL – USA), the Concussion Foundation, Marker AG and private donors. It has been suggested that funding from sport related organisations corrupts the researchers and discredits the research. There is no basis for this in fact and since these are the organisations most interested in the research, it is hardly surprising that they would channel funding and grants into areas of particular concern (injury surveillance, concussion etc.).

Collaboration

The project involves collaboration with other universities and international centres undertaking similar research and contracts, or Memoranda of Understanding, are in place with - University College London and the Institute of Sport, Exercise and Health (ISEH +HCA Healthcare), Queens Square Brain Bank, the Florey Institute of Neuroscience and Mental Health in Melbourne, University of Buffalo New York, University of Maryland Brain Bank, University of Exeter, University of Brighton, University of Birmingham and the Beacon Hospital Dublin. In addition, ICHIRF is part of an Erasmus+ funded education project run by the Galway Mayo Institute of Technology and involving Oxford Brookes University, La Trobe University Australia, the University of Southern Denmark, and the Letterkenny Institute of Technology.

The project

The overall project is referred to as the ICHIRF-BRAIN Study (the ICHIRF **B**rain health in **R**etired athletes' study of **A**geing and **I**mpact-related **N**eurodegenerative disease).

The initial call for volunteers in 2015 resulted in 1,000 unique ID numbers being issued online. These individuals (concussed volunteers and controls) were invited to complete a detailed questionnaire (162 data points), devised in collaboration with the Florey Institute in Melbourne. A total of 787 questionnaires were completed in full (50.8% males, 49.2% females and 25% controls) and the 5-year follow up review is now in progress (after a slight delay caused by the Covid-19 pandemic). Participants include those from a variety of impact sports - rugby (union and league), motor sports, martial arts, cricket, cycling and skiing - as well as the central cohort (jockeys, equestrian sports and football). A good

example of this is Pat Lambie, the former Springbok fly half, who was interviewed when he was being screened at ICHIRF by Owen Slot (Chief Rugby Correspondence for The Times).

<https://www.thetimes.co.uk/article/pat-lambie-after-five-concussions-i-was-relieved-when-a-broken-knee-ended-my-career-c6m8j8fpr>

The screening

Of the initial cohort that returned a completed questionnaire, 175 have been invited for detailed screening in London involving –

Complex neuro imaging

Neurological evaluation by a Consultant Neurologist

Neuro-psychological evaluation by a Clinical Psychologist

Computerised neurocognitive evaluation (Cogspout)

Blood evaluation and storage

Balance testing

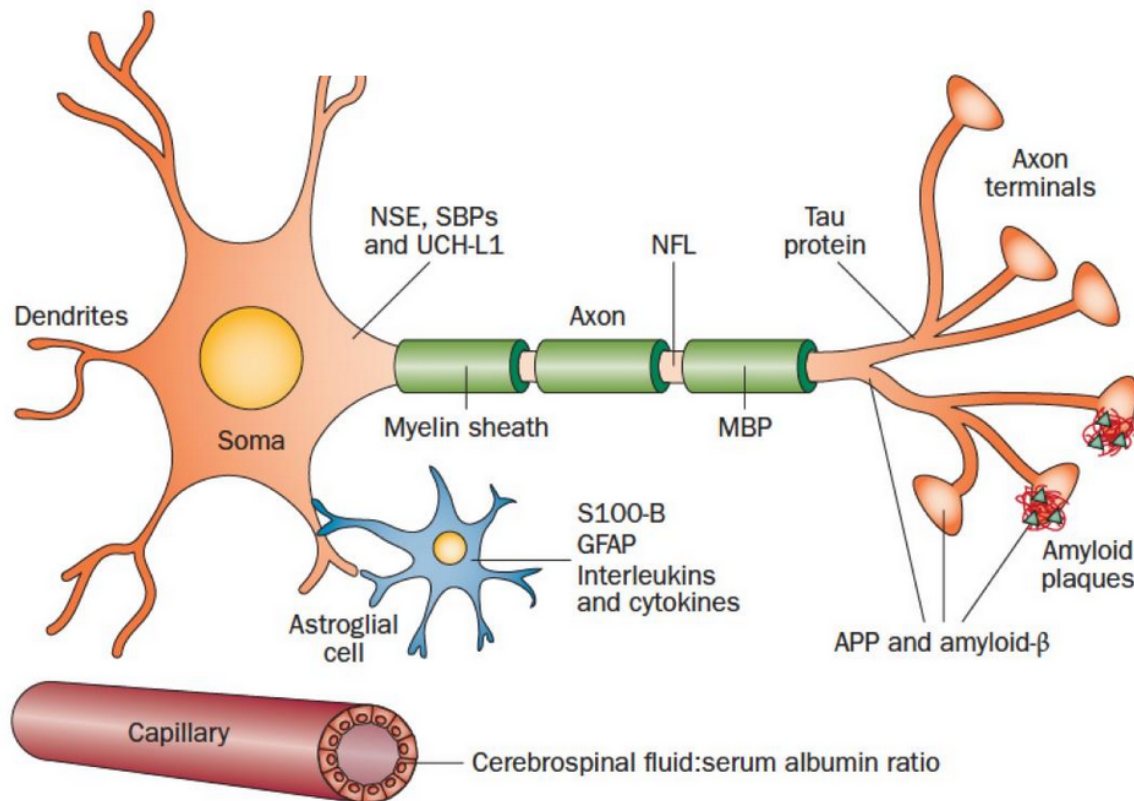
Saccades testing

Saliva testing for micro- RNA (in collaboration with Birmingham University)

Biomarker testing – see below.

Publications

The biomarker study is a collaboration between ICHIRF and two professors from UCL and the University of Gothenburg, Prof Henrik Zetterberg and Prof Kaj Blennow (who are already looking at blood biomarkers in acute concussion).



This study looks at the primary blood biomarkers associated with brain damage – S100-B, GFAP, UCH-L1, NFL, Tau, Amyloid beta-42 and Amyloid beta-40.

The neuro-imaging data is currently being evaluated as part of a PhD study at UCL and papers on the methodology, neuro-psychology, blood biomarkers and salivary micro-RNA are in draft. Additional data relating to saccades, balance testing, blood pathology profiling and CogSport computerised neurocognitive testing has yet to be analysed.

Discussion

International research is currently focused on two different aspects of concussion – the immediate diagnosis of concussion (and the return to sport following this) and the long-term effects that may only become apparent 20 or more years later.

The object of the ICHIRF project is to establish if participation in impact sports have an increased the risk of altered brain function in later life; or if concussion in sport can result in the early onset of confusion, depression, and memory loss. The only way to establish this is to compare a group of athletes who have suffered at least one concussion with a similar group who have never had concussion (the control group). The recruitment of volunteers who have never had concussion is therefore an essential part of the ICHIRF project.

There are two topics of particular interest to the ICHIRF team –

- a) The unexplained increase in concussion rates seen in female riders (approximately 3.6 times greater than the rates seen in male riders)
- b) The genetic fingerprint that determines which athletes are resistant to changes in brain function following impact sports.

ICHIRF is uniquely placed to research both these areas because –

- a) unlike the other sports taking part in this research project, horse racing involves large numbers of female competitors and it is the only sport where men and women compete side by side on equal terms.
- b) horse racing has the highest rates of concussion recorded in any sport and yet retired jockeys do not appear to be more at risk of deteriorating brain function in later life.

Brain Donation

Because some neurodegenerative diseases can only be diagnosed at post-mortem, it is not possible to identify individuals who may have these conditions from the normal battery of tests that we have available. This includes detailed physical examination, MRI brain scans, blood tests and sophisticated neuropsychological screening.

It is therefore imperative that, in addition to being screened, we identify individuals who are willing to consider the option of brain donation when they volunteer for the ICHIRF project. Many of our existing volunteers are already organ donors and the extension of this option to include brain donation has not proved to be a major stumbling block for them.

The brain donation process is managed and coordinated by the Queen Square Brain Bank for Neurological Disorders (QSBB); part of University College London and one of the pre-eminent research centres in the world.

<https://www.ucl.ac.uk/ion/research/departments/molecular-neuroscience/neurodegeneration/queen-square-brain-bank>

Youth sport

A number of issues in youth sport have raised concern recently in the media -

1/ Bouncers in youth cricket (the short ball)

The short ball (bouncer) is designed to intimidate the batsman and serves no other purpose. Since youth cricket allows individuals aged 14-17 to compete against adults over 18, the speed of delivery is determined by the adults, not by the youngest competitors. Helmets have no impact on the incidence of concussion and cricket balls flying around the heads of young teenagers should have no place in the game. The argument has been put forward that to be an elite cricketer, you need to acquire the skills before the age of 18. This is patently misguided.

The military do not start recruiting until 17-18 and these individuals acquire great skills after 18.

The vast majority of wheelchair sportsmen, and sports women, do not start their sport until after the age of 18.

Olympic medal winners include a host of individuals who did not start their sport until after they turned 18.

You can learn to duck after you are 18 and, as below, the New Zealanders have already addressed this problem sensibly.

[Call for cricket to ban bouncers at under-18 levels to prevent long-term brain damage \(telegraph.co.uk\)](#)

2/ Weight categories in youth rugby

Because there is huge disparity in the size of teenagers going through the growth spurt, it is difficult to understand why all Rugby Unions have not followed the example of the New Zealanders and introduced maximum weight allowances for each age group (see below)

[Auckland Rugby Union - Junior Age/Grade Weight Chart](#)

	School Year / Year Born	Grade Name	Grade Info	Tackle / Non-Contact	Team Size	Field Size
Rippa Rugby	Yr 1 / 2015	U6	For Boys & Girls	Rippa	7 a-side	40m Field
	Yr 2 / 2014	U7	For Boys & Girls		7 a-side	
Learning to Play	Yr 3 / 2013	U8		Tackle	10 a-side	40m Field
		U8 Restricted	Under 31kg		10 a-side	
	Yr 4 / 2012	U9		Tackle	10 a-side	Half Field
		U9 Girls Only			10 a-side	
		U9 Restricted	Under 35kg	10 a-side		
		U9 Rippa Girls	Girls Only	Non-Contact	7 a-side	
	U9 Rippa Boys	Boys Only	7 a-side			
	Yr 5 / 2011	U10		Tackle	10 a-side	
		U10 Restricted	Under 40kg		10 a-side	
		U11 Rip Rugby Girls	Girls Only	Non-Contact	7 a-side	
U11 Rip Rugby Boys		Boys Only	7 a-side			
Transition to Full Field Rugby	Yr 6 / 2010	U11		Tackle	10 a-side	3/4 Field
		U11 Restricted	Under 46kg		10 a-side	
		U11 Rip Rugby Girls	Girls Only	Non-Contact	7 a-side	
	U11 Rip Rugby Boys	Boys Only	7 a-side			
	2008<	U13 Girls Only		Tackle	10 a-side	Half Field
U13 Rip Rugby Girls		Girls Only	Non-Contact	7 a-side		
Playing Rugby	Yr 7 / 2009	U12 Capped	Under 74kg	Tackle	15 a-side	Full Field
		U12 Restricted	Under 52kg		15 a-side	
	Yr 8 / 2008	U13 Capped	Under 80kg	Tackle	15 a-side	Full Field
		U13 Restricted	Under 59kg		15 a-side	
	2008<	Yr 7 & 8 Combined			10 a-side	3/4 Field
	Yr 10 / 2006	U15 Girls Only		Tackle	10 a-side	Full Field