

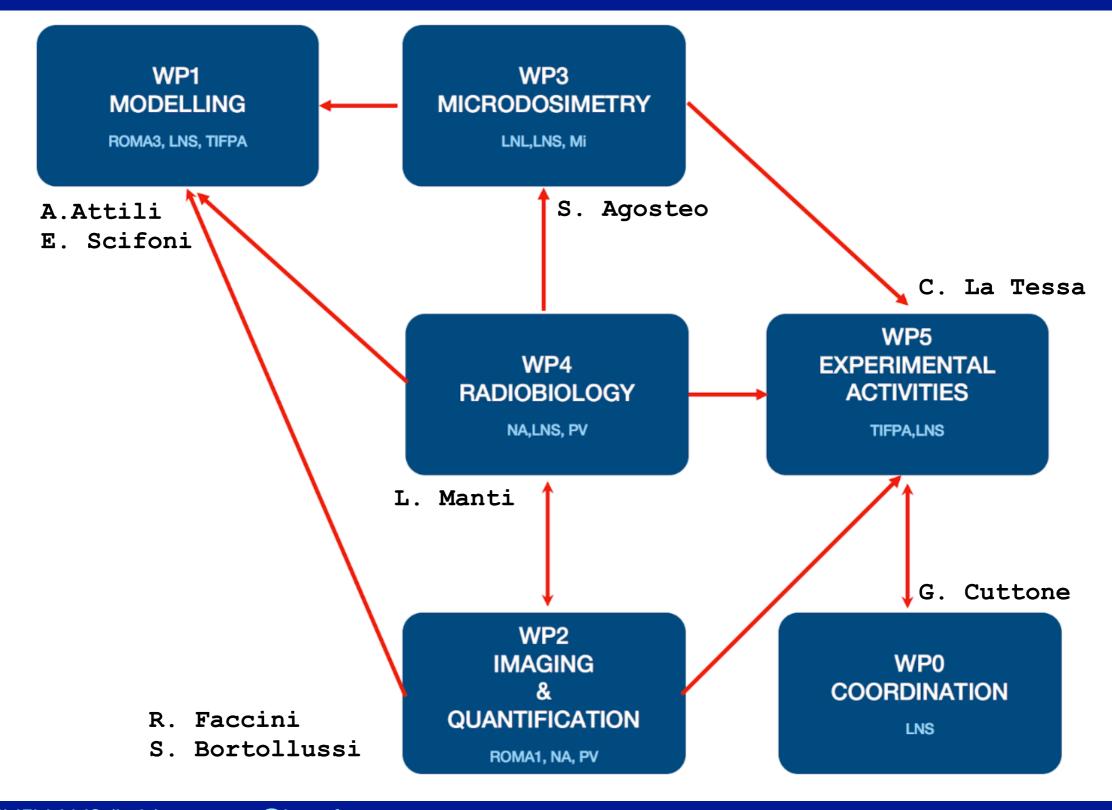
# Second Annual Meeting

Responsabile Nazionale: Giacomo Cuttone

#### Understanding the effect from different point of view







Status of the project

١	WG	Activity/Month	Jan	Feb I	Mar A	lpr M	May Ju	ın Jul	Aug	Sep	Oct	Nov D	ec Jan	Feb	Mar	Apr Ma	y Jun	ul A	ug Sep	Oct 1	lov Dec	Jan F	eb Ma	Apr	May Ju	n Jul J	Aug Seg	Oct Nov De
	0	M0.1: WPs management agreement (Report)			1	$\bot$	1						1			1		П										
	0	M0.2: Project web-site D0.1: Status report		$\vdash$	+	+	+	+									+	Н				$\vdash$						
	0	M0.3: Collaboration meeting			I			$\perp$	İ			士																
	0	D0.2: Status report M0.4: Collaboration meeting		$\vdash \vdash$	+	+	+	+	╀	┞	H	+	+	$\vdash$	$\vdash$	+	+	+	+	Н	+							
	0	D0.3: Status report			$\pm$	$\pm$	$\pm$	士				$\pm$	İ			$\pm$	士		士		$\pm$							
	0	M0.5: Collaboration meeting				4												П										
	1	D1.1: Implementation of MC simulations (Gean4) for p+11B and p+19F nuclear reaction spectra generated in the experimental setup																										
	1	M1.1: Integration of the simulated spectra evaluated in M1.1 in the MKM		$\square$	$\dashv$	$\bot$		$\perp$	$\vdash$	L	$\square$	$\dashv$						Н										
	1	D1.2: Implementation of Geant4-DNA and TRAX-CHEM simulations starting from the spectra obtained in (1.a)				$\perp$		$\perp$								$\perp$	Ш											
	1	M1.2: Inclusion of the bystander effect in the simulations developed in D1.1 and M1.1		${oxed{H}}$				+	╀	╀	$\vdash \vdash$	+	+	$\vdash$	${\mathbb H}$					Н								
	1	M1.3: Comparison between simulation data D1.1 and experimental data taken by WP2. Inclusion of the experimental data (cell survival) in the radiobiological simulations		Ц				$\perp$	L	L	Ш	$\perp$	L	Ш	Ш					Ц		Ш		Ш				
	1	M1.4: Comparison between simulation data D1.1 and experimental data taken by WP2. Inclusion of the experimental data (cell survival) taken by WP4																				Н						
	1	M1.5: Comparison between simulation data D1.1 and experimental data taken by WP2. Inclusion of the experimental data (ROS production) taken by WP4		П	T	Т	T	Т	Γ	Γ	П	T	Τ	П	П	Т	Т	П	Τ	П	Т	П	Т	П				
		M1.6: Comparison between simulation data (D1.1, M1.3, D1.2 and M1.5) and		H				$\top$	$\vdash$	$\vdash$	$\Box$	$\dagger$	Ť	Н	H					Н		Н		$\Box$			$\top$	
	1	experimental data taken by WP2. Inclusion of the experimental data (cell survival, DSB,CA,foci) taken by WP4																				Н						
	1	M1.7: Comparison between simulation data M1.3 and experimental data taken by WP2. Inclusion of the experimental data (cell survival, DSB,CA,foci) taken by WP4	Í																									
	2	M2.1.1: Measurement of concentrations of borated and fluorinated compounds in in-																										
	2	vitro tests, via neutron autoradiography and LC-HR/MS M2.1.2: Ex-vivo test on mice models				+																						
	2	M2.2.3: Implementation of SDR																										
	2	D2.1: Establishment of a procedure for the measurement of the concentration of borated and fluorinated compound in in-vitro tests (18Months)											П				Н	П										
	2	M2.2.2: Read out optimization																										
	2	M2.2.3: Design of optimized antenna M2.3.1: Data analysis																				$\vdash$						
	2	M2.3.2: Multivariate analysis																										
	2	D2.2: Optimization of sensitivity of 19-F MRI by means of hardware and software improvements											П									Н						
Ī	3	M3.1: Preliminary measurements with silicon telescopes and TEPCs with available B				Т												Г										
	3	converters  M3.2: Design of TE plastics containing B-11 and F for TEPC walls and SiC converts		H									+				Н	Н										
	3	D3.1: Microdosimetric spectra from the measurement at LNS with the already available detectors (for WP1 and WP4)		П	T	Т	T																					
	3	M3.3: Continuation of preliminary measurements with silicon telescopes and TEPCs																										
	3	M3.4: Set-up of SiCs and of the new telescope configurations M3.5: Measurements with Si telescopes, SiCs, mini TEPCs with and without B-11																Н							_			
	3	M3.6: Measurements with avalanche confinement TEPCs with and without B-11														$\pm$		I										
	3	D3.2: Microdosimetric spectra with the avalanche confinement detectors simulating different site sizes (for WP1)																										
	3	D3.3: Microdosimetric spectra and scatter-plots with F loaded converters																Г										
	3	M3.7 Measurements with Si telescopes, SiCs with and without F M3.8 Measurements with avalanche confinement TEPCs with and without F				+							+				+	Н										
r	4	D4.1: Corroboration of proton biological enhancement by p-B in previously tested cell											+				П	П										
	4	systems (MCF-10 and DU145 cells) M4.1: Task 4.1 Radiobiological characterization of PANC-1 and BJ cells		$\vdash$	+	+	+										+	Н				H						
	4	D4.2: Preliminary results on enhancement of proton beam effectiveness by p-B and p-																										
	4	F on PANC-1 and BJ cells. Testing carrier concentrations from WP2 M4.2: Task 4.2 Irradiations along high-energy proton SOBPs. Studies of ROS, repair																								+		
-	-	pathways and Clustered Lesions (CL) signatures  D4.3: Results on high-LET radiation induced CL as effector of proton biological																				$\mathbb{H}$			+			
	4	enhancement by p-B and p-F reactions. Cell survival studies with BNCT																										
	4	M4.3: Task 4.3 & 4.4 Preliminary irradiations with low-energy monochromatic proton beams and medium-transfer experiment to assess bystander effects																										
	4	M4.4: Task 4.1 & 4.2 Corroboration of data from experiments along SOBP and monoenergetic proton beams. Relationship with modeling results (WP.1)																										
	4	M4.5: Task 4.3 & Task 4.4 Corroboration of data on bystander effect and CL-elicited responses (ROS, repair pathways, foci, micronuclei, chromosome aberrations,																										
	4	responses (HOS, repair pathways, toci, micronuciei, chromosome aberrations, senescence). Relationship with micro/nano dosimetry results (WP3)		Ц	4	4	1		L	L	Ш	4		Ш	Ц	1		Ц		Ц			1	Ш				
	4	D4.4 Confirmation of nuclear reaction-driven enhancement of proton biological effectiveness and identification of associated specific CL biomarkers. Elucidation af																										
+		the underlying biophysical processes and role of bystander effect  M5.1 Definition criteria and guidelines to be followed during the experimental																H										
	5	activities (collaboration with WP1)											1												1	11		
-	5	M5.2 Planification of the experimental activity of the following 6 months D5.1 Report on experimental criteria to be followed									H		+				+											
	5	D5.2: Summary report of all experimental activities carried out by WP2,WP3 and WP\$											İ				$\parallel$											
-	5	within the second year of activities M5.3: Planification of the experimental activity of the following 6 months			+	+																						
	5	D5.3: Summary report of all experimental activities carried out by WP2,WP3 and WP\$ within the second year of activities																										
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## Covid-19 impact



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	Deliverables 2020	Deadline	Details	Delay
D1.2	Implementation of Geant4- DNA and TRAX-CHEM simulations starting from the spectra previously obtained (E. Scifoni, A. Attili)	30-06	Rimodulazione in corso	/
D2.2	Establishment of a procedure for the measurements of the concentration of borated and fluorinated compound in-vitro tests (R Faccini, C Voena, S Bortolussi)	30-04		No
D3.2	Microdosimetric spectra with the avalanche confinement detectors simulating different site sizes (for WP1) (S Agosteo)		Lo shift è dettato dal fatto che ci sono stati dei ritardi nella realizzazione dei preamplificatori della TEPC-borata e la sua consequenziale caratterizzazione. Una volta che la sua realizzazione verr\( \tilde{A} \) ultimata verr\( \tilde{A} \) fatta una campagna di misura a Trento per investigare le configurazioni con/senza boro con tutti i rivelatori adottati per i test.	6 mesi

## Covid-19 impact



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	Deliverables 2020	Deadline	Details	Delay
D4.2	Results on high-LET radiation induced CL as an effector of proton biological enhancement by p-B and p-F reactions. Cell survival studies with BNCT (L Manti)	31-12	Ci sono dei ritardi nel completamento delle milestone M4.2 ed M4.3. In particolare non sono ancora stati effettuati i test a bassa energia di protoni incidenti (M4.3). Finora è stato fatto soltanto un test preliminare a Caserta ma è necessario effettuare almeno altri due turni di misura in cui poter completare appieno la milestone. Per quanto concerne, invece, i test ad alta energia, questi sono stati effettuati con entrambe le molecole (BSH e BPA). Manca soltanto l'ultimo turno sperimentale a CNAO (M4.2). Mario Ciocca è già stato contattato dando la disponibilità per il beam time anche nel 2020. Non è chiaro però quando sarà possibile spostarsi tra regioni. Infine, occorre ricordare che al momento il WP4 ha dato priorità al completamento degli esperimenti con il boro. Una volta che questi verranno terminati si procederà alla caratterizzazione con il fluoro. Questi testa avverranno tutti nella stessa facility, ovvero a Trento, e verranno effettuati a partire dalla seconda metà del 2021 fino a tutto il 2022.	6 mesi
D0.2 e D5.3	Summary report of all experimental activities (C La Tessa)	31-12		No

#### Open discussions

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WP1 rimodulation

Shared repository

Quantification

Radiobiology

Micorodosimetry

Resp. G. Petringa

Next Experiments

suggestion: same experimental session @TIFPA/CNAO for radiobiological and microdosimetric measurements

Editorial board

G. Cuttone (WG0); G. Petringa (WP1); C. Voena (WP2); V. Conte (WP3); G. Russo (WP4);

#### Discussions with referees



#### **IMPORTANT DATES!**





September 2020: audizione in commissione

## Next meetings



- Every six months: upgrade (via Skype) ==> December 2020
- Annually: collaboration meeting ==> Napoli/Roma 2021

meeting minutes always online: https://docs.google.com/document/d/1QRNG7QqcKzciO8rR1TnGg8n6nnCZsoxCO9vXuEPfXpA/edit