

Circulating concentrations of free triiodothyronine are associated with central adiposity and cardiometabolic risk factors in young euthyroid adults

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Supplemental Material

Table S1. Association between serum levels of thyroid hormones and Parametric Thyroid Feedback Quantile based Index (PTFQI) with body composition by sex.

	fT3 (pg/mL)						fT4 (ng/dL)						TSH (μUI/mL)						PTFQI					
	Men			Women			Men			Women			Men			Women			Men			Women		
	β	R ²	P	β	R ²	P	β	R ²	P	β	R ²	P	β	R ²	P	β	R ²	P	β	R ²	P	β	R ²	P
BMI	0.059	0.003	0.741	0.201	0.040	0.091	-0.226	0.051	0.198	0.136	0.018	0.256	0.191	0.036	0.279	-0.070	0.005	0.559	0.033	0.001	0.852	-0.005	<0.001	0.968
Lean mass	0.101	0.010	0.581	0.141	0.020	0.251	-0.290	0.084	0.107	0.080	0.006	0.519	0.096	0.009	0.600	0.006	<0.001	0.961	-0.030	0.001	0.869	-0.001	<0.001	0.993
Fat mass	0.070	0.005	0.705	0.126	0.016	0.307	-0.211	0.045	0.246	0.211	0.044	0.084	0.095	0.009	0.603	-0.074	0.006	0.546	-0.019	<0.001	0.918	0.085	0.007	0.490
Fat mass (%)	0.058	0.003	0.753	0.061	0.004	0.619	-0.170	0.029	0.352	0.213	0.046	0.081	0.052	0.003	0.779	-0.092	0.008	0.457	-0.050	0.002	0.786	0.114	0.013	0.355
VAT	0.224	0.050	0.217	0.166	0.028	0.175	-0.157	0.025	0.391	0.271	0.073	0.025	0.107	0.011	0.560	-0.062	0.004	0.615	0.037	0.001	0.841	0.146	0.021	0.236
WC	0.041	0.046	0.818	0.214	0.047	0.078	-0.201	0.040	0.254	0.078	0.006	0.526	0.043	0.002	0.810	-0.089	0.008	0.465	-0.087	0.007	0.626	-0.048	0.002	0.698
NAT mass	0.152	0.023	0.449	0.137	0.019	0.300	0.062	0.004	0.757	0.055	0.003	0.678	-0.093	0.009	0.644	-0.043	0.002	0.747	0.020	<0.001	0.921	0.010	<0.001	0.937

Standardized β coefficient, R² and P value from linear regression analyses. All variables were transformed with square root transformation (SQRT), except PTFQI. Abbreviations: fT3, free Triiodothyronine; fT4, free Thyroxine; TSH, Thyroid-Stimulating Hormone; BMI, Body mass index; VAT, visceral adipose tissue; WC, waist circumference; NAT, Neck adipose tissue.

Table S2. Association between serum levels of thyroid hormones and Parametric Thyroid Feedback Quantile based Index (PTFQI) with cardiometabolic risk factors separating for sex.

	fT3 (pg/mL)						fT4 (ng/dL)						TSH (μ UI/mL)						PTFQI					
	Men			Women			Men			Women			Men			Women			Men			Women		
	β	R ²	P	β	R ²	P	β	R ²	P	β	R ²	P	β	R ²	P	β	R ²	P	β	R ²	P	β	R ²	P
Glucose	0.014	<0.001	0.936	0.285	0.082	0.017	-0.132	0.017	0.458	0.146	0.021	0.229	0.059	0.004	0.739	0.026	0.001	0.832	-0.097	0.009	0.585	0.129	0.017	0.288
Insulin	0.289	0.084	0.097	0.234	0.055	0.052	0.190	0.036	0.281	0.086	0.007	0.481	0.207	0.043	0.240	-0.076	0.006	0.534	0.263	0.069	0.133	-0.014	<0.001	0.905
Homa	0.265	0.070	0.129	0.252	0.063	0.036	0.157	0.025	0.374	0.089	0.008	0.464	0.198	0.039	0.261	-0.071	0.005	0.562	0.235	0.055	0.181	-0.008	<0.001	0.950
TC	0.034	0.001	0.848	-0.195	0.038	0.105	-0.201	0.040	0.254	0.093	0.009	0.446	0.341	0.116	0.049	-0.139	0.019	0.252	0.141	0.020	0.426	0.012	<0.001	0.919
LDL-C	-0.017	<0.001	0.922	-0.140	0.019	0.249	-0.191	0.036	0.280	0.035	0.001	0.772	0.290	0.084	0.097	-0.093	0.009	0.443	0.094	0.009	0.596	-0.001	<0.001	0.993
HDL-C	-0.093	0.009	0.601	-0.121	0.015	0.317	-0.174	0.030	0.324	0.126	0.016	0.299	0.004	<0.001	0.982	-0.200	0.040	0.096	-0.096	0.009	0.588	-0.035	0.001	0.771
Triglycerides	0.205	0.042	0.244	-0.066	0.004	0.589	0.009	<0.001	0.958	-0.079	0.006	0.517	0.328	0.108	0.058	0.040	0.002	0.743	0.264	0.070	0.131	-0.057	0.003	0.642
LDL-C/HDL-C ratio	0.045	0.002	0.800	-0.027	0.001	0.823	-0.055	0.003	0.757	-0.062	0.004	0.611	0.216	0.047	0.219	0.054	0.003	0.658	0.129	0.017	0.469	0.009	<0.001	0.939
TG/HDL-C ratio	0.208	0.043	0.239	0.001	<0.001	0.993	0.067	0.005	0.706	-0.119	0.014	0.327	0.261	0.068	0.136	0.100	0.010	0.408	0.252	0.064	0.150	-0.051	0.003	0.673
TC/HDL-C ratio	0.098	0.010	0.508	-0.035	0.001	0.775	-0.023	0.001	0.896	-0.055	0.003	0.652	0.236	0.056	0.179	0.081	0.007	0.503	0.173	0.030	0.329	0.034	0.001	0.779
APOA1	0.025	0.001	0.890	-0.067	0.004	0.583	-0.264	0.070	0.137	0.096	0.009	0.429	-0.021	<0.001	0.907	-0.146	0.021	0.226	-0.130	0.017	0.471	-0.026	0.001	0.833
APOB	0.052	0.003	0.773	-0.067	0.005	0.580	-0.232	0.054	0.194	0.119	0.014	0.327	0.305	0.093	0.084	-0.177	0.032	0.142	0.106	0.011	0.556	-0.007	<0.001	0.955
C Reactive protein (mg/L)	0.000	<0.001	0.999	0.159	0.025	0.187	0.372	0.138	0.030	0.043	0.002	0.723	-0.030	0.001	0.865	-0.114	0.013	0.349	0.148	0.022	0.402	-0.061	0.004	0.618
Homocysteine	0.462	0.213	0.006	-0.117	0.014	0.335*	0.020	<0.001	0.912	-0.079	0.006	0.517	0.130	0.017	0.465	0.202	0.041	0.093	0.166	0.028	0.347	0.104	0.011	0.390
Leptin	0.034	0.001	0.851	0.081	0.007	0.507	-0.365	0.133	0.034	0.013	<0.001	0.913	0.034	0.001	0.850	-0.096	0.009	0.429	-0.205	0.042	0.244	-0.044	0.002	0.718
Adiponectin	0.075	0.006	0.674	-0.113	0.013	0.356	0.109	0.012	0.538	-0.296	0.087	0.014	-0.177	0.031	0.315	-0.030	0.001	0.808	-0.001	<0.001	0.997	-0.243	0.059	0.044
GGT	0.286	0.082	0.102	0.159	0.025	0.192	-0.063	0.004	0.724	0.072	0.005	0.558	-0.220	0.048	0.211	-0.134	0.018	0.273	-0.203	0.041	0.249	-0.042	0.002	0.733
ALP	0.051	0.003	0.774	0.125	0.016	0.303	0.088	0.008	0.620	-0.006	<0.001	0.961	-0.013	<0.001	0.940	-0.126	0.016	0.300	0.053	0.003	0.768	-0.128	0.016	0.290
CMR Score	0.200	0.040	0.257	0.196	0.038	0.099	-0.016	<0.001	0.929	0.058	0.003	0.629	0.133	0.018	0.454	0.057	0.003	0.632	0.107	0.012	0.545	0.051	0.003	0.671
FLI	0.141	0.020	0.426	0.234	0.055	0.056	-0.178	0.032	0.313	0.084	0.007	0.501	0.093	0.009	0.601	-0.075	0.006	0.544	-0.012	<0.001	0.948	-0.038	0.001	0.758
Systolic BP	0.263	0.069	0.139	0.226	0.051	0.057	-0.08	<0.001	0.922	0.191	0.036	0.109	0.085	0.007	0.637	0.084	0.007	0.484	0.135	0.018	0.453	0.168	0.028	0.157
Diastolic BP	0.374	0.140	0.032	0.150	0.022	0.210	0.152	0.023	0.397	0.254	0.064	0.031	0.017	<0.001	0.925	0.024	0.001	0.842	0.214	0.046	0.232	0.198	0.039	0.096
Mean BP	0.370	0.137	0.034	0.197	0.039	0.097	0.098	0.010	0.588	0.248	0.061	0.036	0.247	0.002	0.794	0.054	0.003	0.655	0.206	0.043	0.249	0.202	0.041	0.088
VO ₂ max	0.075	0.006	0.678	-0.140	0.020	0.252	-0.040	0.002	0.824	-0.139	0.019	0.256	-0.074	0.005	0.683	-0.045	0.002	0.711	-0.071	0.005	0.695	-0.086	0.007	0.483

Standardized β coefficient, R² and P value from simple linear regression analyses. All variables were transformed with square root transformation (SQRT), except PTFQI. Abbreviations: FT3, free Triiodothyronine; FT4, free Thyroxine; TSH, Thyroid-Stimulating Hormone; HOMA-IR, Homeostatic model assessment index of insulin resistance; TC, Total cholesterol; HDL-C, High density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol; TG, triglycerides; APOA1, Apolipoprotein A-1; APOB, Apolipoprotein B; GGT, gamma-glutamyltransferase; ALP, Alkaline phosphatase; CRP: C reactive protein; CMR Score, Cardiometabolic risk score; FLI, Fatty liver index; BP, blood pressure; VO₂max, maximum oxygen consumption.

Table S3. Association between serum levels of thyroid hormones and Parametric Thyroid Feedback Quantile based Index (PTFQI) with cardiometabolic risk factors adjusting for sex.

	TSH			FT4 (ng/dL)			FT3			PTFQI		
	β	R ²	P	B	R ²	P	β	R ²	P	β	R ²	P
Glucose	0.041	0.049	0.684	0.040	0.049	0.686	0.187	0.081	0.058	0.046	0.049	0.651
Homa- IR	0.059	0.020	0.567	0.116	0.030	0.247	0.252	0.078	0.011	0.091	0.025	0.378
Insulin	0.058	0.015	0.573	0.127	0.027	0.205	0.252	0.072	0.012	0.097	0.020	0.351
Total Cholesterol	0.070	0.005	0.496	-0.016	0.001	0.874	-0.118	0.014	0.246	0.061	0.004	0.559
LDL-C	0.075	0.0015	0.467	-0.049	0.012	0.628	-0.098	0.019	0.333	0.035	0.011	0.739
HDL-C	-0.119	0.209	0.197	0.036	0.197	0.688	-0.105	0.206	0.252	-0.049	0.198	0.601
Triglycerides	0.158	0.047	0.119	-0.049	0.026	0.625	0.019	0.024	0.849	0.051	0.026	0.620
APOA1	-0.098	0.171	0.297	0.013	0.169	0.889	-0.042	0.170	0.654	-0.048	0.171	0.612
APOB	0.046	0.013	0.654	-0.007	0.011	0.943	-0.023	0.012	0.823	0.036	0.012	0.725
C Reactive protein	-0.087	0.009	0.396	0.132	0.019	0.190	0.123	0.016	0.226	-0.007	0.002	0.948
Homocysteine	0.164	0.166	0.085	-0.039	0.142	0.676	0.077	0.146	0.412	0.122	0.154	0.205
Leptin	-0.038	0.103	0.700	-0.124	0.117	0.196	0.061	0.105	0.526	-0.102	0.111	0.303
Adiponectin	-0.080	0.136	0.410	-0.162	0.155	0.085	-0.057	0.133	0.549	-0.167	0.155	0.087
GGT	-0.159	0.248	0.080	-0.007	0.224	0.934	0.172	0.252	0.055	-0.108	0.235	0.243
ALP	-0.083	0.068	0.407	0.024	0.062	0.808	0.102	0.071	0.301	-0.073	0.066	0.471
CMR Score	0.091	0.008	0.371	0.033	0.001	0.745	0.200	0.038	0.046	0.073	0.005	0.480
Fatty liver index	0.007	0.217	0.942	-0.025	0.218	0.784	0.171	0.245	0.059	-0.024	0.218	0.795
Systolic BP	0.076	0.244	0.397	0.108	0.250	0.218	0.211	0.281	0.016	0.145	0.258	0.110
Diastolic BP	0.021	0.024	0.833	0.217	0.069	0.028	0.223	0.071	0.024	0.210	0.064	0.040
Mean BP	0.050	0.113	0.608	0.188	0.145	0.046	0.240	0.166	0.011	0.201	0.147	0.039
VO2max	-0.056	0.095	0.573	-0.101	0.102	0.300	-0.071	0.096	0.471	-0.081	0.098	0.423

Linear regression analyses were performed. Standardized β coefficient, R² and P value are provided. All variables were transformed with square root transformation (SQRT), except PTFQI. Abbreviations: TSH, Thyroid-Stimulating Hormone; FT4, free Thyroxine; FT3, free Triiodothyronine; HOMA-IR, Homeostatic model assessment index of insulin resistance; HDL-C, High density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol; TG, triglycerides; APOA1, Apolipoprotein A-1; APOB, Apolipoprotein B; GGT, gamma-glutamyltransferase; ALP, Alkaline phosphatase; CRP: C reactive protein; CMR Score, Cardiometabolic risk score; FLI, Fatty liver index; BP, blood pressure; VO₂max, maximum oxygen consumption.

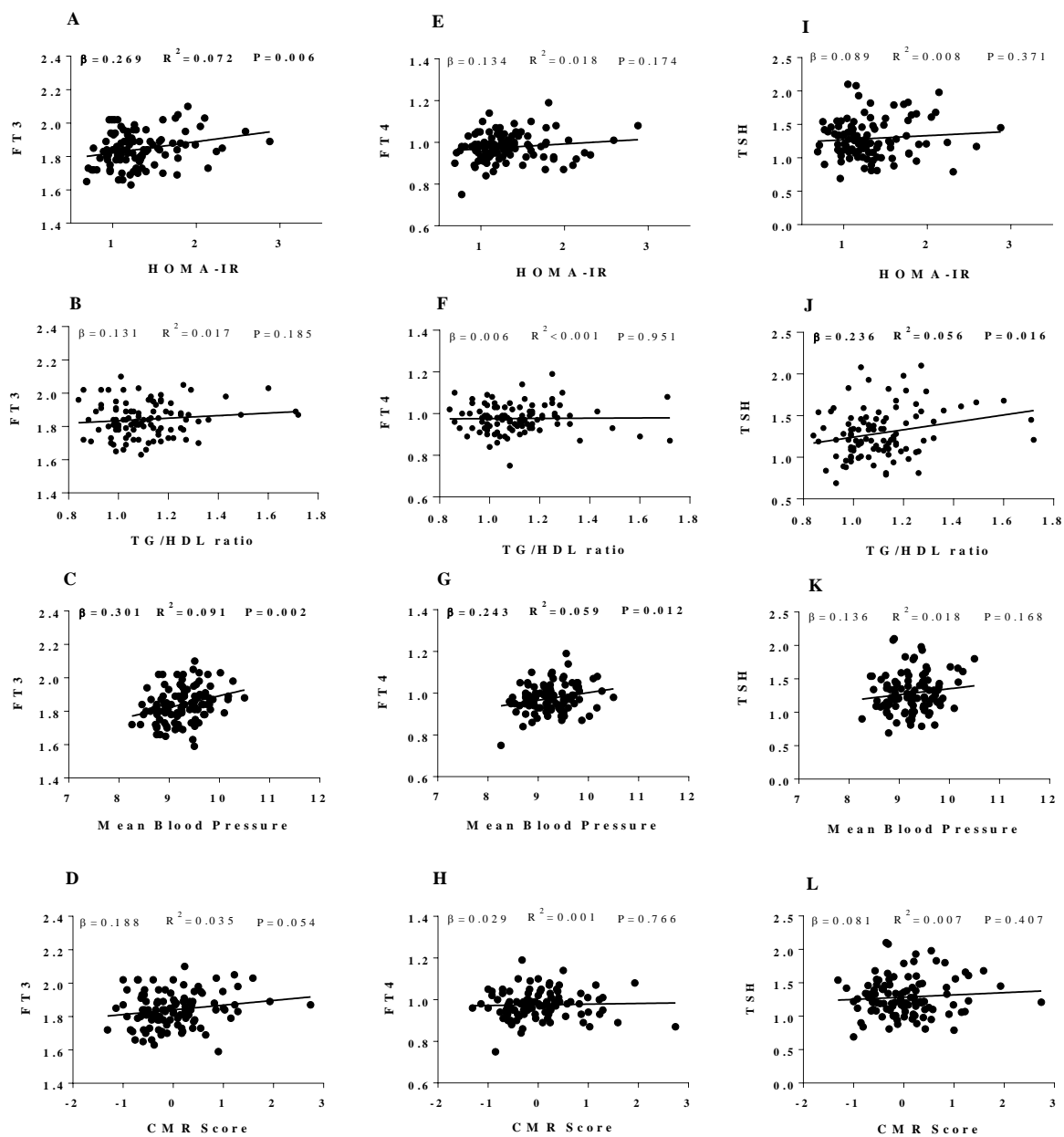


Figure S1. Association between serum levels of TSH and thyroid hormones with homeostatic model assessment of insulin resistance (HOMA-IR), Triglycerides (TG) / High-density lipoproteins cholesterol (HDL-C) ratio, mean blood pressure and cardiometabolic risk score (CMR Score). Standardized β coefficient, R^2 and P value from linear regression analyses. All variables were transformed with square root transformation (SQRT). Abbreviations: FT3, free Triiodothyronine; FT4, free thyroxine; TSH, Thyroid-Stimulating Hormone.

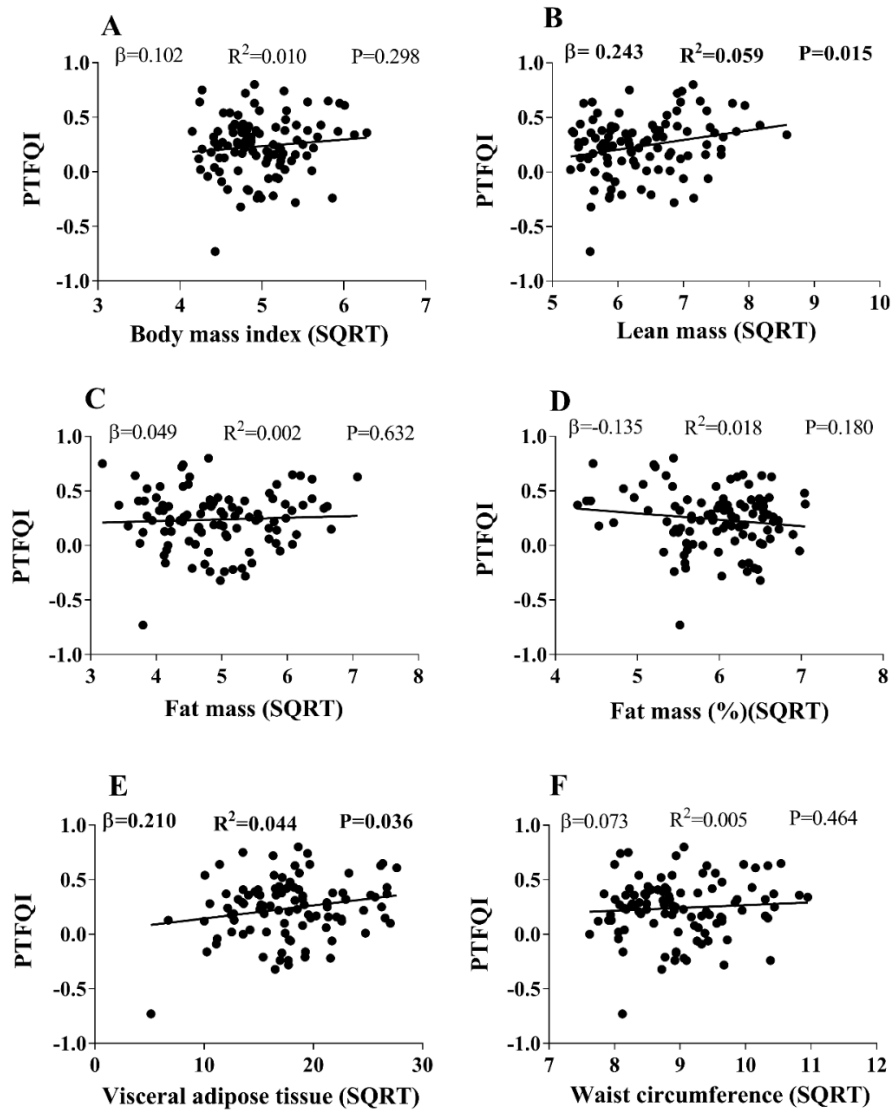


Figure S2. Association between Parametric Thyroid Feedback Quantile based Index (PTFQI) and body composition parameters. Standardized β coefficient, R^2 and P value from linear regression. All variables were transformed with square root transformation (SQRT), except PTFQI.

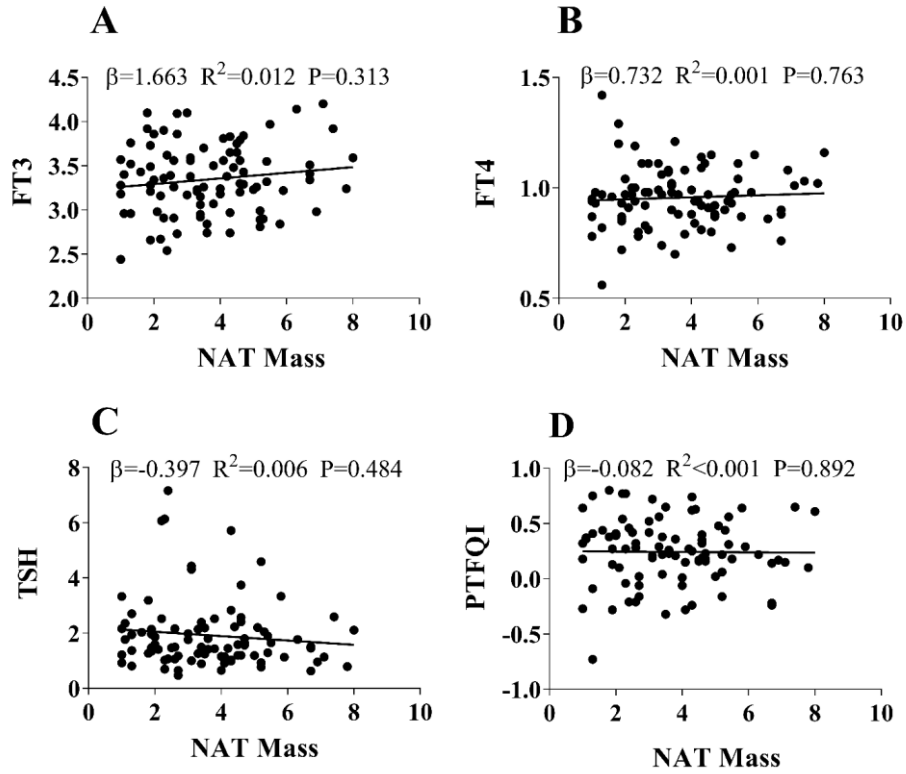


Figure S3. Association between serum levels of thyroid hormones and Parametric Thyroid Feedback Quantile based Index (PTFQI) with NAT Mass. Standardized β coefficient, R^2 and P value from linear regression. All variables were transformed with square root transformation (SQRT), except PTFQI. Abbreviations: TSH, Thyroid-Stimulating Hormone; FT4, free Thyroxine; FT3, free Triiodothyronine.