OXIDATIVE STRESS INDEX
OSI

The **OSI index** (Oxidative Stress Index) was developed to integrate in a single value the information provided by the d-ROMs and PAT tests, in order to simplify the evaluation of the oxidative stress status in plasma samples.

The **OSI index** is based on **specific standardizations** of the results of the d-ROMs and PAT tests, in order to compare them, despite the different measuring units (U Carr and U Cor) and the different value ranges (250-300 d-ROMs test and 2200-2800 for PAT test). Certain arithmetical transformations were used to determine the final OSI values so that an easy and convenient interpretation of the results is possible. The value range for the OSI index is from 0 to 200.

The OSI index value shows the departure from the normal state of oxidative balance (zero value), that is the perfect equilibrium between the pro-oxidant and anti-oxidant components of the oxidative balance.

Low values of OSI index reflect an oxidation state closer to oxidative balance. OSI index increases proportionally with any level of oxidative imbalance; its increase can be caused by either the increase of pro-oxidant species (highlighted by d-ROMs test results) or the decrease of the antioxidant protection (highlighted by PAT test results). The higher the OSI index, the bigger is the deviation from normality.

The validation of the OSI index was obtained by using a table containing **336 OSI values,** compiled from as many PAT test and d-ROMs test values (Fig.2).

Based on the values obtained and to simplify the interpretation of the results, the OSI scale was developed (Fig.1).

The OSI index **does not substitute** the d-ROMs and PAT test results, but it **complements and enhances** their value.

normality	**< 40**	normality
borderline	**41 - 65**	borderline
high	**66 - 120**	alert
very high	**> 121**	critical situation: evident unbalance

Fig.1 – OSI scale

d-ROMs																
600	220	213	206	200	195	191	188	186	186	186	188	191	195	200	206	213
575	208	200	193	187	181	177	174	172	171	172	174	177	181	187	193	200
550	197	188	181	174	168	163	160	158	157	158	160	163	168	174	181	188
525	186	177	168	161	155	150	146	144	143	144	146	150	155	161	168	177
500	175	165	156	148	142	136	132	129	129	129	132	136	142	148	156	165
475	165	154	145	136	129	123	118	115	114	115	118	123	129	136	145	154
450	155	144	134	124	116	109	104	101	100	101	104	109	116	124	134	144
425	146	135	123	113	104	97	91	87	86	87	91	97	104	113	123	135
400	138	126	114	103	93	84	77	73	71	73	77	84	93	103	114	126
375	132	118	106	94	82	72	64	59	57	59	64	72	82	94	106	118
350	126	112	99	86	73	62	52	45	43	45	52	62	73	86	99	112
325	122	108	93	79	66	53	41	32	29	32	41	53	66	79	93	108
300	119	105	90	75	61	47	33	21	14	21	33	47	61	75	90	105
275	119	104	89	74	59	44	30	15	0	15	30	44	59	74	89	104
250	119	105	90	75	61	47	33	21	14	21	33	47	61	75	90	105
225	122	108	93	79	66	53	41	32	29	32	41	53	66	79	93	108
200	126	112	99	86	73	62	52	45	43	45	52	62	73	86	99	112
175	132	118	106	94	82	72	64	59	57	59	64	72	82	94	106	118
150	138	126	114	103	93	84	77	73	71	73	77	84	93	103	114	126
125	146	135	123	113	104	97	91	87	86	87	91	97	104	113	123	135
100	155	144	134	124	116	109	104	101	100	101	104	109	116	124	134	144
PAT-->	**1000**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	**3000**	**3200**	**3400**	**3600**	**3800**	**4000**

Fig. 2 – OSI values table

Normal OSI values correspond either to normal values for both d-ROMs and PAT or to only one of the tests being slightly offset from the normality range.

Borderline OSI values correspond to bigger deviations of both d-ROMs and PAT values from normal, which typically indicates the onset of various health conditions. They are the result of increase of the oxidant species or a decrease of the antioxidant reserve (signs of a possible inflammation process initiation) or even an anomalous increase of the antioxidant reserve that might reflect a state of cellular destruction and consequent release in circulation of intracellular antioxidant agents. All these situations need to be monitored.

High and very high OSI values correspond to large deviations from the normal values of both tests, typically with high values in both tests or a high d-ROMs plus a simultaneously low PAT; both cases are signs of a high oxidative stress. A high OSI value indicates a severe condition to evaluate in depth and with attention.

The OSI index by itself **does not carry the same diagnostic value** of the synoptic tables of the d-ROMs and PAT tests, but it is certainly an excellent starting point for the global evaluation of oxidative stress of the healthcare professional and enables a much easier understanding of the process by the patient. Furthermore, it allows a fast and reliable monitoring of the evolution of a various health conditions.