

vide us with information about the desired result: metabolism. It only provides us with the information that the thyroid hormones are circulating at a level within the limits set by higher brain levels. As pointed out by Dr. David Derry:

If you remember it was a long time before the medical profession admitted that there were two new diseases to appear in the world that were not there before. Chronic fatigue and fibromyalgia were non-existent before 1980. This is seven years after the 1973 consensus meeting. So where did these two new diseases come from? The symptoms and signs of chronic fatigue and fibromyalgia were described in the literature in the 1930's as one way that low thyroid could be expressed. Treated early it was easily fixed with thyroid in adequate doses. But even then the clinicians had noticed that if a patient has low thyroid (chronic fatigue and fibromyalgia) for too long then it became more difficult to reverse all signs and symptoms regardless of what they were.<sup>[13]</sup>

Clinicians have relied strongly on TSH. Yet there has been an ongoing discussion of what range should be considered normal. Prior to the TSH assay and availability of commercial levothyroxine, patients were treated with desiccated thyroid with the dosage increasing until signs and symptoms were resolved. So two things had changed: (1) newer treatment trends involved using lower doses of pure  $T_4$  and (2) the active hormone,  $T_3$ , was not given directly to patients. As has been known for years,  $T_3$  is less available in the hypocaloric state.<sup>[1]</sup>

Numerous studies of weight loss treatments (whether from very low calorie diets, weight loss medications and diet, or bariatric surgery) often list as side effects the same spectrum of symptoms such as fatigue, depression, constipation, hair loss, feeling cold, and insomnia. We believe the insomnia may be related to the coldness of the body core and/or extremities. Many of these symptoms are likely due to the diet-induced hypothyroidism which is maladaptive in our current environment. Testing TSH,  $FT_4$  or total  $T_4$  will miss the diagnosis, since the changes in metabolism and thyroid function consist of only a slight lowering of TSH. Reported changes in total  $T_4$  and  $FT_4$  are inconsistent.<sup>[1]</sup> If the appropriate labs are run, an increase in  $rT_3$  is found, accompanied by a de-

crease in  $FT_3$ . The syndrome of hypocaloric-induced hypothyroidism can be diagnosed only by evaluating changes in  $rT_3$  and  $FT_3$  as well as careful assessment of thyroid symptoms. Correction of diastolic hypertension, improvement of lipids and clinical symptoms, with return of  $rT_3$  and  $FT_3$  to normal after replacement of  $T_3$  will confirm that the condition was present and treated appropriately. While many clinicians discount  $rT_3$ , our clinical results show its importance for patients whose systems use this pathway to decrease metabolism.

The assessment of thyroid status in clinical practice is generally based on a number which represents only one aspect of the system: a circulating hormone level. The clinician is not measuring the ability of that hormone to function by assessing metabolic rate or other signs and symptoms. A direct measure of metabolism would be a more meaningful approach. Since the symptoms are often vague, they may be dismissed by providers. In our litigious society, numbers give us comfortable boundaries with which to determine when to treat and when to tell a patient, "No, there's nothing wrong with your thyroid. If you are depressed, let's try an antidepressant. If you can't lose weight, try eating less and exercising more." We must also realize that there are false negatives and false positives for all tests, including lab tests. Thyroid function tests have a wide range of normal reference ranges. Reference ranges are determined by testing large numbers of "normal" patients and arbitrarily calling the highest 2.5% elevated and the lowest 2.5% as below normal.<sup>[14]</sup> Values outside these ranges often do not mean disease, and in fact may indicate improved health, such as an HDL level above normal. In certain mountainous areas in Europe with low iodine availability, cretins were born due to low thyroid hormones prenatally.<sup>[15]</sup> If such a population were used to determine the normal values of thyroid tests before the cause of cretinism was understood, the test population would have included the cretins. This would have produced a reference lab range with a low for  $FT_4$  and  $FT_3$  that are considered markedly hypothyroid today.

When considering reference ranges for all of the thyroid labs, we find it particularly interesting that our patients with multiple low thyroid symptoms typically reach the low end of the ranges for  $FT_4$  and  $FT_3$ ; in some patients, these values go below the lower end of the range. To determine what values constitute the reference range, blood samples are obtained from clinically "normal" people. We have