

## Frantisek Lopot, PhD

Synopsis from the article: [Lopot F, Nejedl B, Sulková S. Physiology in daily hemodialysis in terms of the time average concentration/time average deviation concept. \*Hemodialysis International\* 2004; 8:39-44.](#)

This article describes the use of the over 15-year-old “Time Average Concentration (TAC)/Time Average Deviation (TAD)” concept for the assessment of different modalities of hemodialysis treatments. The TAD is defined as the average fluctuation of a substance’s plasma concentrations around its TAC value during a whole week’s cycle. Its value for a given treatment schedule may be used to gauge the “physiological superiority” of that particular schedule.

As it is not obvious to what extent the apparently superior physiology of the daily treatment schedules is responsible for the reported improvement in outcomes, the TAC/TAD approach can help to stratify studies aimed at elucidating this particular issue. Employing the TAC/TAD approach to interpret results of prior clinical studies as well as those of in-vitro, modeled simulations has proven very well the width of this approach’s possible applications.

It is interesting to note, for instance, the still-significant difference in plasma urea TAC and TAD values between patients dialyzed with the slow, long (8-hours per session), everyday nocturnal dialysis regimen (currently the most physiological schedule with a TAC level of  $\approx 6$  and a TAD level of  $\approx 1,5$  mmol/L) and individuals in normal health (having a TAC level of  $\approx 5$  and a TAD level of  $\approx 0.5$  mmol/L). Although developed primarily as an amendment to the urea kinetic modeling method, the TAC/TAD concept can be used to assess or quantify any parameter's fluctuation induced by the intermittent nature of a treatment schedule.

### **Commentary by Todd S. Ing, MD**

Dr. Lopot and colleagues have provided us with a very useful tool to assess the undesirable nature of various less-than-continuous dialysis regimens. These investigators have given us a goal to aim for, namely, the TAC/TAD value for normal kidneys, in our pursuit of the Holy Grail of renal replacement therapy.