



# Thioredoxin Reductase Assay

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## Overview

Thioredoxin reductase (TR) is an oxidoreductase responsible for maintaining thioredoxin in the reduced state, thereby contributing to proper cellular redox homeostasis.

Dr. Hondal and his colleagues discovered *a new direct assay, termed the SC-TR assay, to determine the activity of TR based on the reduction of selenocystine, a diselenide-bridged amino acid*. Rather than being an end-point assay as in older methods, *the SC-TR assay directly monitors the continuous consumption of NADPH at 340 nm by TR as it reduces selenocystine*.



[Full publication and images](#)

## Invention

SC-TR is a continuous, direct and highly specific assay of TR in cell lysates that makes use of the reduction of selenocystine (SC). SC is a small, commercially available diselenide-containing amino acid that can be reduced only by TR. The SC-TR assay can be either *performed by standard spectrophotometry or adapted for use in a 96-well plate format*. The SC-TR assay measures the selenocystine reductase activity of TR in the presence of nonionic detergents such as NP-40, which is a common nonionic detergent used in a wide variety of buffers to lyse mammalian cells. The use of NP-40 or other nonionic detergents inhibits activity in the original insulin end-point assay. Dr. Hondal has demonstrated the *utility* of the assay as well as the *specificity* of the reduction of SC by TR by the use of small interfering RNA (siRNA) knockdown, TR overexpression, and inhibition by acrolein, a highly specific selenol-modifying reagent.

## Advantages

- Highly specific to TR
- Continuous & direct
- Compatible with buffers containing nonionic detergents
- Less complex & less expensive than currently utilized TR endpoint assay
- Adaptable to high-throughput processes

## Applications

- As assay kit for use in research or clinical settings

## IP Status

Patent Application Filed

Learn more about their research:

[Dr. Hondal](#)  
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