



The instructions for how to create and run a living organism are coded in its DNA. To make proteins—the large, complex molecules necessary for structure and function—a cell must first make a copy of its DNA. The cell does that through transcription, which uses the DNA as a template to produce a corresponding strand of messenger RNA (mRNA). That mRNA then undergoes translation. In that process, a ribosome—a large complex of proteins and RNA—latches onto the mRNA, and connects building blocks called amino acids to form a chain that becomes a protein.

Weissman and colleagues at the University of California, San Francisco, developed a technique, called ribosome profiling, in which they sequenced the mRNA chunks that ribosomes were latched onto and being decoded in a yeast cell. That gave them a snapshot of the genes being translated within a cell. The technique has since been applied to many other organisms, including humans, and used to identify new proteins and peptides, investigate the process of translation, measure gene expression in cells and determine rates of protein synthesis. In addition, Weissman and his team have employed ribosome profiling to make important insights into the critical role that protein synthesis plays in cell growth and differentiation.