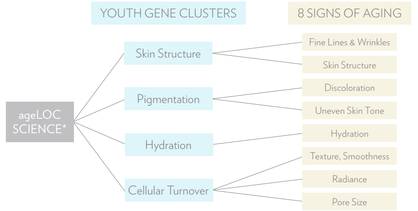
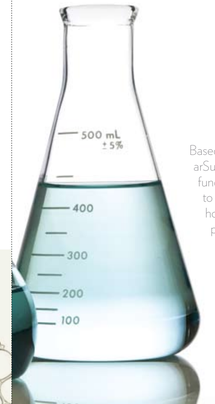
# YOUTH GENE CLUSTERS & THE 8 SIGNS OF AGING




* This is only a selection of meaningful Youth Gene Clusters.

*"There is no doubt that in order to retain a youthful appearance, genes must regain their youthful activity patterns. By analyzing human tissue at the genetic level, we've learned the crucial role of gene expression in retaining one's youth."*

Dr. Joseph Chang
Chief Scientific Officer
EVP Product Development




Based on this discovery, Nu Skin is able to identify critical arSuperMarkers called Youth Gene Clusters, which are functional groups of genes that regulate how we appear to age. Only ageLOC's proprietary science understands how to reset these Youth Gene Clusters to their youthful patterns of activity.

This revolutionary discovery is based upon Nu Skin's exclusive collaborations with leading scientists around the globe, millions of dollars in development, and years of combined anti-aging and genetic research.

NU SKIN.
THE DIFFERENCE. DEMONSTRATED.®



# THE SCIENCE OF AGELOC™

NU SKIN.
THE DIFFERENCE. DEMONSTRATED.®

ageLOC™

## PROPRIETARY SCIENCE

Nu Skin is taking the science of anti-aging to a completely new level by studying the genetic origins of how and why we age. Developed by Nu Skin in collaboration with leading scientists, ageLOC science is based on the discovery of internal sources of aging that contribute to an aging appearance, what Nu Skin calls age-related super markers, or arSuperMarkers. Nu Skin's exclusive ageLOC science targets these arSuperMarkers—the ultimate sources of aging that can influence how we age.

# IDENTIFYING THE SOURCE

The scientific community has access to the Human Genome, but Nu Skin's breakthrough ageLOC science gives us the ability to interpret it in a meaningful way. In a recent scientific discovery, Nu Skin, in collaboration with anti-aging and genetics experts, has identified key groups or functional clusters of genes—Youth Gene Clusters—that help influence how we age. Nu Skin believes that finding and identifying these functional groups of genes is the key to addressing aging at the source.

Clinical study results, genomic analyses, and substantiated research from ageLOC science has led Nu Skin scientists to identify specific functional Youth Gene Clusters that are responsible for youthful skin attributes. The expression of these genes is responsible for the signs of aging on our skin. Through ageLOC science, Nu Skin has the ability to reset these genes to behave more youthfully, helping to restore a more youthful balance in the skin.



# RESETTING THE BALANCE

Once we identify these Youth Gene Clusters, it's important to reset them to reflect a more youthful skin profile. Resetting Youth Gene Clusters is a subtle balancing process—it's not as simple as turning them on and off. Some genes within the cluster may need to be turned up while others may need to be turned down. Nu Skin's proprietary ageLOC science resets Youth Gene Clusters to create a youthful balance within each cluster—returning them to their youthful patterns of activity.

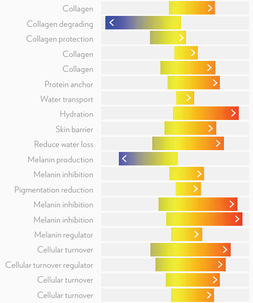
## RESETTING YOUTH GENE CLUSTERS TO A MORE YOUTHFUL BALANCE

FIGURE 1


LEGEND—HEATMAP


Heatmap using DNA microarray data illustrating the differences in gene expression activity with each line representing a single gene. Examples of genes identified as Youth Gene Clusters.

FIGURE 2




Representative diagram (Figure 2) of selected genes from heatmap (Figure 1), illustrating the change in direction in gene expression activity with each line representing a single gene for a given skin aging attribute. Results indicate up regulation and/or down regulation of genes.

# SCIENTIFIC FOUNDATION

In anti-aging science, the Nu Skin team is leading the way. Nu Skin's study of Youth Gene Clusters has resulted in more advanced scientific formulations and enhanced anti-aging products that will redefine the industry. By modeling skin and human tissue in laboratory experiments, Nu Skin has learned how crucial gene expression is to retaining youth. In fact, in order to retain a youthful appearance, we understand how science can restore youthful activity patterns to our genes.

## LOOKING FORWARD

By creating an exclusive partnership with the founders of LifeGen Technologies, Dr. Richard Weindruch and Dr. Tomas Prolla, Nu Skin has access to more than 30 years of research into the genetic basis of aging. Their studies have shown that an innovative approach called caloric restriction is validated by science as an important key to understanding the preservation of youth. Indeed, their findings have been so groundbreaking that they are published in the most prestigious scientific journals in the world.

By studying the way genes are expressed in calorically restricted tissue, Nu Skin will continue to be able to identify and confirm which genes are related to aging and use this knowledge to develop new, innovative products far into the future.

Nu Skin's ongoing research, combined with its new research partnership with Stanford University, will deepen the company's understanding of gene expression and its impact on reversing skin aging even late in life.

We believe ageLOC science is the answer to anti-aging. It's a scientific breakthrough that goes beyond the signs to target the ultimate sources of aging.

ageLOC™