For Better or for Worse Lesson 5 3Q 2007

Moses and Zipporah: Relating with Relations

SABBATH

Read first paragraph – any thoughts? Think about the Hebrews, who were they then? A group of former slaves who themselves were despised and looked down on – do you think they might have had a little compassion on someone of another culture or race?

Why do you think they didn't? Do we have problems like this today?

What lessons can we learn from this? Was this a metaphor for our bondage in sin and the issues in the GC? Do we ever find deliverance from sin and after coming to Christ, joining the church then look down on those still outside the church? Or worse, look down on those who are different in the church?

SUNDAY

The lesson asks "Why did Moses flee?" Any thoughts?

Moses murdered an overseer – in the Great Controversy between Christ and Satan what are the two antagonistic motives? Love and survival of the fittest – which method was Moses practicing when he murdered the overseer?

What emotion did he experience? Fear – so he ran.

But at Sinai when God threatened to kill the people and start over with Moses, how did Moses respond? He was no longer afraid, love had replaced fear and Moses was a new man.

Why do you think God threatened to kill the people at Sinai? Did God not know what was going to happen when He brought the people out of Egypt? Was God now upset and impatient? Or, was there something more going on in the universe? Was there a controversy in the minds of unfallen beings? Did God basically say to the universe – hey, remember just 40 years ago, Moses was willing to kill others, now look he will give his life to save others – My methods of healing work.

MONDAY

Read first paragraph – was Jethro a descendent of Abraham? Was he a friend of God? Was he a priest of God? What does this mean? How could

there be priests (Melchizedek) who were not Jews or part of the sanctuary system? What does this mean? What is the message?

It tells us that God works with all the people of the world to bring them to salvation and that He is not a bigot or racist as all humans are His children. Does it tell us that being a genetic member of one group offers no advantage over any other genetic group?

What does it say about God that He is reaching out to everyone not just one ethnic group?

Then what about the purpose of the Jewish nation? And what about Paul's statement that being a Jew had advantages in every way?

The purpose of the Jewish nation was to be God's assistants, His actors on the cosmic stage to enact a mini-drama depicting the GC and the plan of salvation and ultimately to prepare a group of people who would be the avenue through which the Messiah would come.

The advantages have to do with receiving the oracles of God, the truth, the teaching tools, the sanctuary, feast days, 10 Commandments etc. all designed to lead us back to God, enlighten the mind, expel the lies and bring us back into a trust relationship with God. Many non Jews experienced this advantage – Zipporah, Ruth, Rahab, Caleb, and others non genetic descendents of Abraham, yet able to experience the blessings – why? Because the blessings were for the mind/heart and character and these blessings are free to everyone!

TUESDAY

Read Exodus 4:19-26 – thoughts? Do you think God tried to kill Moses? The Bible says He did, but if God were intent on killing Moses do you think He would have succeeded?

I have some patients who tell me they have tried to kill themselves more than 100 times – do you think if they really wanted to die they could have succeeded? The fact that they never succeed tells us that they really aren't intent on killing themselves.

Do you think, that if God really wanted to kill Moses that He would have failed? Did God have any trouble with the firstborn of Egypt?

So since Moses didn't die, what do we make of this language God tried to kill Moses? Who wrote this? Moses, do you think this was how Moses felt? Do you think that the angel of the Lord appeared in a threatening manner? Does that necessarily mean He wanted to kill Moses?

Why would God do this? What was so important about circumcision of Moses son? Do you think there was ever another Jewish parent who didn't circumcise their son? Do you think every time a Jewish father fails to circumcise his son the angel of the Lord appears and threatens to kill him?

Then why Moses? Who did Moses represent? Moses was a forerunner of Christ and then who would Moses son represent? Would it be Israel, God's firstborn? Who is it that circumcises the heart? The HS at whose direction? Christ's! Was God saying I can't have you representing me as my forerunner if you won't represent me correctly?

What was Moses about to embark upon? Confrontation with the forces of evil – would He need the protection of God? Would he need the protection of on member of the Godhead to protect him from another member of the Godhead? No, do you think God was merely demonstrating to Moses how truly helpless Moses was and how much Moses needed God's protection and therefore he needed to trust and follow God in all things?

In the last days whose protection will we need? And who will God be protecting us from? Another member of the Godhead? No, from evil forces and do we need to follow His directions?

WEDNESDAY

Read Numbers 12:1,2

> Miriam and Aaron began to talk against Moses because of his Cushite wife, for he had married a Cushite. "Has the LORD spoken only through Moses?" they asked. "Hasn't he also spoken through us?" And the LORD heard this.

What is another term for Cushite? Ethiopian? Some scholars say that this would be Sudan today. Are we seeing racial tension and division? Could we take God's reaction as endorsing interracial marriages? Or at least as being against those who would condemn and attack others?

How comfortable are you with interracial marriages? And if you are not comfortable what does that mean? How many races did God create? One, the human race – where did the other races come from? From genetic drift over time and distance, slight and minimal changes in gene expression. (See New Scientist Article at end of notes).

Read EGW comment from Friday -

Moses represented Christ, any significance that Moses was monogamous in a polygamous world? Any significance to the interracial marriage to a non-Jew?

Read bottom paragraph – what do you think "innocent pretext" means? I didn't quite understand that? Do you think that fear of losing power is the real reason behind racism today?

THURSDAY

Top sentence read – thoughts? Is it important when evaluating a candidate to be your life partner to evaluate the family? Why?

Bottom paragraph read – thoughts? Might Moses have been trying to speak to real qualities that Hobab possessed and allow him to feel valued?

Bottom green read – thoughts? What happens if you do the right thing for the wrong reasons? Any examples?

What about the wrong thing for the right reasons? Which is more important doing the right thing or having the right motives?

A doctor who intends with all their heart to heal their patient but prescribes a medication which causes an allergic reaction and the patient dies or a doctor who reads the chart and discovers a patient has a terrible allergy to a medication and so he writes for that medication intending to kill the patient, but he actually read the medication wrong and wrote for a medication that actually helped the patient.

Which of the two doctors is in a better spiritual position and why?

What does this tell us about our actions and decisions? What does this tell us about Sabbath keeping and Isaiah's admonition that the Sabbath is to be a delight?

FRIDAY

Questions 1

Are there prejudice between Christian, Jew and Islam? Does this cause problems today? Do many good Christian people see issues like this playing into the end time scenarios?

How many different groups does the Bible say will be on the earth when Christ comes again? Wheat and tares, righteous and wicked, saved and lost – only two groups – what do the two groups look like?

The saved have the character of Christ – Revelation 12 “These are they who do not love their lives so much as to shrink from death.” The saved will give their lives to save others –

What about the lost? They will take up arms and fight to kill others, can you see Christians and Jews fighting with tanks/planes/missiles/bombs etc. against each other all believing they are fighting on God’s side and all of them are on Satan’s side?

Question 2 – read and discuss

Skin colour: cracking the genetic code

10 March 2007
NewScientist.com news service
Jessica Marshall

SANDRA LAING has brown skin and curly black hair. Her appearance is typical of the coloured people of South Africa, descendants of European settlers, Malay slaves and local peoples such as the Khoikhoi. What's unusual is that Laing's parents were "white" Afrikaaners, as were her grandparents and great-grandparents. That she turned out to resemble a more distant ancestor should have been a mere curiosity - except that Laing had the misfortune to be born in apartheid South Africa back in 1955.

People like Laing, whose story is being turned into a film, illustrate the complexity of the genes that determine our skin, hair and eye colour. Her case, like those of twins where one has light skin and the other dark, has attracted much media attention. But they come as no surprise to geneticists.

"When you look at people of different pigmentation who have had children, it's quite clear there are discrete categories. One parent is fair, one is dark, but the children are not all in the middle," says Greg Barsh, a pigmentation geneticist at Stanford University School of Medicine in Palo Alto, California. "What that indicates is that while there are not one or two genes, there are not 10 or 20. There are probably 5 to 10 genes." We are now rapidly uncovering these genes - and the findings are throwing up some surprises about how skin colours evolved.

For many of those involved in the work, simply understanding the basis of colour differences is worthwhile in itself. "So much world history is ascribed to 'These people look different from me'," says Barsh. "I see providing answers as something that will remove some of the mystique and prejudice."

Meanwhile, law enforcement agencies hope for more practical benefits: they want to be able to generate a description of a person from a DNA sample found at a crime scene. Perhaps the most intriguing prospect is that as we work out exactly out what determines our colour, we may be able to develop ways to tweak it that are far more effective than anything that exists today.

The key to our colour is a dark pigment called melanin. The more melanin there is in skin cells, hair or the iris of the eye, the darker they are. It sounds simple, but there's more to it. For starters, melanin is not a single substance - its basic building blocks join to form various complicated chains. Rather than floating free within cells, these molecules are made inside little granules called melanosomes, whose size, number and distribution in the cells can vary. What's more, the melanosomes are not even made in the skin cells and hair they end up in; instead, specialised cells called melanocytes produce the melanosomes and dole them out to other cells via tentacle-like extrusions. How dark a person looks depends on variations in each step in the triggering, making, packing and distribution of melanin.

Sometimes one of these steps breaks down completely, causing abnormalities such as albinism. Studies of pigmentation disorders in animals and people have led to the discovery of more than 120 associated genes. Yet only a few gene variants have been found that contribute to the differences in normal human skin colour, and one of the most important was stumbled across only recently.

“He had stumbled on a key gene for skin colour”

Keith Cheng, a cancer researcher at Pennsylvania State University in Hershey, was working with golden zebrafish, a strain whose stripes are paler than the typical black. This mutant was first found in an Oregon pet shop in the 1970s. Curious about its lighter colour, Cheng's team took a closer look and

found that its skin cells have fewer, smaller and less dense melanosomes - just like those of lighter-skinned people.

As part of his work, Cheng needed to identify the mutation responsible for the fish's golden colour. It turned out to involve a gene now called *SLC24A5*, which codes for an ion-exchange protein that probably sits in the membrane of melanosomes.

Cheng's colleague Mark Shriver then suggested looking for variations in the human version, *SLC24A5*, in sequences collected as part of the International HapMap, a project to chart genetic variation in humans. The team found two variants, one of which was present in everybody of European descent.

To prove these variants affect skin colour, the researchers looked at which were present in people of mixed African and European descent. They found that those with one copy of the "golden variant" tend to have much paler skin. If both copies of the gene have the golden mutation, the skin is lighter still. They concluded that the golden variant is responsible for between 25 and 38 per cent of the difference in skin colour between Africans and Europeans. Cheng had stumbled upon one of the key genes determining skin colour (*Science*, vol 310, p 1782).

"One of the questions I get asked is, 'Does this mutation alone make you white?'" Cheng says. "The answer is no." That is, you can have light skin without the golden variant: Japanese and Chinese people have the same form of this gene as the Yoruba of Nigeria. You can also have dark skin with the golden variant: up to three-quarters of Sri Lankans have the golden mutation, recent studies have shown.

Clearly there is far more to skin colour than *SLC24A5*. A variation in a gene called *MATP* (also known as *SLC45A2*, which probably makes another melanosomal transport protein, also contributes to the light skin of Europeans. And variations in the gene for tyrosinase, the enzyme that produces the building blocks of melanin, may also play a role, according to a genetic survey published in December by a team including Shriver (*Molecular Biology and Evolution*, DOI: 10.1093/molbev/msl203).

To the researchers' surprise, their findings show that the light skins of east Asians and Europeans evolved separately: the dark forms of *SLC24A5* and *MATP* are the ancestral forms, and only after modern humans migrated out of Africa did *SLC24A5* mutate in one individual, giving rise to the golden variant. The *MATP* variant appeared in a separate individual, either earlier or later. Both variants spread rapidly among the ancestors of modern Europeans.

"We expect there will be other genes that will fit the bill for east Asians," says lead author Heather Norton of the University of Arizona in Tucson. While the study identified variants in two pigment genes that are common in Asian populations, it is still unclear if these variants affect skin colour.

It could turn out that every distinct human population has unique skin-colour gene variants, but there are also some that we all share. In two genes that influence skin colour, Norton found variants that were common to all the groups her team looked at, suggesting these arose before modern humans dispersed.

So why did different populations evolve different skin tones? The leading theory, proposed by Nina Jablonski, also at Penn State, is that our colour reflects a balance between conflicting needs. Not only can sunlight damage our skin, it also breaks down folic acid (also known as folate), an essential B vitamin. On the other hand, we need ultraviolet light to make vitamin D.

Jablonski and colleagues have shown that skin colour around the planet correlates more closely with winter UV levels than with summer levels (*New Scientist*, 12 October 2002, p 34). This suggests that our skin colour has evolved to optimise folic acid and vitamin D levels during winter, with tanning allowing us to adapt to higher UV levels in summer.

If the folic acid hypothesis is correct, the diet of our ancestors was as important as UV levels in influencing colour. It has been suggested that early European farmers ate little vitamin D, making very light skin an advantage, whereas peoples like the Inuit got so much vitamin D from their fish-rich diet that they have retained relatively dark skin despite living in the far north.

There are other possibilities. Mutations that make skin lighter could simply have persisted in regions where this feature is not a disadvantage. However, the fact that the same variants spread among almost all Europeans shows there was strong selection for them. And while sexual selection could have played a role in this most visible of characteristics, the latest evidence fits well with Jablonski's ideas. "Natural selection should leave a stronger signature, and that's what we see," says Shriver.

Indeed, while most researchers had assumed that light skin evolved only once, Jablonski predicted that similar skin colours evolved separately in different populations as modern humans dispersed into regions with different UV levels. "I am now eager to see genetic evidence that darkly pigmented skin evolved more than once: for instance, in the ancestors of modern equatorial Africans, southern Indians and Sri Lankans, and indigenous Austronesians," she says.

Despite the rapid progress, there is much left to discover. "There are some major parts of the world where we don't know what to expect," Shriver says. Only a few groups in Africa have been studied, for instance, despite the large variation in skin pigmentation across the continent.

What we do know, though, could soon be put to use. Murray Brilliant of the University of Arizona College of Medicine in Tucson has shown that variations in just six genes accounted for 50 to 80 per cent of the differences in eye, skin and hair colour among 800 individuals he studied. Those genes included *SLC24A5* and *MATP*. The work was funded by the US National Institute of Justice, which is interested in building up a picture of suspects when DNA samples draw a blank against police databases.

In fact, a cruder form of DNA testing is already being used for this purpose. DNAPrint Genomics of Sarasota, Florida, sells police forces a test that reveals people's ancestral origins, thus giving some idea of what a suspect might look like. The company says its test has been used in around 150 cases in the US and UK. Looking directly at the gene variants that affect appearance will be more accurate, however, and DNAPrint has already developed such a test for predicting eye colour. Brilliant's work could lead to tests for skin and hair colour as well.

For others, the goal is to change skin colour by manipulating melanin levels. There is a huge market for products that claim to do this. "People generally do it for cosmetic purposes alone," Cheng says. Others wish to treat dark or light patches, from age spots to more serious pigmentation disorders.

Most existing products leave a lot to be desired. Take skin lighteners. Hydroquinone, long the key ingredient in many of these creams, was thought to work by inhibiting tyrosinase, the enzyme that helps make melanin. Now it seems that it works by killing melanocytes and may be carcinogenic, leading many countries to ban it.

What's more, most products are not very effective. "It's very difficult to distinguish treated skin versus untreated skin," says Genji Imokawa of the Tokyo University of Technology in Japan, who worked on skin products for 35 years at Kao Corporation. You can measure the difference, he says, but it's not easy to see just by looking. The exception is monobenzylether of hydroquinone, which completely and permanently depigments the skin, apparently by destroying melanocytes. It's drastic, but can give people with severe pigmentation disorders an even skin tone.

Darkening the skin is also tricky. Most attempts to boost melanin levels have focused on synthetic versions of MSH, the hormone that causes tanning after sun exposure (*New Scientist*, 7 May 2005, p 40). The trouble is, such products may do least for those who need them most - fair-skinned people who tan poorly have mutations in the receptor for MSH, called MC1R. Hence the interest in forskolin, a

compound recently found to activate a later step in the tanning pathway. It darkens the skin of mice even if they have mutations in the *MC1R* gene (*Nature*, vol 443, p 340).

While efforts to develop conventional drugs continue, genetic discoveries could lead to a whole new approach based on RNA interference - using small bits of RNA to switch off specific genes. The trick will be getting these "siRNAs" into the melanocytes. "The skin is a formidable barrier," says David Fisher of Harvard University. But if it can be done, RNA interference could open the way to the creation of lotions that gradually produce dramatic changes in skin colour and would only need to be applied once a week or less.

Already, cosmetics company Avon has filed a patent for lightening skin by using siRNAs to switch off the tyrosinase gene (patent number WO2005060536). The patent says the method has been tested on isolated mouse melanocytes and outlines ways of delivering siRNAs to melanocytes in situ. Avon would not discuss details with *New Scientist* but says that the research is continuing.

If this kind of approach proves successful, our skin colour might one day become almost as easy to change as hair colour is today, freeing us from the constraints of our genes.

It would, after all, make a lot of sense to adjust our skin colour to suit the local climate. And being able to choose our colour would make life far harder for those who still insist on judging people on the basis of a handful of gene variants.

From issue 2594 of New Scientist magazine, 10 March 2007, page 34-37

The eyes have it

The textbooks are wrong. Eye colour is often described as a single-gene trait, with brown eyes dominating over blue, but there is more to it than that.

Brown irises have more melanin and absorb most of the light that hits them. When there's less melanin, it can scatter light, creating a blue colour. Green and hazel eyes are usually a mixture of blue and brown.

The main gene involved, called *OCA2*, appears to affect melanin production by altering the pH of cells in the iris, but it is now clear that other, as yet unidentified genes also play a role. For instance, Richard Sturm of the University of Queensland in Brisbane, Australia, has shown that variations in the *OCA2* gene can explain only 74 per cent of the differences in human eye colour. So blue-eyed parents can have a brown-eyed child - there's no need to blame the postman.

Eye colour is alterable - the latest glaucoma drugs have the unexpected side effect of darkening the iris, especially in those with hazel eyes. The drugs can also lengthen and darken eyelashes, sparking hopes that similar drugs could help reverse baldness.

Keeping grey at bay

Hair colour depends on the pigment-producing melanocytes in the base of hair follicles, which dole out melanin to the cells whose corpses make up each hair strand. As you would expect, blonde hair contains less melanin than light brown or black hair.

Red hair is due to various mutations in a gene called *MC1R*. Their effect is to block production of black-brown melanin - the most common form. Redheads produce only a red-yellow type.

The particular gene variants that make our hair black, brown or blonde remain elusive, but we do at least have a better handle on a most vexing aspect of hair colour - its tendency to go away. David Fisher's team at Harvard Medical School has recently shown that melanocyte stem cells near the top of the hair follicle disappear just before a hair turns white. This means the mature melanocytes at the

base of the follicle are not replaced when the hair falls out and a new one begins to form (*Science*, vol 307, p 720).

Greyness could be reversible. In fact, an existing cancer drug seems to occasionally restore pigmentation, and more reliable, safer methods are on the horizon. For instance, AntiCancer of San Diego, California, has developed ways of delivering drugs or genes to hair follicles in fatty sacs. The payload could include genes that restore melanin production, says company president Robert Hoffman. The problem is getting high enough gene expression in all the cells, he says, to avoid producing streaky, partially pigmented hair.

Once we fully understand the genetics, it might be possible to use siRNAs (see below) to alter the colour of growing hairs. The effects of a single treatment could last for weeks, making dark roots a thing of the past for those who prefer it blonde. The first siRNA hair treatment likely to go on sale, though, will neither change nor preserve colour. Sirna Therapeutics of San Francisco is developing an siRNA method for long-lasting hair removal.