SAYS newsletter

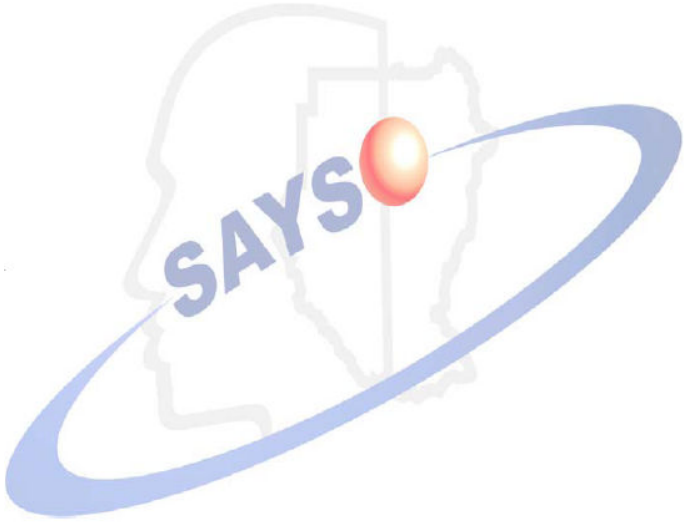
The Official Newsletter of the Sudanese Academy of Young Scientists

Issue 2, October 2007

HUMAN DIVERSITY

How Different Are We?

Editorial office



SAYS newsletter is an electronic publication, designed to encourage publications of young scientists, including reviews, reports, brief communications, and abstracts in pure and applied sciences, and the humanities. Manuscripts and advertising inquiries should be sent to the editor-in-chief at: saysnewsletter@gmail.com

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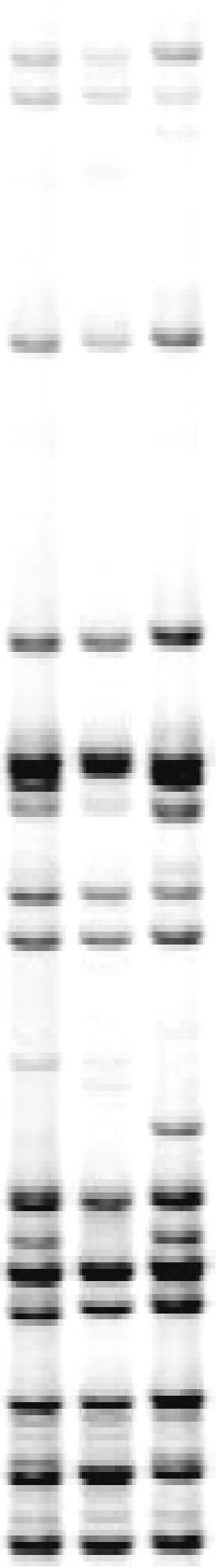
Editorial



Although we are all one species everyone is genetically unique and the genetic differences among individuals are encoded in our genome. The preliminary sequencing of the human genome was completed in April 2003, overlapping with the 50th anniversary of the discovery of DNA itself when two young scientists, James Watson and Francis Crick, opened the door to a new scientific world.

In this issue we focus on human diversity and particularly genetic variation. Our challenge is not so much a matter of addressing the issue of diversity, as such, but rather a matter of enhancing our capacity to deal creatively with diversity. Also we invited a prominent scientist, Melanie Newport the Secretary of the African Society of Human Genetics *(AfSHG),* to give us an overview about the Society and the 5th meeting which will be held this November in Cairo. Professor Newport is a senior lecturer in Infectious Diseases and International Health, Brighton and Sussex Medical School, UK. Also we announced for a theoretical course entitled "Molecular Medicine and Genomics in Africa" which will be held this January at the Institute of Endemic Diseases, University of Khartoum.

Finally I would like to call all young scientists to participate in SAYS newsletter. It is designed to serve its members. For this reason, we welcome your comments and suggestions and if there are changes you would like us to make, by all means drop us a line. If you have recently been honored by a new appointment or award, don't hesitate to contact us. And if you have ideas for feature articles–particularly articles that you would be willing to write we're here to help you air your viewpoints and opinions.

Hisham Yousif Hassan
Editor-in-chief

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About SAYS

The Sudanese Academy of Young Scientists (**SAYS**) is a non-governmental organization. It has been officially registered at the Ministry of Humanitarian Affairs under the auspices of the Sudanese National Academy of Science (SNAS).

On January 15, 2007, the inaugural meeting of the Sudanese Academy of Young Scientists (**SAYS**) was held in the Institute of Endemic Diseases, University of Khartoum, and the proposal for establishing the Academy was discussed and approved.

The objectives of SAYS are:

- Promote research and uphold the cause of science in its basic and applied forms.
- Help in the dissemination of science and research results through publishing and assisting in publishing periodicals, and through organization of scientific meetings.
- Raise community awareness about the importance of science and technology in sustainable social, economic and environmental development.
- Collaborate with similar regional and global organizations.
- Raise funds and accept endowments for the purpose of fulfilling its objectives.
- Help in capacity building of scientific institutions in the country.
- Award grants, scholarships, prizes and medals in the field of research for young scientists.

Membership Criteria:

There are three types of membership; Full Membership, Partial Membership and Honorary Membership.

Full Membership: The member should be below 40 yrs and has at least a master degree in basic or applied sciences.

Partial Membership: The member should be at least a B. Sc holder in Basic or Applied Sciences and not more than 30 yrs old.

Honorary Membership: The member should have a university degree in basic or applied sciences and over 40 yrs.

Human Diversity: Race *vs* Genetics

Early theories of human origins suggested that modern humans were distnict biological species that originated independantly with little or no gene flow between them. In 1758 the Swedish biologist Carl von Linné presented a concept of "race" as applied to humans, he proposed what he considered to be natural taxonomic categories of the human species, based on the geographical distribution, cultural traits and skin color. Eighteen years later the German physiologist Johann Blumenbach classified the human species into five races: the Caucasian race or white race; the American or red race the Mongolian or yellow race; the Malayan or brown race; and the Negro, Ethiopian, or black race. In 1902, the physical anthropologist Carlton Coon refind Blumenbach's classification on the basis of phenotypic physical features; he called the races *Caucasoid*, *Mongoloid, Australoid, Negroid* and *Capoid*. Even with disagreement among anthropologists, this classification remains in use by many researchers, as well as lay people.

In the early 1980s the paleo-anthropologist Milford Wolpoff hypothesized the Multiregional Origin Model based on the fossil record suggesting that after the migration of *Homo erectus* out of Africa there has been parallel evolution from *H. erectus* to *H. sapiens* among geographically dispersed populations. In 1987 the geneticist Rebecca Cann and her collegues proposed the Out of Africa Model or Mitochonderial Eve Theory based on genetic data obtained from mitchonderial DNA (mtDNA) analysis to suggest that all human populations descend from an anatomically modern *H. sapiens* ancestor that evolved in Africa about 200,000 yrs ago.The Out of Africa Model has received much support from genetic and anthroplogical studies over the last decade.

Given that humans, as a species are extremely similar at the genetic level, both language and geography and in a part culture play a crucial rule as genetic barriers that generate the genetic variability between populations, because humans do not mate at random; individuals in the same geographic region and sharing a language are more likely to mate with each other than with individuals from more distant regions.

Differences in individual bases are by far the most common type of genetic variation. These genetic differences are known as single nucleotide polymorphisms, or SNPs (pronounced "snips"). Sequencing of the human genome, and recent advances in identifying and genotyping genetic variation at humdreds of loci in hundreds of individuals, is providing a more detailed understanding of global patterns of genetic variation. Humans are differ on average at only 1 of every 500-1,000 nucleotides between chromosomes, this indicates that all *H. sapiens* are ~99.6-99.8% identical at the nucleotide sequence level. The other 0.2-0.4% of the 3 billion nucleotides that are contained in the human genome comprise ~10 million DNA variants that can potentially occur in all different combinations.

Y-chromosome and mtDNA genealogies are especially interesting because they demonstrate the lack of concordance of lineages with morphlogy and facilitate a phylogenetic analysis. Individuals with the same morphology do not necessarily cluster with each other by lineage, and a given lineage does not include only individuals with the same racial type. Y-chromosome DNA from Africa alone suffices to make this point. And most studies of genetic variation, using many types of genetic markers, show higher levels of genetic variation in African populations than in non-African.

It is essential to point that race and ethnicity are terms without generally agreed upon definitions. Both terms carry complex implications that reflect culture, history, socioeconomics and political status, as well as a variably important connection to ancestral geographic origins, so at this time race is a legitimate taxonomic concept that works for chimpanzees but does not apply to humans. So it is time to change the paradigm from 'race' to human genome variation, and if we could not discuss human variation at a genetic level, we will all miss the emerging story of who we are and where we come from.

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Calling all Geneticists

The African Society of Human Genetics (AfSHG) provides a forum for scientists interested in Human Genetics in Africa to meet, interact, network and collaborate. The Society's aim is to equip the African scientific community and policymakers with the information and practical knowledge they need to contribute to the field of genetics research and to attract global attention to the efforts of African scientists. The overall goals of the AfSHG are capacity building and networking. These will be achieved through the following specific objectives:

1. Information Dissemination: workshops to allow the presentation of information by academic and commercial experts. These experts would update topics of interest to members of the society, and review the progress of biomedical science and technology around the world.

2. Establish Mentor Network and Educational Resources: The AfSHG aims to cultivate interest in investigative science and encourage the participation of African undergraduate and graduate students as well as others wishing to pursue careers related to human genetics and biomedical sciences in general.

3. Genetic Advocacy: The AfSHG will give voice to the cause of human genetics in Africa. It will interface with policymakers, the media, and the public to help reduce fears and concerns surrounding genetics research. AfSHG will accept the challenge to facilitate the conduct of genetics researches that are ethical, legal, moral and culturally acceptable.

4. Appropriate Technology Transfer: The AfSHG hopes to sponsor pecific programs that would aid the transfer of appropriate and relevant technologies.

5. Development of online courses: Members of the Society will be responsible for developing on-line courses for fellowships/affiliations between African, American and European universities and assist members and affiliates with access to the internet and undertake other programs that will provide a bridge over the widening North-South divide in biomedical science and technology.

6. African Journal of Human Genetics (Af J Hum Gen): It is anticipated that there will be a Journal containing

research reports and reviews of topics of interest that would supplement information available in textbooks and other resources which are often scarce in many African institutions.

7. Encourage Collaborative Research: The Society encourages and enhances collaborative research, which is currently responsible for 50% of the productivity of the African scientific community. It will bring together foreign scientists working in Africa, institutions with interest in Africa and African investigators to present information about patient populations, databases and technologies that would generate collaborative research.

A major goal of the society is the organization of a series of annual workshops and meetings in various parts of Africa. Our next meeting, the **5th Annual Meeting** of the AfSHG will be held in Cairo, November 3 - 5, 2007, in conjunction with the First Annual Meeting of the Division of Human Genetics and Genome Research and the **National Society of Human Genetics of Egypt**. The conference theme is: Genomics Research in Africa: Implications for Disease Diagnosis, Treatment and Drug Development.

We look forward to seeing representation from SAYS in Cairo! Please visit our website at **www.afshg.org** for more information about the Society and the meeting.

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Commentary

On page 39 of this issue Elgizouli discusses the *Meme* theory which has been coined by Richard Dawkins in 1976, in his first book *The Selfish Gene*. Dawkins is an ethologist, evolutionary biologist and popular science writer, born in Nairobi in 1941 after his father moved to Kenya from England during the Second World War. His family returned to England in 1949, he studied at Oxford University and graduated in 1962; in 1967 he became assistant Professor of Zoology at the University of California.

In his book, *The Selfish Gene* Dawkins considers organisms as vehicles that genes construct to carry themselves. He became more prominent after he published his book *The Extended Phenotype*. Dawkins argues that we commonly view evolution as a process of competition between individuals known as "survival of the fittest" with the individual representing the "unit of selection". He offers a controversial reinterpretation of that idea.

Dawkins published a controversial book *The Blind Watchmaker* in which he presents an explanation of, and argument for, the theory of evolution by means of natural selection.

In addition to the above mentioned publications he has more six books; *River out of Eden*, *Climbing Mount Improbable, Unweaving the Rainbow, A Devil's Chaplain, The Ancestor's Tale*, and most recently *The God Delusion*.

Currently Dawkins is the Charles Simonyi Professor of the Public Understanding of Science at University of Oxford.

Editor-in-chief

Genetic Interests in an Age of Mass Migration

Each human parent contributes half of a child's DNA, which combines with the other parent's DNA to form a new genetic combination. This so-called recombination gives each of us a unique set of attributes: hair, eye, and skin color; athleticism or lack thereof; susceptibility to certain diseases; and so on.

However, the chunk of DNA known as the 'Y' chromosome, which only males possess, is passed from father to son without recombining. The 'Y' chromosome, therefore, remains basically unchanged through generations, except for random mutations. Similarly, women pass mitochondrial DNA, which also does not recombine, to both their sons and daughters. DNA passed down through generations of mothers could help answer big questions about the human journey across continents.

Random mutations of DNA, which happen naturally and are usually harmless, are called markers. If they can be traced to a particular region, these lineages can be used to track prehistoric migration patterns. However, indigenous identities are being lost as more and more people move from their ancestral villages.

And when they do leave, their kids absorb the dominant culture in that new city and lose touch with the old ways. So what is lost is the context in which their genetic diversity arose. The genes are still going to be there, but without the geographical context, we can't infer anything historical from the genetic data.

In defending my ethnic interests, I am doing the same thing - ensuring that the genetic uniqueness of my ethnic group is passed onto the next generation. When I succeed as a parent, my ethnic group also succeeds because the genetic uniqueness of my ethnic group is perpetuated as part of my child's genetic inheritance. And when my ethnic group succeeds in defending its interests, I also succeed because the genetic uniqueness that I share with other members of the ethnic group is passed on. And this is the case even if I do not have children myself: I succeed genetically when my ethnic group as a whole prospers.

A critical proposal is that ethnic groups have a vital interest in defending

territory against immigration from other ethnic groups: For all of past human experience and still today, control of a territory is a precious resource for maintaining ethnic genetic interests in the long run. Loss of numbers within a territory dominated by one's ethnic group as a result, say, of disease or natural disaster, results in a loss of ethnic fitness, but this loss is not critical because the numbers can eventually be made up.

However, in a world of limited resources and carrying capacity - indeed, a world that, in the view of many experts, has already reached unsustainable human populations - immigration of ethnic outsiders constitutes a permanent loss of fitness. Because of continued immigration and high fertility among many immigrant ethnic groups, the result is displacement of the founding populations. If present trends continue, the founding population is set to become a minority. The submergence date is just two generations later, around 2100. This represents a catastrophic loss of genetic interest for the natives. The extent of that loss depends, of course, not only on the numbers of immigrants, but also on their genetic distance from the host population. At the extremes, the results are nothing short of astounding. It would be more genetically advantageous for, say, a Bantu to give his life resisting immigration of two members of a genetically distant group like North-East Asians than it would be to rescue one of his own children.

Given the massive potential payoff, successful ethnic altruism is always adaptive for every member of an ethnic group; indeed, the quantitative logic implies that for the vast majority, successfully advancing the interests of one's ethnic group has a much greater payoff than investing in one's own genealogical family. The main danger is that individualistic elites who are unaware of, or do not subjectively value their ethnic interests, will in effect sell out their own ethnic groups for personal profit. Because of their wealth and power, elites have much more potential to advance or hinder ethnic interests, but they have at times acted to subvert them, perhaps because they would be the last to suffer personally from ethnic replacement as they "often live in gated neighborhoods whose pleasantness is

assured by immigration control in the form of private security guards".

Ethnic interests are best optimized, around the world, by ethnic states where citizenship is defined by ethnic criteria - a prescription which Salter terms "universal nationalism." All existing ethno-states are vulnerable to displacement by highly mobilized, rapidly reproducing ethnic minorities. Globalism and multiculturalism legitimate these trends, but in the long run they are a threat to everyone's ethnic interest because both ideologies actually legitimate and necessarily increase competition of the nasty zero-sum kind.

Globalism results in increased genetic competition because everyone has potential access to everyone else's territory, and multicultural societies sanction ethnic mobilization because they inevitably become a cauldron of competing ethnic interests.

Since ethnic issues are basically about conflicts of interest, they raise difficult ethical questions. An ethical system that results in the loss of the genes of those who practice it is necessarily a failure. But unlike the case with individual and family interests, ethnic interests have a fragile or even non-existent status in law, custom, and moral philosophy. Universal nationalism in which people are accorded the right to live in an ethno-state would serve ethnic interests and therefore the genetic interests of most humans. It is therefore biologically just according to an ethic they called it "adaptive utilitarianism," and this sense of justice would lend it legitimacy. There will, of course, remain conflicts of interest between ethnicities in a world of limited resources, and fitness differences between groups are inevitable. Social controls might prevent conflict, but total suppression by a world government would be such an infringement of freedom that it would make us less than human: "For a naturally evolved organism the ultimate form of liberty is the freedom to defend its genetic interests".

"There are not well-defined boundaries that would distinguish one race from another at the DNA or gene level because there is a lot of overlap between populations in terms of their genetic variation." For instance, we find African genes in people who are considered Scandinavian, and we find

English genes in people who are considered Chinese."

There is no such thing as a genetically 'pure' population. Because of our constant history of migration we all share genes." For example, "we know that sickle-cell disease is much more common in persons of African descent. But that doesn't mean a European can't have sickle-cell disease. That too reflects the pattern of migration and sharing of genetic variation."

We are not saying there are no differences between populations. We are saying that while there are differences on average, there is so much overlap and so much sharing of genetic variation that you can make serious mistakes if you try to infer something about an individual patient based on his or her racial background.

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From Numbers to Probabilities

(Part 1)
The Origin of Risk Management
An historical review cited in
Peter L. Bernstein's "AGAINST THE GODS the remarkable story of risk"

The Greek mythology drew on a giant game to explain what modern scientists call the Big Bang: Three brothers rolled dice for the universe, with Zeus winning the heavens, Poseidon the seas, and Hades, the loser, going to hell as master of the underworld.

Even though it is not suggested that Greeks gave no thought to the nature of probability, the ancient Greek word εκιος (EIKOS), which meant plausible or probable, had the same sense as the modern concept of probability: "to be expected with some degree of certainty.", here Socrates defines εκιος as "likeness to truth". The definition reveals a subtle point of great importance, Likeness to truth is not the same thing as truth. Truth to the Greeks was only what could be proved by logic and axioms. Their insistence on proof set truth in direct contrast to empirical experimentation.

The greatest contribution of the Greeks was not in scientific innovation, the unique quality of the Greek spirit was the insistence on proof, "Why?" mattered more to them than "What?", they were able to reframe the ultimate questions because their were the first civilization in history to be free of the intellectual straitjacket imposed by an all-powerful priesthood. It was about 450 BC, when the Greeks devised an alphabetic numbering system that used the 24 letters of the Greek alphabet and three letters that subsequently became obsolete. For example ρδπ (rho-deca-penta) meant 115.

One is tempted to assume that the lapse of time between the invention of the astragalus and the invention of the laws of probability was nothing more than a historical accident. The Greeks and the Talmudic scholars were so maddeningly close to the analysis that Pascal and Fermat would undertake centuries later that only a slight push would have moved them on to the next step, but it did not occur. Before a society could incorporate the concept of risk into its culture, changes would have to come, not in views of the present, but in attitudes about the future.

After decades, the Arabs, through their invasion of India, had become familiar with the Hindu numbering

system, which enabled them to incorporate eastern intellectual advances into their own scholarship, scientific research, and experimentation. The results were momentous, first for the Arabs and then for the West. In the hands of the Arabs, the Hindu numbers would transform mathematics and measurement in astronomy, navigation, and commerce. New methods of calculation gradually replaced the abacus, a word derived from the Greek word *abax*, which means sand-tray. The new numbering system took place of the simple abacus; writing replaced movable counters in making calculations, and fostered abstract thinking which opened the way to areas of mathematics never conceived of in the past.

The earliest known work in Arabic arithmetic was written by Alkhowarizmi, a mathematician who lived around 825 B.C., the word algorithm which means rules for computing was derived from his name, he was the first to establish rules for adding, subtracting, multiplying and dividing with the Hindu numerals.

Omar Khayyam, famous for his collection of poems as the Rubaiyat, used technical mathematical observations to reform the calendar and to devise a triangular rearrangement of numbers that facilitated the figuring of squares, cubes, and higher powers of mathematics, this triangle formed the basis of concepts developed by Blaise Pascal.

The story of numbers, in the West, begins in 1202, when a book titled *Liber Abaci*, or Book of the Abacus, appeared in Italy. The fifteen chapters of the book were entirely handwritten, the author, Leonardo Pisano, was only 27 years old, he was known as Fibonacci, the son-of-Bonacio, Bonacio means "simpleton" and Fibonacci means "blockhead", and he certainly was hot blockheaded.

Fibonacci was inspired to write *Liber Abaci* on a visit to Bugia, an Arab mathematician revealed to him the wonders of the Hindu-Arabic numbering system.

Frederick the Emperor was fascinated with *Liber Abaci*, he invited Fibonacci to appear before him and in the course of the interview, Fibonacci solved problems in algebra and cubic equations given by Frederick scientists; Fibonacci subsequently wrote a book prompted by this meeting, *Liber*

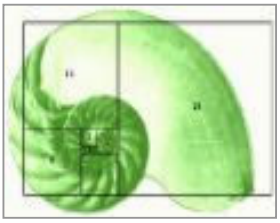
Quadratorum, or The Book of Squares, which he dedicated to the Emperor.


Fibonacci is best known for the short passage in *Liber Abaci* that led to something of a mathematical miracle, the passage concerns the problem of how many rabbits will be born in the course of a year from an original pair of rabbits, assuming that every month each pair produces another pair and that rabbits begin to breed when they are two months old. Fibonacci discovered that the original pair of rabbits would have spawned to total of 233 pairs of offspring in the course of a year.

He discovered something else, much more interesting. He had assumed that the original pair would not breed until the second month and then would produce another pair every month. By the fourth month, their first two offspring would begin breeding; the total number of pairs of rabbits at the end of each month would be as follows: 1,2,3,5,8,21,34,55,89,144,233, etc.

The Fibonacci series is a lot more than a source of amusement, divide any of the Fibonacci numbers by the next higher number: after 3 the answer is always 0.625, after 89 the answer is always 0.618. Divide any number by its preceding number, after 2 the answer is always 1.6 and after 144 the answer is always 1.618, the Greeks, decades ago, knew this proportion as "the golden mean".

This proportion appears throughout nature: in flower patterns, the leaves of an artichoke, the leaf stubs on a palm tree, the ratio of the length of the human

body above the navel to the to its length below the naval in normally proportioned people. The Fibonacci ratio also defines the proportions and shape of a spiral, which appears in the shape of certain galaxies, in a ram's horn, many seashells, coil of the ocean waves, which made some people, believe that Fibonacci numbers can be used to make a wide variety of predictions, but up to the time of the Renaissance, people perceived the

future as little more than a matter of luck or the result of random variation, and most of their decisions were driven by instinct.

To be continued

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Dawkin's *Memes*: the Replicators in Our Brains

In his major work the Selfish Gene (1976) Richard Dawkins, the prominent Oxford evolutionary biologist, ventured into the realm of culture armed with the tools of the modern Darwinian synthesis. Analogous to the behaviour of genes, Dawkins proposed an explanation of cultural transmission, and hitherto cultural evolution driven by natural selection. To achieve the analogy, Dawkins coined the term meme to describe units of cultural transmission: ideas, tunes, clothes, catch-phrases, fashions...etc.

The more scientifically defendable notion of cultural evolution is no invention of Dawkins. The science philosopher Karl Popper noted the resemblance between scientific progress and evolution by natural selection; the population geneticist Cavalli-Sforza used models of population genetics to investigate patterns of cultural diversity initiating a sub-discipline of cultural anthropology that examines gene-culture co-evolution. However, it was Dawkins who came up with the bold proposal that cultural entities are subject to a process that parallels evolution by natural selection, only instead of genes, it acts on memes. An a priori critical point is the air of deterministic cultural anthropology that emanates from a theory that claims a socio-biological explanation for the complexity and diversity of human culture. Perhaps Dawkins was encouraged to make his proposal by the accumulating mass of theoretical explanations for patterns of human behaviour generated in the field of evolutionary psychology.

In any case, the concept of memes undergoing natural selection provided sociobiological disciplines with a rather powerful tool of analysis. Meme theory takes Darwinian evolution a grand step further. Darwin provided a theory to explain how species could emerge from a natural process without the need to assume an almighty designer. Dawkins attempts to do away with the celebrated notions of "free will" and "Self", so central to human individualism and self-perception, with an algorithm of culture, just as Darwin swept away the idea of a Creator with an algorithm of life.

Similar to genetic transmission, cultural (memetic) transmission is not unique to humans. Dawkins provides

the argument of songs chanted by the saddleback bird. On an island off New Zealand these birds share a repertoire of about nine distinct songs. Any given male sings only one or a few of the nine songs, and thus males could be classified into dialect groups occupying overlapping territories. By comparing the songs of fathers and sons it became clear that the song patterns were not inherited genetically. Rather young males seem to adopt songs from their territorial neighbours by imitation, and occasionally new songs popped up as a consequence of the erroneous imitation of an old one. This process is surely not uniquely distinct from the mode of transmission of human languages, or music and dance genres for that matter. Consider, for example, what Ray Charles made out of gospel music; or the evolution of pop music from the rock 'n roll era to the current variety.

The hallmark of the modern Darwinian synthesis is the existence of genes: unitary replicators characterized by longevity, fecundity and copying-fidelity. The processes of mutation, competition, selection, and evolution simply follow the trail. Now, in analogy, memes identified as units of information residing in our brains, replicate by a process of imitation. In this process, memes transmit themselves from brain to brain, in a more or less Lamarckian fashion i.e. the inheritance of acquired characteristics. The analogy goes further; genetic evolution comes about as a consequence of mutation or the variations in the sequence of DNA emanating from the imperfect copying fidelity of genes. Memetic evolution is a consequence of a similar, albeit less well defined, process, whereby memes are subject to imperfect imitation (cultural mutation) in the widest sense of the word, from raw non-intentional error to mastered creative invention. Dawkins gives the following illustrative example: if a scientist reads, or hears about, a good idea, he passes it on to his friends and colleagues. He mentions it in his articles and lectures. If the idea catches on, it can be said to propagate itself, spreading from brain to brain. The idea becomes a fertile meme that literally parasitizes each target brain, utilizing it for the sake of its propagation, just like a virus parasitizes the genetic mechanism of a host cell. During this process a meme does not necessarily stay the same; it accumulates appendages and

interpretations or loses certain components. It may also remain intact or reach a dead end and wither away, or it may, at some stage, consolidate itself to become a portion of what is considered by many to be "common sense". Memes, of this character, may conglomerate as complexes to create a tradition, an ideology, or a world view.

The tricky part, however, is the determination of the survival value of a certain meme. When considering genes, the answer is fitness in the context of adaptation to a particular environment. In the case of memes the question is somewhat different. No more are we considering the survival of a gene in a gene pool, but that of a meme in a meme pool. So the question is: what is it about a particular meme that gives it stability and penetrance in a particular cultural environment? The answer is, therefore, cultural advantage and not biological advantage. Dawkin's hypothesis is that memes seem to have broken the monopoly of genes as replicators and ushered in a new kind of evolution, much faster and not necessarily subservient to genetic evolution. This, he claims, is the explanation for the breathtaking "progress" of modern man.

In another of his numerous books, A Devil's Chaplain (2003), Richard Dawkins gave an example of the memetic spread of the meme idea citing the internet. On the 29th August 1998 the adjective memetic clocked up 5042 mentions, besides a newsgroup talking-shop that had received 12 000 posting during the previous year and several web pages. Today this spread has multiplied monstrously. My brain, for instance, has been thoroughly infected by the meme theory, and here I am propagating it to infect yours.

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Knowledge of Unmarried Adolescent Females about Reproductive Health Issues and Risks Related to Sexual Behavior Khartoum State-Sudan.

Adolescence health has its origins in early childhood growth and well-being. The health of an adolescent, will affect his/her health in late life. There are more than 1.5 billion young people (between the ages of 10-19) in the world today; 85% of them live in developing countries. Most of them lack appropriate knowledge about sex, sexuality and reproductive health. This makes them vulnerable to contract STIs including HIV/AIDS, as well as other reproductive health hazards.

Sudan is a multi-cultural, multi-ethnic and multi-lingual country, home to around six hundred tribes, each with own different beliefs, religions, customs, traditions and languages. According to the 1993 Census, 98% of the population are Sudanese nationals, 80% are Muslims and the others follow Christianity or other indigenous beliefs. And the most dominant culture is the patriarchal culture, which reflects the male supremacy and female subordination. This states that females should be extremely protected and over-controlled so as to keep their honour. Those females find themselves subjected to many cultural beliefs and practices that may affect their life, to keep their families honour and their own virginity. Such practices start from early childhood of females where they are circumcised to keep their virginity. FGM/C is widespread in Sudan, it has been reported that in some parts of the country over 85% of females have been genitally mutilated. FGM/C is associated with many health complications like excessive bleeding, painful sexual intercourse, urinary tract infections and pelvic inflammatory diseases.

Then as females starts to grow they are married in their early adolescent years before they start to recognize their sexual desires. 20% of marriages in Sudan take place for girls under 15 and 60% under 18. Early marriage is linked with high rates of adolescent fertility and pregnancy related complications. Nearly half (46%) of the girls aged 6-16 years in rural areas of the Northern states of Sudan have never attended schools. Many of these young married

females become reluctant to sexual relationships with their husbands due to their ignorance about sexuality or they may think that sexual intercourse is a painful practice. Such attitude exposes these females to sexual abuse and harassment in addition to sexual and domestic violence. This result has many physiological and psychological consequences that include: STIs/HIV infection, anxiety, depression, hatred towards the male spouse, body scars and bruises. As a result, in many cases females get involved in extramarital sexual relationships which are often unplanned, erratic and, sometimes, the result of pressure or force. Young married females usually experience teenage pregnancy that jeopardizes their own health as well as their babies' health. Malnutrition and anemia are more common among adolescent females that may risk their developmental stage and leads to pregnancy related complications.

Such a situation raises many questions on how adolescents acquire knowledge about their reproductive health. What could be the health situation of adolescent groups? What will be their health condition in the near future? Until when will the silence of honour persist? Although there is an increase in the concern about adolescent health, there is still an information gap on the issues that needs to be searched deeply and openly.

This study is a cross sectional study funded by OSSREA, that aims to identify the knowledge of reproductive health (RH) issues and risks related to sexual behaviour among unmarried female adolescent groups in Muslim societies and to explore the sources of RH knowledge attained and the influencing factors that could impede female adolescents from acquiring RH knowledge in relation to sexuality.

The study was carried out in Khartoum State secondary female schools. Data was collected using both Quantitative and Qualitative methodology. A standardized questionnaire was used for interviewing the female adolescents. The total number of adolescent females interviewed was 100, selected from one public and one private secondary school in Khartoum state (50 each). Two focus group discussions (FGD) were carried for two groups of female

adolescent mothers. Each group contained a range of 6-7 mothers each.

The findings of this study revealed that female adolescents are not aware enough about RH issues, (88%) of the respondents emphasized that there is a relation between menstruation and pregnancy, still yet they didn't understand what is the relation exactly with its biological details. The female adolescents don't know the exact time of the female's fertile period. The majority (85%) of the respondents said that they heard about family planning (FP), with the majority (58%, 49/85) of them having knowledge about pills only when asked about the family planning types they know. Despite the fact that almost all of the respondents heard about STIs/HIV/AIDS, still the adolescents' awareness about STIs/HIV/AIDS is vague. Female respondents just knew the name of the type of FGM/C they have but they don't know the difference between the types. As for the sources of knowledge attained by female adolescents the school plays a vital role by providing the adolescent females with information about maturity signs and the relation between pregnancy and menstruation. Mass media was the common source of FP knowledge delivered to the respondents. Concerning STIs/HIV/AIDS knowledge TV/Radio and schools played the most vital roles to deliver information to adolescents. As for the FGM/C knowledge, respondents received information mostly from school and family.

There was no great disparity between educated mothers and illiterate mothers in their role of informing their female adolescents' daughters about RH issues. Sudanese mothers still fear talking about sexuality as part of protecting their children. Mothers mainly depend on the school to provide their children with any kind of information they need. Thus the adolescent's family, lack of comprehensive sex education through schools and mass media, Sudanese culture, social, political and religious contexts were the major factors that hinders female adolescents RH knowledge.

Consecutively, to protect our future adolescent generation's health from being crippled, this study came out with many recommendations. The most important is including adolescent health

promotion programs within the MDG's (Millennium Development Goals) programs in Sudan. Second, reproductive health awareness and advocacy campaigns should target adolescents' parents. Third, adolescents themselves should be involved to be a basic part of the awareness programs targeting their group.

Acknowledgement: Study funded by OSSREA (Organization for Social Science Research in East and South Africa).

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Maternal Morbidity/Maternal Mortality

Definition: maternal mortality rate is the number of maternal deaths in a period (usually a year) per 100,000 women of reproductive age (usually defined as aged 15-44 or 15-49. Maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental cause.

Again it was reported that nearly 585000 pregnant mothers die annually in Sudan and 300 million pregnant mothers suffer from long-lasting obstetric and child birth complications as a result of various factors influencing immediately on:

1. Health behavior.
2. Reproductive behavior
3. Unknown factors.

Socio-economic factors play an important role in elevating the incidence of maternal death such as poverty, female illiteracy and sanitary needs.

Certainly outcome factors are more aggravating pregnancy-related deaths such as obstetitric heamorrhge 25%, sepsis15%, abortions13%, eclampsia 12% and obstructed labour 8%.

Concerning maternal morbidity factors are commonly associated with malaria that account for 8% of maternal death worldwide and sometimes leads to maternal Aneamia, While the remaining causes of maternal morbidity are considered to be included, e.g. Hepatitis, HIV/AIDS, mental disorders and traumas.

As a result of all these various direct and indirect causes of maternal mortality and morbidity still the outcome of both is the high pregnancy-related death; moreover basic obstetric interventions are rural-based (primary) such as administration of Antibiotics, Oxytocics, and Anticonvulsants. Furthermore manual removal of placenta and retained conception products and assisted vaginal delivery a remaining the key success of rural intervention together with surgical interventions as secondary activity.

Preventive activities:

These reflect proper active immunization using Tetanus Toxiod, together with routine prophylactic measures to some diseases such as

malaria, may contribute effectively in reduction of maternal death. Moreover aseptic delivery services, skilled attendance at every single labor, skilled tradition birth attendant and feasible referral system these are the golden primary community –based intervention. And to some extent addressing cultural practices that could harm maternal health and well-being are more appreciated during safe motherhood model e.g. Girl education, women empowerment and others. Still with the pledge of international commitment to reduce maternal mortality by 2015 to the acceptable range ,many cost effect barriers stand behind the ultimate goal to achieve such as data under reporting, lack of political commitment to address maternal death provoking factors and insufficient funding to reproductive health as a holistic approach.

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Theoretical Course "Molecular Medicine and Genomics" in Africa

19 - 24 January 2008 Khartoum, Sudan

Organizers:

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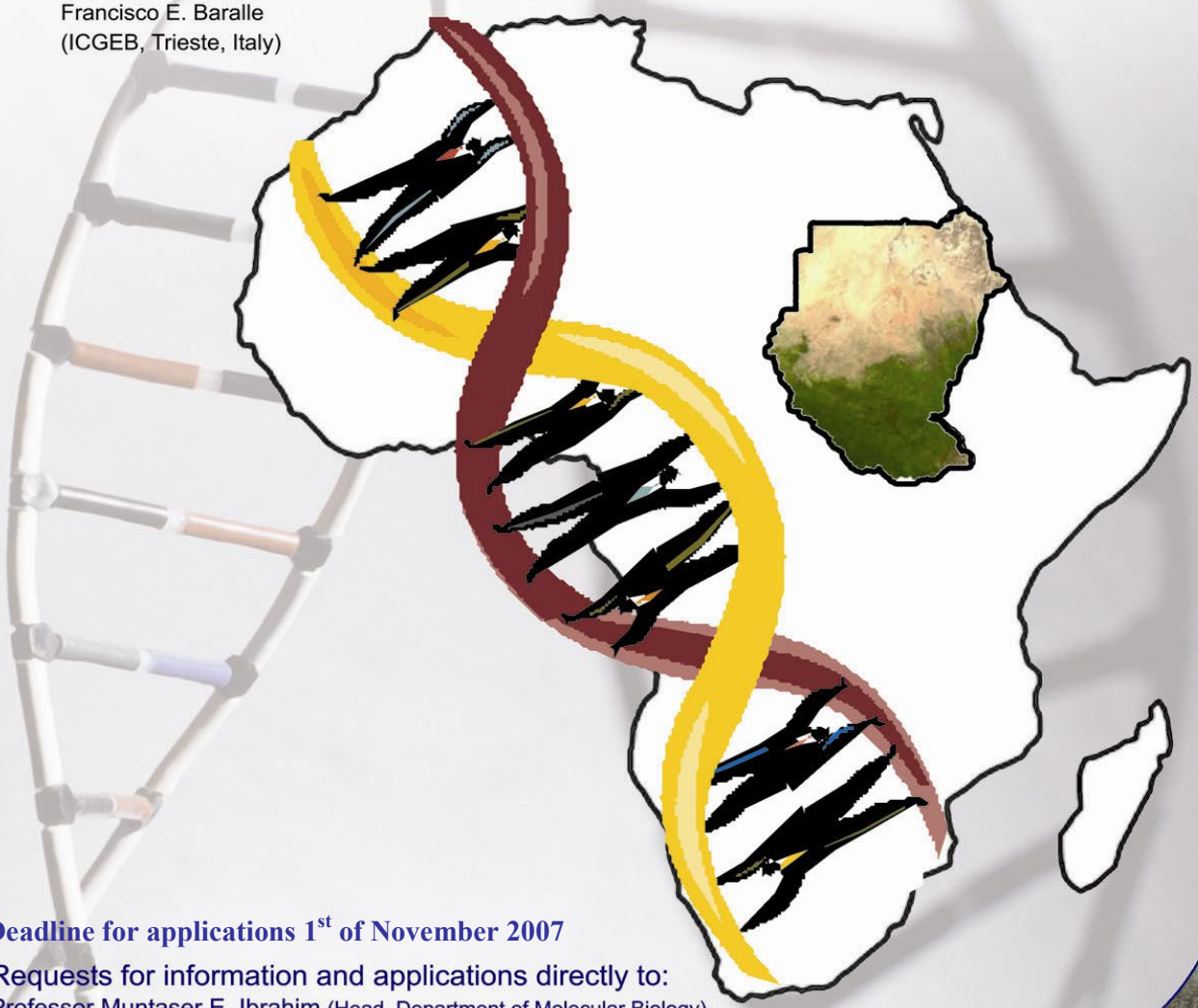
(Institute of Endemic Diseases, University of Khartoum, Sudan)
Francisco E. Baralle
(ICGEB, Trieste, Italy)



Deadline for applications 1st of November 2007

Requests for information and applications directly to:
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Oligo team

In 2002, Dr Preisig co-founded Inqaba Biotechnical Industries (Pty) Ltd., the first genomic service company in South Africa (www.inqababiotec.co.za). The company, based in Sunnyside Pretoria, started with a staff of four. In five years the team has grown to eleven full time staff members, several part-time staff members and internship students. Inqaba biotec's original services were the production of oligonucleotides and DNA sequencing service, which was supplemented with the Fermentas Life Science, Lucigen and Nanodrop Technologies distributorships. As the company has grown inqaba biotec has added several different services including Gene Synthesis, DNA extraction, PCR amplification, PCR cloning, RNAi synthesis and Phylogenetic analysis. inqaba biotec is also a partner in the BioPAD supported Microarray Platform Project hosted by the ACGT's microarray facility. The dynamic distributorship portfolio has also increased with the addition of Clare Chemicals Research, MiVac, Zymo Research and CLC Bio.


ABI 3130 XL sequencer

In November 2005, Dr Preisig welcomed BioPAD as a shareholder and a strategic partner. A recent highlight in the company's development was the installation of BioPAD's infrastructure investment in a high throughput DNA sequencer in February 2007. The Roche GS 20, used for Africa's first high throughput sequencing service, is available to all Life Scientists world-wide.

The service was launched in March and to date has yielded an impressive 205 MB worth of sequencing data. The GS 20 was upgraded to the new GS FLX system in August 2007. In addition, inqaba biotec has recently upgraded the Sanger sequencing laboratory with the purchase of a 16 capillary ABI 3130 XL sequencer.

With Dr Oliver Preisig leading the way, inqaba biotec is looking forward to a successful future together with its valuable customers: Breaking Biotec Boundaries in Africa!

Dr Oliver Preisig:

Inqaba biotec's executive director Dr Oliver Preisig was born in 1968 close to Zurich in Switzerland. He obtained his doctoral degree from the Swiss Federal Institute of Technology in Zurich in 1995. His doctoral research in the group of Prof. Hauke Hennecke focused on the genetic and biochemical characterisation of a novel terminal oxidase of the nitrogen-fixing bacterium *Bradyrhizobium japonicum*. He furthered his expertise in molecular biology, first as a postdoc and later as a senior researcher in the group of Prof. Michael Wingfield at the University of the Free State (1995-1997) and FABI at the University of Pretoria (1998-2002). During this time, he characterised several dsRNA viruses in tree pathogenic fungi and supervised M.Sc. and Ph.D. students.

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3. Tables should be used to present large amounts of numerical data and when they simplify the text: they should not duplicate the text. Each table should be typed on a separate sheet in double spacing, without ledger lines, together with its identifying Roman numeral and a short title.

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