**TSARIN GADON DABI’U DA SIFFOFIN HALITTA (GENETICS)**

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**Gabatarwa**

Al-Fazaaree, daya ne daga cikin sahabban Manzon Allah (tsira da amincin Allah su kara tabbata a gare shi), watarana ya dawo gida sai ya samu matarsa ta haifa masa jariri baki sitik!  Nan take hankalinsa ya tashi.  Domin balarabe ne shi, farin balarabe kuwa.  Haka ma matarsa.  Amma ta yaya aka yi ta haifa masa jariri baki sitik?  Nan take ya nannade wannan jariri a zanen gayo, ya kama hanya sai wajen Manzon Allah (tsira da amincin Allah su kara tabbata a gare shi).  Yana zuwa ya tarar da shi cikin sahabbansa kamar galibin lokuta.  Yana isowa wajensa bayan ya masa sallama, sai ya nuna wa Manzon Allah wannan jariri, ya ce: "Dubi abin da ta haifa mini."  Sai Manzon Allah (tsira da amincin Allah su kara tabbata a gare shi) ya fahimci inda ya dosa nan take.  Sai ya ce masa: "Kana da rakuma?" Sai ya ce: "Eh, ina da su."  Sai Manzon Allah ya sake ce masa: "Meye launinsu?"  Sai ya ce: "Jajaye ne."  Sai Manzon Allah ya sake ce masa: "Babu wani mai launin baki-baki daga cikinsu?" Sai wannan balarabe ya ce: "Akwai,"   sai Manzon Allah ya sake tambayarsa: "Daga ina ya samo wannan launi (bayan iyayensa jajaye ne)?"  Sai Al-Fazaaree ya ce: "Watakila wata jijiyar (dabi'ar) halitta ce ya jawo (daga kakanninsa)."  Sai Manzon Allah ya ce:  "Haka shi ma wannan, ta yiwu wata jijiya ce ya jawo (daga kakanninsa)."

Watarana Manzon Allah (tsira da amincin Allah su kara tabbata a gare shi) yana zaune sai ga wani daga cikin mutanen Madina ya riko matarsa, rike da jariri baki sitik su ma, a kidime.  Suna zuwa wajensa sai mutumin ya ce: "Ga abin da ta haifa."  Sai matar ta yi caraf ta ce: "Na rantse da Wanda ya aiko ka da gaskiya, a matsayin cikakkiyar budurwa ya aure ni, kuma ban taba shigo da wani gidansa ya haye kan tabarmarsa ba."  Fadin haka ke da wuya sai Manzon Allah (tsira da amincin Allah su kara tabbata a gare shi) ya nuna cewa lallai abin da ta fada gaskiya ne.  Domin daga ita har shi suna da dabi'un halitta wajen casa'in da tara ga kowanne, kuma kowanne daga cikinsu na yaduwa cikin jikinta ne a lokacin saduwa, yana rokon Allah da ya sa jaririn da za a haifa ya zo da kama irin nashi.

Ummu Sulaim ita ce mahaifiyar Anas dan Maalik (Allah kara musu yarda).  Watarana ta shigo inda Manzon Allah (tsira da amincin Allah su kara tabbata a gare shi) yake zaune tare da sahabbansa, sai ta ce: "Ya Manzon Allah, hakika Allah ba ya kunyar bayyana gaskiya.  Shin, wanka ya wajaba ga mace idan tayi mafarki (ana saduwa da ita)?"  Sai Manzon Allah nan take ya ce mata: "Na'ma, muddin ta ga ruwa." (Ma'ana ruwan maniyya kenan).  Nan take sai Nana Aisha ta ce: "Shin mace ma na fitar da wani ruwa ne?"  Sai Manzon Allah ya ji, kuma ya bata amsa da cewa: "Kayya, Aisha! Ta yaya ake samun kamaiceceniya to, (tsakanin jariri da iyayensa)?"

Daidai lokacin da Manzon Allah (tsira da amincin Allah su kara tabbata a gare shi) ya shigo garin Madina lokacin hijira, sai Abdullahi ibn Salaam, daya daga cikin manyan Malaman Yahudawan Madina ya je ya same shi, ya ce masa: "Na zo ne in tambaye ka kan wasu abubuwa guda uku, wadanda babu wanda ya sansu sai Annabi..."  Daga cikin tambayoyin da ya masa akwai neman sanin dalilin da ke sa jariri ke yin kama da mahaifinsa ko mahaifiyarsa?  Sai Manzon Allah ya amsa masa cewa: "Idan ruwan (maniyyin) namiji ya riga na mace, to, (jaririn) zai yi kama da mahaifinsa.  Idan kuma ruwan (maniyyin) macen ne ya riga na namijin, to, (jaririn) zai yi kama da mahaifiyarsa."  Daga nan sai Abdullahi ibn Salaam ya ce: "Na shaida hakika babu abin bautawa a bisa cancanta face Allah, kuma lallai kai Manzon Allah ne."

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Daga cikin nau'ukan ilmin kimiyyar halitta da rai a duniyar yau, akwai fannin da ke bincike kan dalilan samun kamaiceceniya tsakanin 'ya'ya da iyayensu ko kakanninsu, na kusa ne ko na nesa.  Da kuma kamaiceceniya ta dabi'ar jiki, da dabi'ar tunani, da dabi'ar juriya ko ragwanci, da dabi'ar kirar jiki, da dabi'ar tsawo da gajarta, da dabi'ar zati ko mutuntaka, da dabi'ar sanyi ko zafin zuciya, da dabi'ar karfi ko kudurar zuciya, da dabi'ar taushi ko kaushin hali da yanayi, da dabi'ar bambancin launin fata, ko launin gashin kai, ko yanayin farata da dai sauransu.  Har wa yau, me yasa wasu 'ya'ya ke gadon cututtuka daga iyayensu?  Me yasa wasu ke yin kama da dangin iyayensu ba da asalin iyayensu ba?  Me yasa ake haifan 'ya'ya masu dauke da cututtukan da iyayensu ba su da su?  Me yasa musamman a yau likitoci da ma Malaman addinin musulunci ke shawartar samari da 'yan mata masu niyyar aure da su je don gunadar da binciken jini da kwayoyin halittar jikinsu kafin su yi aure?  Me yasa jaririn da ake haifa wani ke zuwa namiji, wani kuma mace?  Dukkan wadannan nau'ukan al'amuran halitta ana binciken yanayinsu ne karkashin wani sabon fannin ilmin likitanci mai suna "**Genetics",** ko "**Heredity"** ko kuma "**Genetic Inheritance",** a turancin kimiyyar halitta da rai.

Hadisin farko da ke sama Bukhari da Muslim ne suka ruwaito shi, tare da sauran malaman sunan, wato Abu Daud, da Tirmidhi, da Nasaa'i, da Ibn Majah.  Hadisi ne ingantacce. Hadisi na biyu kuma *mursal* ne, ba hadisi bane ingantacce, amma ma'anar da ke cikinsa daya ne da wanda ke cikin hadisin da ya gabace shi.  Wato hadisin farko ya karfafe shi wajen ma'ana kenan.  Hadisi na uku ingantacce ne, domin Muslim ne ya ruwaito shi.  Sai hadisi na hudu, wato hadisin Abdullahi ibn Salaam, shi ma ingantacce ne, domin Bukhaari ne ya ruwaito shi. Dukkan al'amuran halitta da ke dunkule cikin wadannan hadisai da suka zo a sama, abubuwa ne masu ban mamaki da suka faru, wadanda a lokacin faruwarsu babu wanda zai iya gudanar da wani bincike a likitance don gano sababin faruwarsu, sai dai kawai a yi imani.  Amma a yau Allah ya kawo mu lokaci da zamani mai cike da yalwa wajen samuwar kayayyaki da fasahar binciken kimiyya da likitanci, cikin sauki.  Ganin irin tasirin da wannan tsarin bincike ke yi a sauran kasashen Turai na yau, musamman kasar Amurka, yasa na ga dacewar gudanar da bincike na musamman don kosar da masu karatu, da yardar Allah, dangane da wannan sabon fannin bincike. Duk da cewa dadadden ilmi ne, amma Malaman kimiyyar zamani basu fara gudanar da bincike a cikinsa ba sai cikin shekarar 1981.

Wannan kasida za ta gudanar da bincike ne kan asali da dalilan da ke haddasa wadancan al'amura.  Da farko bayanai za su zo kan ma'anonin kalmomin turanci masu alaka da wannan bincike, wadanda mai karatu zai ta cin karo dasu a halin karatunsa.  Sannan bayanai kan "Kwayar Halitta" ko "Tubalin Halitta", wato "Cell" su biyo baya.  A nan ne za mu fahimci tsarin wannan sinadari mai matukar muhimmanci, da yanayinsa, da muhallinsa, da adadinsa, da kuma abubuwan da ke kunshe a cikinsa, musamman irinsu "Tantanin Kwayar Kalitta" ko ganuwarta, wato "Cell Membrane", da "Ruwan Rayuwa", wato "Cytoplasm", da kuma "Asalin Sinadarin Halitta", wato "Nucleus."  A cikin sinadarin halitta ne al'amuran da suka shafi bincikenmu suke kunshe.

Abu na farko shi ne "Madarar Bayanan Dabi'ar Halitta," wato "DNA" ko "Deoxyribonucleic Acid", a warware.  Sai kuma babbar kundi, wato "Ma'adanar Bayanan Dabi'ar Halitta," ko "Chromosome" a turance.  Bayan mun yi bayani kan wannan babban kundi, sai mu zarce kan sauran abubuwan da ke da alaka da wannan babban kundi mai dauke da dukkan bayanai kan dabi'un da 'ya'ya ke gadonsu daga iyayensu, irinsu "Dabi'ar Halitta," wato "Gene".  Da "Dabi'ar Halitta ta Musamman," wato "Allele."  Sai kuma "Kebantacciyar Dabi'ar Halitta," wato "Trait" ko "Genetic Trait", wadda ita kuma ta kasu kashi biyu ne; akwai "Dabi'a Mafi Rinjaye," wato "Dominant Trait," da kuma "Dabi'a Nakasasshiya," wato "Recessive Trait."

Wadannan su ne damuwanmu cikin binciken baki daya.  Kuma Fannin gudanar da bincike kansu shi ake kira "Genetics."  "Nau'in Dabi'ar Halittar" mutum kuma shi ake kira "Genotype".  Wannan wani abu ne da ba a iya gani, kamar yadda bayanai za su nuna mana nan kusa. Amma "Nau'in Dabi'ar Halitta na Zahiri" (irinsu kama, da launin jiki, da launin idanu, da tsawo da sauransu) shi ake kira "Phenotype."  "Gadon Dabi'ar Halitta" daga iyaye ko kakanni kuma, shi ake kira "Heredity" ko "Genetic Inheritance."  Dan adam ba ya rayuwa sai da matsaloli na abin da ya shafi lafiyar jiki.  Wannan ka'ida ce gamammiya da Allah ya sunnata wa dan adam, hatta kan abin da ya shafi "Gadon Dabi'ar Halitta" akwai shi.  Idan aka samu matsala wajen gadon wata dabi'a ta halitta, har abin yayi mummanar tasiri ga rayuwar mai gadon, a kimiyyance an samu abin da ake kira "Genetic Disorder" kenan.  To, shi dan adam a duk sadda ya samu kansa cikin matsala, duk tsawon zamani, sai yayi kokarin neman magani; ta hanyar halal ko ta hanyar haram.  Ya danganci irin tarbiyya ko lalurar da ya samu kansa a ciki.  Don haka, "Fannin Ilmin Magance Tangardar Dabi'ar Halitta" shi ake kira "Genetic Engineering."  A karshe wannan kasida za ta dubi hukuncin halacci ko haramci a Musulunci, dangane da abin da ya shafi tsarin da Malaman Kimiyyar likitanci ke bi a yau, wajen gyara dabi'ar halittar da ta samu tangarda, sanadiyyar nakasu daga dayan iyayen mai gado.

Wadannan su ne shahararrun kalmomin da mai karatu zai ta cin karo dasu.  A sashen da ke tafe cikakken bayani zai zo kan kowannensu, don a fahimci abin da kowanne yake nufi.

**Ma'anonin Kalmomi a Warware**

Fannin bincike kan yadda ake samun bambance-bambancen dabi'a da siffofin halitta yana da fadi matuka.  Don haka dole ne mu shata wa kanmu inda za mu faro da inda za mu tsaya, musamman ganin cewa wannan ita ce kasidar farko.  Akwai kalmomi masu dimbin yawa da ke ishara zuwa ga muhimman al'amuran da muke son fahimtarsu kan wannann nau'in ilmi.  Amma za mu dubi shahararru daga cikinsu ne kadai, don kada mu fadada bayani a karshe mai karatu ya bace, ya rasa inda aka kwana balle inda za a tashi.  Wannan sashen bincike yana da muhimmanci, domin ya kunshi matakin farko ne da za su taimaka wa mai karatu fahimtar sauran abubuwan da ke tafe.  A takaice dai ma iya kiransa "Tubalin Fahimta."

Kalmar farko ita ce: "Kwayar Halitta" wacce a harshen turancin Malaman Kimiyya suke kira da suna *"Cell".* Wannan ita ce asalin rayuwa da duk wani halitta mai rai baki daya; daga dabbobi zuwa mutane da bishiyoyi. Duk wani abu mai rai a tare da shi, to asalinsa daga wannan kawayar halitta ne, wato "Cell".  Wannan kwayar halitta ido ba ya iya riskanta, kuma Allah ya watsa ire-irensu da yawa a cikin jikin dan adam, misali.  Duk bayanan da za su zo kan tsarin gadon dabi'un halitta suna dogaro ne kacokam kan wannan tubali, wato kwayar halitta.  Sai kalmar "Cell Membrane", wato "Tantanin Kwayar Halitta" kenan na can ciki.  Wannan tantani aikinshi ne bayar da kariya ga dukkan madaukan da ke cikin Kwayar Halitta.  Kuma shi ne ganuwa na biyu daga cikin kwayar halitta, bayan ganuwar waje mai suna "Cell Wall." Sai kalmar "Cytoplasm", wanda a harshen Hausa na kira "Ruwan Rayuwa."  Wannan ruwa yana cikin kwayar halitta ne, a cikin ganuwar "Tantanin Kwayar Halitta" da bayaninsa ya gabata, kuma yana daga cikin abubuwa masu matukar mahimmanci da ke dauke a cikin Kwayar Halitta baki daya.  Wasu malaman musulunci masu kokarin fahimtar tsarin halitta ta nassoshin Kur'ani ma suna ganin wannan ruwa ne Allah ke ishara zuwa gare shi, da ya ce ya halicci kowace dabba ne daga ruwa.

Bayan "Ruwan Rayuwa" (Cytoplasm), sai abu mai mahimmanci na gaba, wato "Asalin Sinadarin Halitta" wanda a harshen Turanci ake kira "Nucleus".  "Nucleus" yana  cikin harabar tantanin kwayar halitta ne shi ma, kuma shi ne jigo a fannin binciken sanin tsarin gadon dabi'u da siffofin halitta a kimiyyance.  Domin shi ne yake dauke da dukkan abubuwan da bincikenmu ke dogaro a kansu wajen sanin tsarin gadon dabi'un halitta.  A cikin wannan "Asalin Sinadarin Halitta" (Nucleus) ne ake samun "Chromosome", wato "Ma'adanar Bayanan Dabi'ar Halitta".  Kowace kwayar halitta na dauke da tagwayen "Ma'adanar Bayanan Dabi'ar Halitta" guda 23 ne.  Wannan ke nuna cewa a cikin kowanne, za a samu guda 46 kenan (23 x 2 = 46).  Dukkan wadannan ma'adanar bayanan dabi'ar halitta iri daya ne, a jikin mutum daya, duk da yake kowane dan adam na shi sun sha bamban da na waninsa.  Kowane dayan tagwayen "Ma'adanar Bayanan Dabi'a" kuma yana dauke ne da zaren "Madarar Bayanan Dabi'ar Halitta" da ake kira "Deoxyribonucleic Acid" ko "DNA" a takaice.  Wannan zare a siffar sarka yake, mai harde da juna. Kuma a jikin layin wannan sakakken zare ne ake da "Kwayoyin Dabi'ar Halittar" kowane dan adam.  Wadannan kwayoyin dabi'un halitta su ake kira "Genes".  Kowane dan adam yana kebantuwa ne da kwayoyin dabi'un halitta daban da suka sha bamban da na wani, wadanda ya gado su daga wajen iyayensa ko kakanninsa ko kakannin kakanninsa, har dai abin ya kai ga Annabi Adamu da Hauwa'u, amincin Allah ya tabbata a gare su.

Sai kalmar "Allele", wato "Dabi'ar Halitta ta Musamman."  Misali, daga cikin dabi'ar halitta akwai tsawo, da gajarta, da saurin fushi, da fara'a, da sanyin zuciya, da zafin rai da sai sauransu.  Wadannan dukkansu "Dabi'un halitta ne na musamman," wato "Allele.  Sai kalmar "Trait", wato "Kebantacciyar Dabi'ar Halitta" wajen rinjaye ko rauni ake nufi.  Idan mutum yana da wata dabi'a ta halitta mai rinjaye, wacce ke bayyana a jikin 'ya'yansa, wannan ita ake kira "Dominant Trait", wato "Dabi'a Mai Rinjaye."  Idan kuma dabi'ar halittarsa ba ta iya bayyana a fili, saboda rinjayar da dabi'ar halittar matarsa ko na mahaifinsa suka yi a kan nashi, sai a kira wannan da suna "Recessive Trait", wato "Dabi'a Nakasasshiya" kenan.  Sai kalmar "Genotype" wato "Nau'in dabi'ar halitta" na wani mutum da ake iya gane shi da shi. Kowane dan adam idan aka gudanar da gwajin dabi'ar halitta (DNA test) daga kwayoyin halittarsa za a samu yana da kebantacciyar dabi'a ta musamman wanda babu mai irinta, kuma duk wanda ya dangance shi daga cikin 'ya'yansa, za a iya gane dangantakarsu ta wannan hanya. Wannan shi ne kokarin da Gwamnatin Jigar Legas take ta yi a halin yanzu kan gawawwakin wadanda suka rasa rayukansu a hadarin jirgin *Dana Air* da ya auku makon jiya. Ana amfani da wannan hanya ne wajen kokarin gane waye wane? Kuma wa ke da alaka da wane? Wadannan al'amura ne da ke boye cikin kwayoyin halittar dan adam, kamar yadda bayani ya gabata.  Sai kalmar "Genetic Code," wato "Tambarin Dabi'ar Halitta."  Jerin haruffa ne da ke wakilatar bayanan dabi'un halittar kowane dan adam, wadanda ke da alhakin haifar da gadon dabi'a daga maihaifi a misali, zuwa kan 'ya'ya ko jikokinsa.

Kalma ta gaba ita ce kalmar "Phenotype", wato "Nau'in Dabi'ar Halitta na Zahiri."  Kamar yadda ake amfani da "Genotype" don gano alaka da dangantaka ta hanyar kwayoyin dabi'ar halitta da ke boye a kwayar halittar jikin mutum, to, haka tsarin "Phenotype" yake wajen gano dangantakar halitta, amma na zahiri; tsawo ne, gajarta ne, fadi ne, sirantaka ne, fari ne, baki ne, da dai sauransu.  A takaice dai, "Phenotype" shi ne "Nau'in Dabi'ar Halitta na Zahiri" da ake iya gani.  Domin akwai dalilai guda biyu da ke haddasa tsarin gadon dabi'un halitta a tsakanin halittu.  Dalilin farko shi ne bambance-bambancen da ke tsakanin kwayoyin halitta, wato "Cell" kenan, kamar yadda bayani ya gabata a sama. Dalili na biyu kuma shi ne tasirin mahallin da halittu ke zama a cikinsa  ko a harabarsa, wajen sauya dabi'ar halitta daga wanda ake gado zuwa mai gado.

Kalma ta gaba ita ce "Gene Mutation," wato "Canjin Dabi'ar Halitta."  Wannan kan faru ne idan aka samu kari ko ragi ko jirkicewar yanayin dabi'un halitta, daga cikin kwayoyin halittar mutum.  Misali, mutum na iya rayuwa shekaru goman farkon rayuwar aurensa yana haifan 'ya'ya masu kama iri daya na dabi'ar halitta, sai a gaba ya samu wasu 'ya'ya masu bambancin dabi'ar halitta daban da wacce 'ya'yansa na farko suke da ita, sanadiyyar wancan dalili.  Idan haka ta faru, to, an samu "Sauyin Dabi'ar Halitta" kenan daga kwayoyin halittar da ke jikinsa ko na matarsa. Wannan shi ake kira "Gene Mutation."  Kalma ta gaba ita ce "Genetic Disorder," wacce ke nufin "Tangardar Dabi'ar Halitta."  Wannan tangarda na haifar da cuta ne na musamman, misali kamar su cutar sankara da sauransu, kuma hakan na faruwa ne sanadiyyar canji ko sauyin dabi'un halitta da ke cikin kwayoyin halittar Uba ko Uwa, mai dauke da dabi'ar halitta mafi rinjaye, wato "Recessive Trait."  Wasu cututtukan kan samu ne ta hanyar gado daga Uba ko Uwa masu dauke da cutar, wasu kuma kan samu ne sanadiyyar "Canjin Dabi'ar Halitta" (Gene Mutation) da ya faru daga baya, a kwayoyin halittar mai gadar da dabi'ar.

Kalma ta gaba ita ce "Gene Therapy," wato "Magance Tangardar Halitta."  Ana kuma yin hakan ne ta hanyar maye gurbin dabi'un halittar da suka lalace ko masu haddasa tangarda ta hanyar gadar wa 'ya'ya cututtuka na musamman, da wasu dabi'un halitta (Genes) masu kyau, wadanda suke lafiyayyu.  Fannin "Gene Therapy" ne ke magance matsalolin "Genetic Disorder", wato "Tangardar Dabi'ar Halitta."  Sai kalma ta gaba, wato "Heredity."  Abin da wannan kalma ke nufi shi ne, tsarin "Gadon Dabi'un Halitta" daga mai gadarwa (Uba ko Uwa) zuwa mai gado ('Ya'ya ko Jikoki). Wadannan dabi'un halitta dai sun hada da launin fatan jiki, da launin idanu, da launin gashin kai, da dai sauransu.  A wasu lokuta a kan yi amfani da kalmar "Inheritance" a maimakon "Heredity."  Duk ma'anarsu daya ne a wannan fanni. Sai kalmar "Genetics", wadda ke nufin "Ilmin Gadon Dabi'un Halitta."  Wannan shi ne sunan da wannan fanni ke tutiya da shi.  Suna ne gamamme.  Sai kalma ta karshe, mai suna "Genetic Engineering," wato "Fannin Kwaskwariman Dabi'ar Halitta" ta hanyar kimiyya da fasahar sadarwar zamani.  Wannan fanni ne mai hadari, kuma nan gaba bayanai za su zo kan muhawarar masana kimiyya, da masana al'adu, da masana tarihi, da Malaman addini, kan dacewa ko rashin dacewar wannan tsari na kwaskwariman dabi'ar halittar dan adam, musamman.

**Asali da Bunkasa**

Duk da cewa bincike na hakika a tsarin binciken kimiyya na zamani kan wannan fannin ilmi bai shige shekaru ashirin da wani abu ba, sai dai idan muka yi la'akari da tsarin zamantakewar dan adam a wannan duniya, dangane da tarihi, za mu samu shi ma tsohon fannin ilmi ne kamar sauran nau'ukan ilmin da suka danganci rayuwar dan adam.  Don haka idan ana maganar asali, a iya cewa lallai ilimi ne mai asali tun farkon samuwar halitta a doron kasa. Wannan a fili yake kamar yadda muka gani a misalan da suka zo cikin hadisan da suka gabata a Mukaddima.  To amma shahararsa da bunkasarsa basu kunno kai ba sai cikin 'yan shekarun baya.  Kafin wannan lokaci da muke ciki, akwai wasu marhaloli hudu shahararru da wannan fanni na ilimi ya ketare.

*Marhala ta Farko*

Kafin bayyanar tsarin binciken ilimin kimiyya irin na zamani, fannin Tsarin Gadon Dabi'u da Siffofin Halitta yana nan, kuma galibi mutane kan bambance dangantakar da ke tsakanin mutane ne ta hanyar dabi'un halitta na bayyane, wato kamar yanayin kirar jiki, da tsawo, da launin idanu, da launin gashin kai, da dai sauransu.  Amma a kimiyyance babu wasu abubuwa da ake iya tantance ingancin tabbacin wannan alaka.  A cikin wannan marhala ta rayuwar dan adam dai abin da aka dauka shi ne, mutane kan gaji dabi'un halitta ne daga iyayensu, ko danginsu, gaba daya, ba tare da wani kwange ba.  Ma'ana duk Uba ko Uwa, suna gadar wa 'ya'ya dukkan dabi'un halittarsu ne baki daya, babu kwange.  Wannan tsarin tunani, a binciken ilimin dabi'un halitta na zamani, shi ake kira "The Law of Blending Inheritance."  Wato ka'idar da ke nuna cewa dukkan halitta kan gadar wa zuriyarsu cikakken jerin dabi'ar halittar da suke dasu ne.  Ma'ana suna sajewa da su babu wani bambanci ko kadan.  To amma da tafiya tayi nisa a karni na 19 (19th Century), sai wata sabuwar mahanga mai dalili sama da wadda ta gabaceta ta bullo.

*Marhala ta Biyu*

A marhala ta biyu ne aka samu wata sabuwar mahanga dangane da abin da ya shafi tsarin gadon dabi'un halitta.  Wannan mahanga kuwa ta samo asali ne daga wani shahararren malami mai suna Gregor Mendel dan kasar Jamus, wanda ya gudanar da bincike kan nau'ukan shuke-shuke da yadda ake samun gadon dabi'u a tsakaninsu sanadiyyar "hadin-aure" da yayi a tsakaninsu, wato "Hybridization" kenan.  Ya yi gwaje-gwaje cikin shekarar 1865 inda ya fitar da sakamakon da ke nuna cewa, akan samu gabon dabi'un halitta a tsakanin jinsi da nau'ukan shuke-shuke, amma ba wai cikakkiyar gado ake samu ba, sabanin ra'ayin marhalar farko da ya gabata mai suna "Blending Inheritance."  Wannan ra'ayi na Gregor Mendel shi ake kira da: "Mendelian Inheritance."  A wasu lokuta kuma akan kira shi da suna: "Mendlism." A cikin wannan marhala ne har wa yau aka fara kiran wannan fanni da suna "Genetics."  Wanda ya fara kiran wannan fanni da wannan suna kuwa shi ne William Bateson, a cikin wata kasidarsa da ya gabatar a wani taron duniya da aka yi a birnin Landan kan "hadin-aure" tsakanin shuke-shuke, wato *3rd International Conference on Plant Hybridization,* cikin shekarar 1906. A wannan marhala, abin da tsarin bincike ya tabbatar na tsarin gadon dabi'un halitta duk a kan shuke-shuke ne, ba a gudanar da wani bincike na musamman ba kan kwayoyin halittar dan adam, dangane da abin da ya shafi fannin.  A halin yanzu wannan shi ne bangaren nau'in ilimin gadon dabi'un halitta da ake kira; "Classical Genetics."

*Marhala da Uku*

A shekarar 1911 kuma sai bincike kan bangaren kwayar halittar dake dauke da dabi'un halitta ya kunno kai. Wanda ya fara bincike kan wannan fanni kuwa shi ne Thomas Hunt, inda ya gano cewa lallai bangaren Ma'adanar Dabi'ar Halitta (Chromosome) ce ke dauke da wadannan dabi'un halitta masu haddasa gadon dabi'un halitta a tsakanin halittu masu rai.  A shekarar 1913 kuma bayan shudewar Thomas Hunt, sai wani dalibinsa mai suna Alfred Sturtevant ya tabbatar da cewa lallai Dabi'un Halitta (Genes) suna tsare ne, daya na bin daya, a jere a cikin wannan bangare na Ma'adanar Dabi'ar Halitta (Chromosome), ba wai a cakude suke ba ko a hargitse.  Bayan wannan hobbasa da Thomas da dalibinsa Alfred suka  yi, sai kuma wata muhawara ta kutso kai, cewa: tunda Dabi'un Halitta (Genes) ne ke taimakawa wajen samar da Sinadaran Kara Kuzari (Cell Protein) ga Kwayar Halitta (Cell), shin, tsakanin wannan sinadaran karin kuzari da Ma'adanar Dabi'ar Halitta (Chromosome), wanne ne daga cikinsu ke haddasa Gadon Dabi'un Halitta a tsakanin halittu masu rai?

Wanda ya fara kokarin gano hakan kuwa shi ne Frederick Griffith a cikin shekarar 1928. Sakamakon bincikensa ya gano masa wani tsarin juyin yanayin da ke faruwa a cikin Ma'adanar Dabi'ar Halitta (Chromosome) ne.  Wannan tsarin juyin yanayi, wanda Frederick ya kira da suna: "Transformation", wani mataki ne daga cikin matakan da ke samuwa kafin Gadon Dabi'un Halitta (Inheritance) ya samu a cikin Kwayar Halitta (Cell).  Da aka shiga shekarar 1944 kuma sai wani gungun masana su uku, wato: Oswald Theodore Avery, da Colin McLeod, da kuma Maclyn Mc-Carthy suka gudanar da bincike don tantance hakikanin abin da ke haddasa wannan tsarin juyin yanayi da Frederick ya kira "Transformation" a baya.  Sakamakon bincikensu dai ya nuna cewa, Madaukan Dabi'ar Halitta (DNA) ne ke haddasa wannan yanayi, wanda mataki ne da ke samar da Gadon Dabi'ar Halitta (Inheritance) a tsakanin halittu.  Ba su kadai ba, hatta gwajin bincike na musamman da Harshey da Chase suka gudanar a shekarar 1952 ya sake tabbatar da hakan.

A nasu bangaren kuma, masana James D. Watson da Francis Crick sun gudanar da bincike na musamman kan wannan Madaukan Dabi'ar Halitta (DNA), inda suka gano tsarinsa da cikakkiyar siffarsa.  Wannan bincike nasu sun gudanar dashi ne a shekarar 1953.  A cikin shekarar 1955 kuma aka sake gudanar da wani bincike kan Madaukan Dabi'ar Halitta (DNA), inda aka gano tasirinsa wajen samar da Sinadaran Kara Kuzari (Protein), wanda ke taimakawa wajen gina Tambarin Dabi'ar Halitta (Genetic Code) na kowane halitta.  Wadannan su ne al'amura muhimmai da suka faru a marhala ta uku cikin wannan fanni na ilimin Tsarin Gadon Dabi'un Halitta (Genetics).

*Marhala ta Hudu*

Marhala ta hudu, wadda ke cike da ci gaba a fannin kimiyya da kere-kere, ita ce marhala ta karshe da wannan fanni na tsarin Gadon Dabi'un Halitta ya kutsa.  Wannan marhala ta faro ne cikin shekarar 1977, lokacin da wani masani mai suna Frederick Sanger ya gudanar da bincike na musamman kan yadda Madaukan Dabi'ar Halitta (DNA) ke jera Dabi'un Halitta (Genes) a kwayar halittar rayuka. Sakamakon wannan bincike, wanda Malaman kimiyya ke kira: "DNA Sequencing," yana da muhimmanci matuka a wannan fanni na ilimi.

Bayan sakamakon wannan bincike, a shekarar 1983 kuma sai ga Kary Banks Mullis, wani masani ne kan wannan fanni, inda bayan tsawon lokaci yana gudanar da bincike ya fitar da sakamako kan yadda ake iya tsame sinadarin Madaukan Dabi'ar Halitta (DNA) daga sauran sinadaran da ke mahallin Ma'adanar Dabi'ar Halitta (Chromosome).  Wannan wani mataki ne da ya samar da karin sanayya kan Dabi'un Halitta (Genes). Wannan sabon tsari da Kary Banks ya hankado shi ake kira "Polymerase Chain Reaction," (PCR).  Daga nan aka ci gaba da gudanar da bincike na kwakwaf cikin wannan fanni, ta hanyar amfani da sababbin na'urorin binciken kimiyya da fasahar sadarwa da kere-kere, wajen gano wasu al'amura da suka buya a lokutan binciken shekarun baya. Babban hobbasa da aka yi wajen tantance matakin da ake ganin shi ne na karshe wajen bunkasa wannan fanni shi ne sakamakon binciken da ya tabbata a shekarar 2003, shekarar da aka kammala bincike kan adadin Dabi'un Halitta da ke cikin kwayoyin halittar jinsin dan adam baki daya.

Wannan aikin bincike na musamman wanda aka masa suna **THE HUMAN GENOME PROJECT,** hukumar Kiwon Lafiyar Kasar Amuka da Kamfanin Binciken Dabi'un Halitta mai suna **Celera Genomics** ne suka dauki nauyin aiwatar da shi.  A sakamakon binciken ne aka tantance cewa jinsin dan adam na dauke ne da adadin Dabi'un Halitta (Genes) tsakanin 20,000 zuwa 25,000.  Har wa yau sakamakon binciken ya dada tabbatar da cewa, lallai fahimtar yadda wadannan Dabi'un Halitta ke jituwa ko kasa jituwa a tsakaninsu ne zai taimaka wajen samar da waraka ga cututtukar da ke addabar al'ummar duniya baki daya.  Wannan hobbasa ne ya fitar da abin da na kira**: "Taswirar Tambarin Dabi'ar Halitta**," wato "**The Human Genome**."

Wadannan su ne shahararrun marhaloli hudu masu muhimmanci da wannan fannin ilimi ya kutso ta cikinsu.  Duk wani abin da ya danganci wannan fannin ilimi da ba a ambace shi ba, to, ya samo asali ne daga gare su.

**Rabe-raben Fannin Dabi'u da Siffofin Halitta**

Kamar sauran fannonin ilimi da muke dasu a yau, Malamai sun kasa wannan fanni na binciken dabi'u da siffofin halitta zuwa kashi hudu.  Sun yi hakan ne ta la'akari da fadinsa, saboda fanni ne mai fadi sosai, musamman a wannan zamani mai dauke da ci gaba a fannin kimiyya da kere-kere, wanda kuma ya dada taimakawa wajen kawo irin ci gaban da ba a samu ba cikin shekaru 100 da suka gabata.  Dalili na biyu kuma shi ne, saboda sawwake tsarin daukan ilimin da kuma gudanar da bincike a cikinsa don fa'idantar da al'umma. Dalili na uku kuma shi ne, don bambance asalin wannan fanni, da irin nau'in binciken da ya gudana a zamani ko marhala ta farko, da irin binciken da yake gudana a wannan zamani ko marhala da muke ciki.  Wannan shi zai taimaka wa malaman tarihi kan tsarin bincike a fannin dabi'u da siffofin halitta, don bambacewa tsakanin abin da aka yi a baya da wanda ake yi a halin yanzu.  Ga takaitaccen bayani nan kan kowanne daga cikin wadannan rabe-rabe guda hudu da ake dasu a halin yanzu.

*Fannin 'Yan Mazan Jiya*

Wannan shi ne bangaren binciken ilimin dabi'u da siffofin halitta mai lura da asalin fannin baki daya.  Shi ne bangaren da ke lura da dukkan al'amuran da suka faru a marhala ta farko, kamar yadda bayanai suka gabata a sashen baya.  Kuma shi ne bangaren da dukkan malamai suka yarda ya fi sauran inganci dangane da asali da kuma tasirinsa.  Wannan reshe ne ke bincike kan siffofin halitta na bayyane, wato *Phenotype,* da yadda kwayoyi halitta ke hayayyafa a tsakaninsu, wato *Cell Division,* don haifar da gadon dabi'u da siffofin halitta daga iyaye zuwa 'ya'ya ko zuriyarsu.  Daga cikin abin da wannan reshe na ilimi ya gano har wa yau, akwai dalilan da ke sa a samu bambancin jinsi wajen haihuwa sanadiyyar wasu dalilai na zahiri, kamar yanayin mahalli da tsarin jima'i a tsakanin jinsi biyu, da dai sauransu.

A wannan fanni ne aka gano tasirin mahalli wajen samar da jinsin halitta.  Misali, dabbobi irin su Kada, da Kunkuru, duk an gano cewa irin mahallin da suke yin kwai a cikinsa ne ke tabbatar da samuwar namiji za a haifa ko mace.  Sabanin jinsin dan adam, wanda hakan ke samuwa sanadiyyar dalilan dabi'ar halitta na boye da ke can cikin Madaukan Dabi'ar Halitta (Chromosome).  Bayan 'yan adam hatta dabbobi da shuke-shuke, ta sanadiyyar wannan fanni ne aka gano irin tasirin mahalli da dabi'un halittar da ke cikin kwayar halittarsu wajen samar da yabanya, ko yawan hayayyafa da dai sauransu.

A wannan reshe ne har wa yau ake gudanar da bincike kan dalilan da ke haddasa samuwar cututtuka daga iyaye zuwa 'ya'yansu, sanadiyyar bambanci ko tangardar da ake samu a tsakanin sinadaran dabi'un halitta.  Wannan fanni ne ke tabbatar da tsarin gadon dabi'u da siffofin halitta a zahiri, wato Genetic Inheritance kenan.  Kuma shi ne fannin farko da ake takama da shi a duniya baki daya.  Dukkan sauran fannonin suna dogaro ne a gare shi wajen gina abin da suke gudanar da bincike a kansa.  Shi yasa hatta a Jami'o'in da suke karantar da fannin Gadon Dabi'u da Siffofin Halitta (Genetics), wannan shi ne reshen farko da ake fara karantar da dalibai kafin a haura zuwa wani reshe da ke dogaro kan tsarin binciken kimiyya da fasahar zamani.

Idan muka yi la'akari da hadisan da muka kawo a baya, inda Manzon Allah ke tabbatar da bambancin launin jiki, da bambancin jinsi wajen saduwa tsakanin namiji da mace, za mu fahimci cewa duk sun kunshi abubuwan da wannan reshe ne ke bincike a kansu.  Haka sakamakon binciken babban masanin kimiyyar nan mai suna Gregor Johann Mendel dan kasar Jamus da bayani ya zo kansa a baya, inda ya tabbatar da samuwar gadon dabi'u da siffofin halitta a tsakanin kwayoyin halittar shuke-shuke da mutane, duk yana dogaro ne kan wannan reshe.  Haka sauran ra'ayoyin magabata kan fannin kimiyya da suka zo kafin rubutun tarihi, duk da cewa wasunsu a cike suke da kurakurai, amma galibi bayanansu na ishara ne zuwa ga abin da wannan reshe ke karantarwa.  Don haka ake kiran wannan reshe da suna "Classical Genetics" a Turance, wato "Fannin Ra'ayin Mazan Jiya."  Wasu sunayen da ake kiransa da su sun hada da "Mendelian Genetics" da kuma "Transmission Genetics."

*Fannin Sinadaran Dabi'ar Halitta*

Fanni na biyu shi ne wanda ke dogaro kai tsaye ga tsarin bincike kan yanayin sinadaran dabi'ar halitta, wato *"*Molecules."  Abu na farko da wannan reshe ke bincike kansa shi ne asalin "Dabi'ar Halitta" (Genes) da ke cikin kwayar halittar kowace rai.  Aikin wannan fanni ne gudanar da bincike kansa, da yanayinsa, da tsarinsa.  Shi yasa wasu ke danganta wannan reshe da ga tsarin binciken dabi'ar halitta na zamani, wato kishiyar reshen da ya gabata kenan.

Bayan asalin dabi'ar halitta, wannan reshe na gudanar da bincike kan Ma'adanar Bayanan Dabi'ar (DNA), da Sinadaran Kara Kuzari da ke cikin kwayar halitta (Cell Protein), wadanda ke sana'anta kowane kwayar dabi'a da siffar halitta a cikin kowane mai rai.  Wannan reshe ne ke bayanin yadda dan adam ke samuwa daga kwayar halitta (Cell) zuwa yadda yake a halin yanzu.  Reshen ne ke lura da tsarin gudanuwar jijiyoyi da kiftawar idanu da kuma dabi'ar jure cututtuka, duk a mahangar dabi'ar halitta.

Daga cikin aikin wannan reshe har wa yau akwai bincike kan yadda dabi'un halitta ke bayyana kansu da siffofinsu ga kowace halitta, wato "Genes Expression."  Sannan yana bincken dalilan samuwar cututtuka irinsu Sankara (Cancer) ta hanyar gamayyar dabi'un halitta, da yadda ake magance mantsalolin tangardar dabi'ar halitta (Genes Therapy) da kuma kwaskwariman dabi'ar halitta ta hanyar kimiyya da fasahar zamani (Genetic Engineering).

Wannan reshe, a takaice, shi ake kira "Molecular Genetics" saboda tsananin dogaronsa kan asalin sinadaran da ke samar da dabi'un halitta, da kuma amfani da tsari ko hanyoyin binciken zamani don tantance al'amuran da suka danganci fannin baki daya.

*Fannin Bambancin Dabi'u*

Reshe na uku shi ne fannin Bambancin Dabi'u.  Wannan fanni ko reshe yana bincike ne kan bambance-bambancen da ake samu tsakanin nau'ukan halittu sanadiyyar kebantuwarsu, ko yanayin mahallinsu, ko yanayin jima'i a tsakanin jinsinsu, ko kuma dabi'un rayuwarsu.  Ba nan kadai ba, fannin na lura da wadannan abubuwa ne tare da karkasa nau'ukan da suka danganci junansu a mahangar binciken ilimin dabi'un halitta.

Wannan reshe ne ke taimakawa wajen gano kamaiceceniya tsakanin nau'ukan dabi'un halittar mutane ko dabbobi, da yadda za a samar da magungunu ko hanyoyin waraka a likitance, don magance sauyin dabi'un halitta (Gene Mutation) da ke faruwa ko samuwa a cikin Ma'adanar Dabi'ar Halitta, wato DNA.  Bayan gano wadannan bambance-bambance, sai a rarraba su rukuni-rukuni, don tantance abin da ke hada alaka a tsakaninsu.  Idan aka samu wasu matsaloli da suka danganci kebantuwarsu, sai a yi tunanin yadda za a samar da waraka.

Don tabbatar da fahimta a kwakwalwar mai karatu, sun kawo misali da daya daga cikin dabbobin dajin Afirka mai da aka si sani da suna "Cheetah", wacce Allah ya hore mata kudurar gaugawa, da zafin nama, da juriyar gudu na tsawon lokaci, da kaifin basira wajen fahimtar abin da zai cutar da ita.  Da malaman ilimin dabi'a da siffofin halitta suka gudanar da wani bincike na musamman kan Dabi'ar Halittar wannan dabba don fahimtar abin da ke kebance ta daga sauran dabbobi masu dabi'a irin nata.  Sakamakon binciken ya nuna cewa jinsin wannan dabba ta "Cheetah" dabi'un halittarsu duka iri daya ne.  Sabanin sauran dabbobi da ake samun bambancin dabi'un halitta a tsakanin jinsi daya.  Da wannan malaman ilimin fannin dabi'ar halitta suka tabbatar da cewa akwai barazanar karewa da ke fuskantar jinsin wannan dabba.  Suka ce da zarar an samu wata cuta wacce ke iya kashe su nan take, ba za a iya samun hanyar ceto jinsin nasu daga karewa ba.  Saboda babu inda za a samu dabi'ar halitta irin tasu da za ta dace da dabi'unsu na zafin nama, da kuzari, da kuru, da kaifin basira wajen kaucewa daga abokin gaba, sannan da hikimar nemo abinci da sauransu.  Wannan fanni dai a yanzu shi ake kira da suna "Population Genetics."

*Fannin Alaka Tsakanin Dabi'ar Halitta da Siffofi*

Wannan shi ne fanni ko reshe na karshe, wanda aikinsa shi ne gudanar da bincike kan alakar da ke tsakanin dabi'ar halitta (Genes) da kuma siffofin halitta na bayyane.  A wannan fanni ne ake fahimtar da alakar da ke tsakanin siffar halitta – misali, saurin tafiya ga mutane, ko dabar iya nemo inda abu yake ga karnuka, ko yawan kwai ga tsuntsaye da jinsinsu, ko kuma dabi'ar yawan yado da yabanya ga shuke-shuke ko tsirrai da bishiyoyi.  Wadannan dukkansu dabi'u ne da siffofin halitta da suke kebance wasu jinsin halittu, ta wannan reshe ake gano alakar da ke tsakanin wadannan dabi'u na halitta da siffofinsu.

Masana a wannan fanni ko reshe ne amfani ne da ka'idar "Quantitative Trait Loci", wato "TQL" a gajarce.  Da wannan ka'ida ne suke amfani wajen fahimtar wannan alaka, musamman wajen gano yabanya a shuke-shuke da bishiyoyi, da kuma yawan 'ya'ya ko ingancin rayuwa ga dabbobi.  Wannan fanni shi ake kira "Quantitative Genetics," kuma fanni ne mai cike da sarkakiyar lissafi da hasashe a fannin kimiyyar lissafi.

**Muhimmanci Ga Al'umma**

Fannin gadon dabi'u da siffofin halitta yana da fadi sosai, kuma yana da sarkakiya matuka.  Amma duk da haka, babu wani fanni mai ci sosai yanzu a duniya, daga cikin nau'ukan bangarorin ilimin da ke karkashin fannin likitanci, irin wannan fanni.  Wannan tasa yake da muhimmanci sosai, saboda tasirinsa kan kusan dukkan halittar da ke bayan kasa baki daya.  Wannan sashe zai dubi muhimmancin da wannan fanni yake da shi ne, da fa'idojin da yake samarwa ba ga likitoci kadai ba, wajen sawwake musu ayyukansu, har ga kowa da kowa.

*Cututtuka "Marasa" Magani*

Daga cikin ci gaban da aka samu da bayyanar wannan fannin ilimin likitanci shi ne, da yawa daga cikin cututtukan da a baya aka kasa samun waraka daga gare su sanadiyyar yanayinsu da tsaurinsu wajen karban magani, yanzu an gano cewa ba cututtuka bane wadanda ake iya warkar da su ta hanyoyin da aka bi a baya, saboda irin asali da yanayin da ke haddasa su. Cututtuka irin su cutar Asma, da Sankara (Cancer), da cutar Siga (Diabetes), da na Hauhawan jini (Hypertension), duk suna cikin cututtukan da aka ta bugawa da su a baya wajen magani, ba tare da samun wani natija mai fa'aida ba.  Amma sanadiyyar bunkasar wannan fannin ilimi, yanzu an gano cewa cututtuka ne masu alaka da dabi'u da siffofin halitta da mutum ke iya gadonsu daga wajen iyaye ko kakanninsa.  Wannan tasa aka sauya mahanga wajen magance su, daga amfani da kwayoyi ko canza tsarin rayuwa wajen rage damuwa da bakin ciki, zuwa la'akari da tsarin kwayoyin halitta da gwajinsu ga masu niyyar aure, don kauce wa haifar 'ya'ya masu kamuwa da ire-iren wadannan cututtuka a gaba.

Wannan shi ne abu mafi muhimmanci na farko da wannan fanni ya gadar wa al'umma a yanzu. Da zarar an samu wata cuta da ta bayyana tana ta ta'asa cikin al'umma, an yi magani an kasa magance ta, nan take sai a debi kwayoyin halittar wadanda abin ya shafa a yi gwaji, daga nan ana iya gano asalinta, idan har ta danganci dabi'u da siffofin halitta ne.  Wannan ya dada taimakawa gaya wajen habaka bincike mai inganci a fannin likitanci, da zummar neman hanyoyin magancewa tare da hana yaduwar cututtuka da dama wadanda a baya suka gagari masana harkar lafiya.

*Habaka Harkar Noma da Samar da Abinci*

A zamanin baya manoma kan yi wasu 'yan dabaru wajen kokarin samar da sabon irin shuka na abinci ta hanyar "hadin-aure", wato "Crossbreeding," tsakanin jinsin shuka guda daya ko daban-daban.  Wannan wata hanya ce da duk aka amince cewa ta sanadiyyarta an samu habaka tsarin noma da hanyar samar da sabon nau'in irin abinci.  Sai dai a yanzu an fi amfani da wannan hanya wajen aiwatar da hakan a saukake, musamman a kasashe masu ci gaban tattalin arzikin kasa.  Domin a yau akan dauki nau'in dabi'ar halittar wata shuka ko wata dabba, a sanya shi cikin kwayoyin halittar wani irin shuka daban, don gadar wa wannan irin shuka wasu dabi'un da ake bukata.

Misali, a kasashe masu fama da farin dango, ko kwari masu lalata shuke shuke, a kan yi amfani da kwayoyin halittar da ke dauke da samfurin sinadarin da ke kashe kwari ko wanda suka tsana, sai a shigar da shi cikin kwayoyin halittar irin shukan da ake bukata.  Da zarar an shuka ta tsiro, duk kwarin da suka nufaci wannan shuka nan take za su mutu.  Haka a kasashen da ke fama da tsananin sanyi, wanda hakan ke yin mummunan tasiri kan shuke-shuke, sai a dauki dabi'un halittar wani nau'in kifi da ke karkashin teku, a shigar da shi cikin kwayoyin halittar wannan irin shuka.  Da zarar shukar ta tsiro, duk yadda sanyi ya kai da kasaita, ba zai yi mummunar tasiri a kan ta ba.  Haka za su tsira, su yi girma, har su fitar da kwaya sannan a girbe.

Haka idan ana bukatar yabanya mai kyau, ko zaki daga wani irin shuka, ko kamshi, ko kuma dadi daga wani nau'in abinci da ake so, sai a debi dabi'un halittar wata shuka mai zaki makamanciyar wacce ake so, a shigar cikin shukar da ake son shukawa.  Da zarar ta isa girbi, dukkan siffofin halittar da ake son ta siffafu da su nan take za ta fito da su.  Haka abin yake a fannin dabbobi da kifaye ko dabbobin ruwa, da dai sauransu.  Dukkan wannan ya samu ne ta sanadiyyar inganta bincike kan fannin dabi'u da siffofin halitta a kimiyyance.

*Inganta Fannin Tsaro*

Fannin gadon dabi'u da siffofin halitta ya samar da hanya mafi sauki wajen gano masu laifi musamman a kasashen da suka ci gaba, inda aka fi aikata miyagun ayyuka sosai babu kakautawa.  Gwamnatoci, ta hadin gwiwa da likitoci suna amfani da wannan fanni wajen gano tambarin hannu da kuma kwayoyin halittar masu laifi, don kama su da gurfanar da su a gaban kuliya.  Idan aka yi sata ko kashe kashe a wasu wurare, a kan dauki abubuwan da aka samu a wurin, wadanda masu laifi suka bari ko suka taba.  A kan wadannan kayayyaki za a gudanar da bincike, a ciro kwayoyin halittar da aka samu a jikinsu.  Da wadannan kwayoyin halitta ne za a gano nau'in jini, da nau'in jinsi, da nau'in dabi'ar halittar wanda aka gano tambarin hannunsa.  Tunda suna da rumbun adana bayanan 'yan kasa baki daya ta kwamfuta (National Database), nan take za a gano wanda ke da wadannan siffofi na halitta, sannan a nemi adireshin gidansa.  Da zarar an same shi a kamo shi.  Idan kuma wadanda aka kama ne misali, sai a musu gwajin dabi'ar halitta ko gwajin kwayoyin halitta, don tabbatar da dacewarsu da abin da aka samu a wajen aikata laifi.  Wannan hanya ce mai kyau kuma mai inganci wajen tantance wa ya aikata me, kuma a ina?

*Tabbatar da Nasaba tsakanin Al'umma*

Wannan abu ne mai muhimmanci da fannin dabi'u da siffofin halitta ya samar a duniya.  Tabbas a baya al'ummomi daban-daban sun samar da hanyoyin tabbatar da nasaba a tsakaninsu.  Wasu al'ummomin suna amfani ne da tsarin rubutu, da tantance duk wadanda aka haifa a kowace shekara, da nasabarsu, da danginsu.  A wasu al'ummomin kuma suna amfani da dattawa ne, wadanda Allah ya hore musu kaifin haddace abubuwa, don tabbatar da nasabar jama'a.  Sai dai wani abu sabo da wannan fanni ya kawo shi ne, idan rikici ya sarke tsakanin jama'a kan nasabar wani; wannan na cewa "da na ne", wancan na cewa "nawa ne," ta hanyar daukan samfurin kwayoyin halittarsu kadai ana iya gane waye ke da dan daga cikinsu. Wannan hanya ce mai sauki. Wanda in da a zamanin baya ne, sai an nemo masana kan sanin bambance-bambancen tsarin jiki, da murya, da fuska, da girman yatsun kafa da na hannaye, da dai sauransu.  Amma a yau sai dai kawai a debi jininka, ko yawunka, ko kuma numfashinka, da na wanda ake son riskar da nasabar gare shi, a yi gwaji.  Wannan ita ce hanya mafi inganci wajen tantance nasaba da dangantaka, kuma malaman musulunci sun yi amanna da wannan tsari.  Shi yasa Shehu Usmanu ibn Fodio, Mujaddadi, Allah rahamshe shi yake cewa, wajibi ne ga kowace gwamnati ta kafa hukumar lura da nasabar al'umma, don kada a samu cakuduwa, wanda hakan na iya haddasa rikici mai girman gaske, musamman wajen gado, da dangantaka, da suna, da kuma neman hakkin dan uwa.

*Tabbatar da Kariya daga Cututtuka*

Alkaluman bayanai sun tabbatar da cewa a yanzu akwai mutane miliyan 200 da suke fama da cututtuka masu alaka da dabi'u da siffofin halitta; ma'ana, sun gado wadannan cututtuka ne daga iyayensu, ko dangin iyayensu, ko kakanninsu, ta hanyar kwayoyin halitta a lokacin haihuwa.  Bayyana da bunkasar wannan fanni ya taimaka wajen samun kwararru masu baiwa jama'a shawarwari kan abin da ya kamata su yi kafin auratayya tsakaninsu da mata.  Ko kuma ga wadanda suka riga suka yi aure, akan shawarce su da aiwatar da gwajin kwayoyin halitta (Genetic Test), don tabbatar da cewa babu cin karo mai haifar da cututtuka ga 'ya'ya idan an tashi haihuwa, a tsakanin kwayoyin halittar ma'auratan biyu.  Wannan yana da muhimmanci sosai, hatta malaman musulunci a wannan zamani suna kira da lallai ya kamata ga masu niyyar aure su yi wannan gwaji, don tantance tsari da kintsin kwayoyi da dabi'un halittar jikinsu.  Idan akwai cin karo, likitoci kan bayar da shawara kan abin da ya kamata su yi bayan auren ko kafin auren.  Idan rabuwa ce, su rabu shi yafi alheri, tunda ba a riga aka daura auren ba.  Idan kuma wasu magunguna ne za a basu, duk sai a basu a lokacin.

To amma galibi musamman a kasashe masu tasowa, ba mu cika damuwa da hakan ba, saboda rashin wayar da kai daga wajen hukuma, ko kuma muna tsoron kada a samu tangarda, alhali ba za mu iya rabuwa da wacce muke so ba.  A nan, fannin gadon dabi'u da siffofin halitta ya samar da kariya mai muhimmanci wajen kare ma'aurata gadar wa 'ya'yan da za su haifa wasu cututtuka, wadanda da a ce an yi auren ba tare da gwaji ba, suna iya afkawa cikin lalura mai girman gaske.  Domin lura da 'ya'ya masu ire-iren wadannan cututtuka (kamar Sicklers misali), abu ne mai matukar wahala wajen kudi, da lokaci, da juriya, da hakuri.  Akwai baiwar Allah da na sani da Allah ya jarrabe  ta da nau'in cuta mai alaka da dabi'a da siffofin halitta.  Sai ka tausaya mata.  Idan a makaranta take, ba a mako uku mai kyau sai an dawo da ita gida.  Wasu lokuta ta sume, wasu lokuta a kasa gane kanta.  A takaice dai ba ta da iko kan sarrafa lokutanta. A kowane lokaci tana iya kamuwa da rashin lafiya.

*Tantance Asali da Tarihin Al'ummomi*

Ta hanyar fannin gadon dabi'u da siffofin halitta an tantance al'ummomi da dama, an kuma gano asalin wasu da dama.  Sannan an fahimci dalilan da suka sa ake samun wasu launukan jiki masu sabanin na jama'a, ga wadanda suke zaune a wuri daya.  Misali, akwai wasu kabilu a kasar Amurka da ake kira "Hopi," can wajen jihar Arizona.  Mutane ne masu bakin gashin kai, da bakin fatar jiki, da bakin gudan idanu.  Suna cikin rayuwa sai kawai suka fara haifar wasu 'ya'ya masu fararen fatan jiki sal, masu fararen gashin kai sal, masu launin idanu sabanin irin na iyayensu.  Masu irin wannan nau'in halitta su ake kira "Zabya" ko kuma "Albinos" a turance.  Ana fara haka sai masana tarin kasar Amurka suka ce ai wata al'umma ce daban.  Amma da fannin ilimin gadon dabi'u da siffofin halitta ya bayyana, sai aka gano cewa ba wai wata al'umma bace daban, tangardar dabi'un halitta aka samu (Genetic Disorder) tsakaninsu da iyayensu wajen halitta.  Abin da ke faruwa shi ne, daga cikin sinadaran halitta da ke samar da dan adam akwai sindarin da ake kira "Melanin," wanda ke samar da launin fatar jiki, da launin idanu, da launin gashin kai da na jiki, da duk inda wani launi yake a jiki.  To amma idan aka samu matsala wajen halitta ya zama akwai rashin dacewa tsakanin dabi'un halitar uba da na uwa a bangaren wannan sinadarin Melanin, sai a haifi yaro fari sal, komai na jikinsa fari, babu wani launi da zai danganta shi da mahaifinsa ko mahaifiyarsa.  Wannan sakamakon bincike ya samu ne ta hanyar bunkasar fannon gadon dabi'u da siffofin halitta.

*Fahimtar Gamewa da Karfin Kudurar Ubangiji*

A karshe, bayyanar wannan fanni da irin tasirinsa wajen bunkasa bincike don fahimtar tsarin halitta ya dada taimaka wa musulmi musamman wajen fahimtar gamewa da karfin kudurar Allah madaukakin sarki.  Domin idan aka nuna maka kwayar halitta za ka yi mamakin yadda za a ce maka ta haka ne dan adam ke samuwa.  Daga launin idanunsa, zuwa tsawon yatsunsa, da gajartar jikinsa, da kaurin hancinsa, da laushin fatar jikinsa, da tsawon gashin jikinsa, da tsarin hakoransa, da tsarin lebbansa, da yanayin tafiyarsa, da yanayin fahimtarsa, da yanayin natsuwarsa, da kimar hankalinsa, da fadin iliminsa, da fahimtar muhallinsa, da nau'in farin cikinsa, da saurin fushinsa, da jinkirin fahimtarsa, da dai sauransu.  Wannan duk yana nuna mana iya girma da fadin kudurar Allah ne, wajen kwarewa da halitta, da hikima, da kuma tassarafi cikin halittarsa baki daya.  Albarkokin Allah sun yawaita, wanda shi ne mafi kyawon masu halitta.

**Tallafi Daga Fannin Kwamfuta da Sadarwa**

Kamar yadda mai karatu ya karanta a baya, wannan fanni na Tsarin Gadon Dabi'u da Siffofin Halitta, wato *Genetics,* fanni ne da ke saurin habaka, duk da tsauri da tsananin tsadar bincike da fannin ya siffantu da su.  Daga cikin dalilan da suka haddasa wannan ci gaba a cikin shekarun da basu wuce ashirin da biyar ba, akwai ci gaba a fannin sadarwa da kwamfuta, ko kuma fannin sarrafa bayanai dai a takaice, wato *Information Technology* kenan. Wannan a fili yake.  Domin duk wanda ya dubi tsarin gudanar da bincike a wannan fanni, ya san kwarin idanu, da kaifin gani kadai ba su isa su taimaka wa fannin ci gaba ba, sai da tallafin ci gaban kimiyyar sadarwa da kere-kere.  Domin dukkan sinadaran da ake gudanar da bincike a kansu ba abubuwa bane da ake iya gani da kwayar idanu, nan take.  Galibinsu sai ta hanyar na'urar kambama abubuwa (Microscope) ake iya hangarsu, a fahimci yanayinsu, a yi nazarin tsarinsu da abin da suka kunsa, kafin a gano duk abin da ake son ganowa don taskance su a rubuce ko a zane.

Wannan sashe zai yi dubi ne zuwa ga wasu daga cikin shahararrun masarrafai ko manhajojin kwamfuta da kwararru kan wannan fanni suke amfani da su wajen tantance tsarin bincike a wannan fanni na Tsarin Gadon Dabi'u da Siffofin Halitta (Genetics).  Akwai bangarori shahararru da wadannan masarrafai suka shafa, kuma za mu dubi nau'ukan manhajojin kwamfuta da aka gina a cikinsu, masu amfani a babbar manhajar *Windows* na kamfanin *Microsoft Inc.* Na farko, kwai manhajoji na musamman a bangaren nazari da tantance yanayin Madarar Dabi'un Halitta, wato: "Deoxyribonucleic Acid" ko "DNA" a takaice.  A bangare na biyu kuma, akwai manhajoji ko masarrafan kwamfuta da aka gina don nazarin mahallin DNA, da sauran sinadaran da suka dangance shi, wajen fahimtar tsarinsu da gudanar da bincike kansu.  Na uku akwai manhajoji na musamman kan nazarin sinadaran kara kuzari da ke cikin kwayar halitta, wato: *Cell Protein Analysis.* Na hudu kuma sai manhajoji da aka gina kan nazarin fannin alakar da ke tsakanin kwayoyin halitta wajen bunkasa da habaka, ba bangaren kamaiceceniya wajen dabi'u ba kadai.  Wannan fanni kuwa shi ake kira *Phylogenetics.* Duk da cewa a farko ba mu tabo wannan fanni ba, amma ganin cewa muna nazarin manhajojin ne a jumlace, shi yasa na kawo mana.  Bayan wadannan fanno akwai wasu fannonin dai daban.

Kafin mu ci gaba, zai dace mai karatu ya fahimci cewa, su wadannan manhajoji na kwamfuta aikin su shi ne tantance bayanan da aka shigar musu a rubuce, ko a tsarin hotuna, ko kuma a tsari ko yanayin zane.  Sannan bayanan na iya kasancewa ta hanyar tsarin shigar da bayanai ne, wato a rubuta da hannu ta hanyar allon shigar da bayanai na kwamfuta, wato: Keyboard, ko kuma ta tsarin wasu manhajoji ko na'urorin sadarwa, irin su na'urar daukan hotuna, wato *Scanning Machine,* ko na'urarorin tantance zafi ko adadin sinadarai da ake amfani da su irin su: *PCR Machine (*wato *Polymerase Chain Reaction Analysis)* da aka saba amfani dasu a dakunan binciken kimiyyar sinadarai tun sama da shekaru ashirin da suka gabata.  Ta wadanan hanyoyi ne ake samun bayanan da wadannan manhajojin kwamfuta da za mu yi magana a kansu yanzu ke sarrafawa, don taimaka wa likitoci ko masu bincike a wannan fanni fahimtar alaka, da kamaiceceniya, ko bambance-bambancen da ke tsakanin nau'ukan kwayoyin halitta da siiffofi da kuma dabi'unsu.

*Manhajojin*

A fannin nazarin Madarar Bayanan Dabi'ar Halitta, wato DNA, akwai manhajar MyRAST wacce ke taimakawa wajen tantance nau'ukan kwayoyin halittar dabbobin da kwayar halittarsu bata kai ta dan adam ba wajen bunkasa. A baya abu ne mai wahala a iya tantace wadannan kwayoyin halitta a bangare daya, tare da sanya musu rubutacciyar alama, cikin tsibin bayanan da ake dasu kan nau'ukan kwayoyin halitta.  Amma samuwar wannan manhaja ta taimaka matuka, inda a rana daya, bayan tara dukkan bayanan da ake dasu kan kwayoyin halitta, da wannan manhaja sai a tantance kowane irin kwayar halitta daban, tare da alamar kowanne, don sawwake ayyuka da tsarin bincke.  Sai manhaja mai suna Gene Designer, wadda ke taimakawa wajen tattaro bayanan sinadaran *Amino Acid* da ke kwayar halitta, da kuma sinadaran Madarar Dabi'ar Halitta a daya bangaren, don fahimtar yadda wadannan sinadarai ke haduwa wajen samar da kamaiceceniya tsakanin halittu ko zuri'o'i.

Sai manhajar *CLC Free Workbench*, wadda ke taimakawa wajen hado bayanan da suka shafi Madarar Dabi'ar Halitta (DNA) da sinadaran kara kuzari na kwayar halitta (Cell Protein), tare da tsara su a reshe daya, don taimaka wa masu bincike yin fashin-baki kan alakokin da ke tsakaninsu.  Mai nazari na iya samun wadannan bayanai cikin shafi guda, ta hanyar wannan masarrafa.  Sai masarrafa mai suna *Geneious*, wadda kamfanin *Alexei Drummond Biomatters Ltd* da ke birnin Auckland na kasar New Zealand ya gina.  Amfanin wannan masarrafa dai shi ne taskance bayanan da suka shafi dukkan Taswirar Dabi'ar Halittar dan adam baki daya, wato Human Genome, a cikin kwamfuta, tare da sawwake hanyoyin mu'amala da bayanan cikin sauki.  A takaice dai wannan masarrafa ko manhaja kamar "Rumbun Bayanan Kwayoyin Halitta" ne, mai dauke da kafofin karawa, ko ragewa, ko nemowa, ko adanawa, ko kuma tasarrafi da su baki daya.

Akwai kuma manhajar ganin taswira da hotuna da bayanan da suka shafi kwayoyin halitta da dukkan abin da ya dangance su, cikin sauki.  Wannan manhaja kuwa ita ce: *Genome2D,* wacce aikinta shi ne budo bayanan kawai, a kowane irin siffa ko yanayi suke.  Sannan kana iya aikawa da bayanan da kake bukata cikin sauki, zuwa wani mahallin don sarrafa su.  Sai manhajar *PHIRE,* wanda aka gina da tsarin gina manhajar kwamfuta mai suna *Visual Bacic* na kamfanin *Microsoft.* Wannan manhaja dai aikinta shi ne taimakawa wajen binciko (ta hanyar tambaya – search) nau'ukan kwayoyin halitta masu dauke da cututtuka (Bacteriophage) da ke jerin bayanan Taswirar Dabi'ar Halitta, tare da tare da tantance su ta yanayi da tsari mai kayatarwa ga masu bincike ko nazari.  Su wadannan kwayoyin dabi'un halitta da suka harbu da cututtuka, ana amfani ne dasu wajen yin kwaskwariman wasu kwayoyin halittar, don haka ake taskance bayanansu don amfanin gaba.

Akwai kuma manhajar *MB DNA Analysis,* wadda Mista Oleg Simakov ya gina.  Wannan manhaja dai kyauta ce, kuma amfaninta shi ne iya tantace bayanan siffofin sinadaran kwayar halitta da ake bukata don yanke hukunci kansu.  Hakan kuwa ya hada da yanayin alakokin da ke tsakaninsu, da girman yanayinsu, da kuma lissafin madaukan da ke cikinsu, don tantance hakikaninsu, da dai sauran abubuwa masu gamsarwa wajen nazari da bincike.  Sai manhajar *GenePalette,* wacce ake amfani da ita wajen iya tsakuro bayanan taswirar dabi'ar halitta daga rumbun adana wadannan bayanai na kasar Amurka *(GenBank Database)*, kan nau'ukan kwayoyin halittar dabbobi daban-daban, tare da jero su ta yadda mai nazari zai iya ganinsu tsaf, har ya gudanar da nau'in nazarin da yake son gudanarwa a kansu.  Akwai kuma manhajar *UniPro DPview* wadda kamfanin *UniPro Bioinformatics Groups* da ke kasar Rasha ya gina.  Wannan manhaja na da muhimmanci ne wajen iya nemo bayanan taswirar dabi'ar halitta, tare da tantance kamaiceceniyar da ke tsakaninsu, sannan ta taimaka wa mai bincike wajen tsara alaka a tsakanin bayanan, ta hanyar wasu ka'idoji da zai iya ginawa.

Bayan wadannan har wa yau, akwai manhaja mai suna *SEQtools,* ita ma manhaja ce ta musamman da ake amfani da ita wajen gudanar da nazari kan madarar bayanan dabi'ar halitta, tare da sinadaran kara kuzarin kwayar halitta (*Cell Protein*), tare da jera su, da tantance bayanan da suka shafi sinadaran *Enzymes* da dai sauransu.  Akwai kuma manhajar *GENtle* mai taimakawa wajen gyara bayanan da suka shafi Madarar Dabi'ar Halitta (DNA), da sinadaran *Amino Acid,* da lura da rumbun bayanan kwayoyin halitta, da dai sauransu makamantansu.  Sai manhaja ta karshe da za mu dakata a kanta a bangaren nazarin madarar bayanan dabi'ar halitta (DNA) mai suna *DNA Club.* Wannan manhaja aikinta shi ne yin amfani da tsarin zanen hotuna mai inganci *(Vector Graphics)* wajen nazarin bayanan da suka shafi dukkan sinadaran kwayar halitta (Cell Properties).

A bangaren nazarin zane ko hotunan da suka shafi sinadaran mahallin Ma'adanar Dabi'ar Halitta *(Plasmid Graphics),* akwai manhajoji masu mahimmanci sosai.  Da farko akwai manhajar *Ape Plasmid Editor,* wadda Mista Wayne Davis da ke Jami'ar Utah ta kasar Amurka ya gina.  Wannan masarrafa aikinta shi ne zanen hotunan bayanan kwayoyin halitta da take daukowa daga Babbar Rumbun Bayanan Dabi'ar Halitta (GenBank) don nazarinsu, da kuma tsara taswira na musamman da ake iya amfani da masarrafar *BLAST* don tantance su.  Wannan masarrafa na amfani da launuka wajen tsara wadannan zane don kayatarwa. Manhaja ta gaba a wannan fanni ita ce: *pDRAW32* wadda ake amfani da ita wajen shigar da sunayen sinadaran madarar dabi'ar halitta (DNA), tare da tantance kusurwarsu a zanen taswirar mahallinsu. Kamfanin da gina wannan manhaja shi ne *AcaClone Software Inc.*

Sai manhaja ta musamman mai suna *Plasmid Processor,* wadda ake amfani da ita wajen bayyana hoton sinadaran da ke mahallin madarar dabi'ar halitta (DNA) don yin nazarinsa a makarantun jami'o'i da sauran cibiyoyin binciken kimiyyar sinadaran jikin dan adam.  Akwai kuma manhajar *BVTch Plasmid* wadda ake amfani dai ita wajen zanen hoton taswirar sinadaran mahallin dabi'ar halitta *(Plasmid Map),* a siffar tagwaye ko tilo *(Double or Single Strand).* Da wannan masarrafar za ka iya yin zanen, tare da lika wa kowane bangaren sinadarin suna ko alamar rubutu da ke nuna yanayi ko hakikaninsa.  Sai masarrafa ta karshe a wannan fanni mai suna *PlasmaDNA,* wadda ta masu koyon nazari ne a wannan fanni.  Tana taimakawa ne wajen gwama nau'ukan dabi'un halitta daban-daban don samun kamaiceceniya, wato *Gene Cloning* kenan. Sai kuma bayar da dama wajen taskance bayanan da suka shafi ayyukan da mai nazari yayi kan wadannan nau'ukan dabi'un halitta. Wannan manhaja ce mai sauki wajen ta'ammali ga dukkan mai nazari.

Wadannan su ne shahararrun manhajoji da aka gina masu taimaka wa masu nazarin sinadaran kwayoyin halitta a kimiyyance, tare da tsara su, don kokarin samar da waraka ga galibin matsalolin da ake dasu na cututtuka masu alaka da Tsarin Gadon Dabi'u da Siffofin Halitta a tsakanin jinsin mutane, da wuraren da suka fito, da kuma yanayin jikinsu.

**Tsarin Jirkita Dabi’un Halittar Irin Abinci**

A yau za mu dubi wani bangare ne daga cikin bangarorin da wannan fanni mai fadi ke dauke dasu. Wannan bangare kuwa shi ne bangaren da ke lura da kokarin masana kimiyyar dabi’ar halittar halittu wajen sauyawa ko jirkita dabi’un halittar irin abinci da muke shukawa a gonakinmu, don samar da wasu nau’ukan iri na abinci masu dauke da yanayi da dabi’un da suka sha bamban da na asali. Me yasa malaman kimiyya ke yin haka? Wasu irin abinci ne aka jirkita asalin dabi’unsu? Wasu kasashe suka shahara da haka? Meye alfanun da ke tattare da yin hakan a kimiyyance, da kuma fannin tattalin arzikin kasa? Shin hakan na da wani cutarwa ne? In eh, me da me ake tsoro? Wannan bangare ne na musamman dake fannin Tsarin Gadon Dabi’u da Siffofin Halitta, kuma a turance shi ake kira: **Genetic Modification of Crops,** ko **GMC** a gajarce.

**Ma’ana da Asali**

Kamar yadda bayani ya gabata a sama, wannan bangare da ake kira *GMC* shi ne yin amfani da kwarewar ilimin kimiyyar halittu wajen cirewa ko kara a kalla daya daga cikin kwayoyin dabi’un halitta (*Genes)* da ke cikin Tubalin Halittar (*Cells)* irin shuka na abinci (Crop Seed), don samar da wata fa’ida ta musamman. Hanyar da ake amfani da ita wajen yin hakan kuwa ita ce hanyar Magance Tangardar Dabi’un Halitta, wato **Genetic Engineering.** Wannan ita ce sabuwar hanyar aiwatar da wannan tsari. Ta sha bamban da hanyoyin da manoman da ke amfani, kamar hanyar aure tsakanin nau’uka mabanbanta daga cikin dabbobi ko irin shuka, wadanda aka fi sani da: **Selective Breeding,** da **Somaclonal Variation.**

Wannan sabon fanni ya samo asali ne daga kasar Amurka sama da shekaru ashirin da suka gabata. An fara sayar da nau’ukan jirkitattun irin abinci a kasar ne cikin shekarar 1994. Kafin wannan lokaci, masana sun fara gano wannan dabara ne tun cikin shekarar 1946, cewa ana iya daukan dabi’ar halittar wani irin shuki, a sanya wa wani. Cikin shekarar 1988 aka samu shukin farko ta wannan sabuwar hanya. Wannan nau’in shuka kuwa shi ne na sabon nau’in shukan taba mai iya jure kwayoyin bateriya da ke kashe shuke-shuken abinci.

Ana shiga shekarar 1994 kuma sai ga sabon nau’in irin shuka na tumatur, jirkitacce, mai iya jure tsawon lokaci bayan an tsinko daga gona, ba tare da ya zama tubus ba balle ya zagwanye. Wannan nau’in sabon iri bai jure tsawon lokaci ba saboda dan Karen tsada da kamfanin ya tsawwala masa. A shekarar 1995 kuma sai ga sabon irin masara jirkitacce, da waken soya, da kuma tumatur dai har wa yau. Ana shiga shekarar 2000 sai aka samar da nau’in shinkafa da suka kira *Golden Rice,* wanda aka jirkita shi don magance matsalolin ciwon ido ta hanyar shigar sinadaran *Vitamin A* a cikinsa. Zuwa shekarar 2011 an tabbatar da cewa kasar Amurka ce a gaba wajen samar da ire-iren wadannan jirkitattun nau’ukan irin shuka na abinci. An kiyasta cewa akwai a kalla nau’ukan irin shuka guda 25 jirkitattu a kasar, kuma kashi 91 na waken soya da ke kasar duk jirkitaccen iri ne, kashi 81 na masarar kasan jirkitacce ne, haka kashi 88 na irin audugan kasar shi ma duk jirkitacce ne.

**Tsarin Jirkitawa**

Wannan sabon tsarin inganta irin shuka, kamar yadda masu goyon bayan tsarin suke cewa, yana aukuwa ne ta hanyar debo daya daga cikin dabi’’un halittar wata irin shuka, a sa shi cikin Madarar Dabi’ar Halitta (DNA) na irin shukan da ake son jirkitawa, don wata fa’ida ta musamman. Misali, masana kan iya daukan wani nau’in irin shuka na masarar wata kasa a Afirka, irin wanda ke jure zafin rana, da jure rashin noma na tsawon lokaci, sai a dauki daya daga cikin nau’in dabi’un halitta (Genes) da ke cikin wannan irin masara na Afirka, a shigar cikin Madarar Dabi’ar Halittar (DNA) masarar kasar Amurka da ba ya iya jure zafin rana ko rashin noma na tsawon lokaci. Da zarar an shigar da wannan kwayar halitta, sai a ci gaba da renon wannan irin kwayar shuka da aka masa kari a dakin binciken kimiyya (Science Laboratory); daga tsira har girbewa.

A kasar Amurka misali, kamfanonin samar da amfanin gona ne ke tafiyar da wannan tsari. Kamfani zai nemi izini wajen hukuma don yin gwaji. Da zarar hukuma ta basu damar gwaji sai kama gwaji. Idan kamfani ya gama gwajin nau’in irin shukan da ya samar, babu matsala, sai ya sake neman izini wajen hukuma kan nomawa tare da sayar da wannan nau’in irin shuka da ya samar a gonarsa. A halin yanzu akwai kamfanoni sama da uku a kasar Amurka masu tafiyar da wannan aiki; a wajensu kadai ake iya sayan irin shuka jirkitattu.

**Muhawara Tsakanin Masana**

Tun sadda wannan tsari na jirkita dabi’un halittar irin shuka ya bayyana, babu shekarar da za ta shiga har ta kare ba tare da samun muhawara mai zafi a tsakanin masana kimiyyar halittu da dabbobi ba. Wannan muhawara kuwa kan kankama ne tsakanin masu goyon bayan wannan tsari, don tabbatar da inganci ko alfanunsa, da kuma wadanda ke ganin tsari ne mummuna da nan gaba zai kawo cikas a rayuwar duniya baki dayanta, ba ma kasar Amurka ba. Wannan muhawara ne ya raba kasashen duniya masu arzikin tattali zuwa biyu. Kasar Amurka na bangaren masu goyon bayan wannan tsari, domin kashi 90 cikin 100 na nau’ukan abincin da ake sayarwa a shagunan abincin kasar Amurka duk daga jirkitattun nau’in irin shuka aka samar dasu. A daya bangaren kuma akwai kasashen Nahiyar Turai da ke ganin wannan tsarin bincike ne mai hadari da bai kamata a danganta shi ga abincin mutane da dabbobi ba.

**Matashiya**

Ga wadanda suka saba bibiyar wannan shafi a kodayaushe, kasidu kan Tsarin Gadon Dabi’u da Siffofin Halitta, wato fannin da a harshen Turancin ilimin kimiyya ake kira *Genetics,* sun faro ne tun cikin shekarar da ta gabata. Idan ba a mance ba har wa yau, mun gabatar da kasidu har zuwa kashi na 7, wadda tayi magana kan tsarin jirkita siffofin da dabi’un halittar shuke-shuke da kayayyakin abinci da ake shukawa. Mun kawo ma’ana da asalin wannan fanni da har yanzu a duniya ake ta muhawara wajen fa’ida ko rashin fa’idarsa musamman a bangaren lafiyar jiki da muhalli. Wannan muhawara ce da za ta dauki tsawon lokaci ana fafatawa tsakanin masana masu goyon bayan tsarin, da kwararru da ke ganin wannan babu abin da zai jawo wa duniya illa matsala.

A yau cikin yardar Allah za mu ci gaba da tattaunawa kan wannan fanni na tsarin gadon dabi’u da siffofin halitta, wato *Genetics.* Wannan zai zama kashi na 8 kenan, ko kasida ta 8 daga cikin jerin kasidun da muka fara kawowa a wannan shafi cikin wannan fanni. Zan kuma yi kokarin ganin na lazinci jeranta su ba tare da yankewa na tsawon lokaci ba, don kauce wa mantuwa kan abin da kasidar baya tayi magana a kai. Duk da cewa wannan shafi ne da ke tattaunawa kan jimillar fannin kimiyya da kere-kere, wanda hakan ke bukatar a rika cakuda kasidun kan fannoni daban-daban.

Fannin da za mu duba shi ne bangaren abin da ya shafi Nau’in Dabi’ar Halitta na Zahiri, wato *Phenotype.* Idan mai karatu bai mance ba dai, a kasidar farko mun nuna cewa: Nau’in Dabi’ar Halitta, ko *Genotype* a kimiyyance, shi ne nau’in dabi’u da siffofin halittar da ya kebance kowane dan adam da zuriyarsa. Shi yasa ma idan ana son jingina wani jariri ko ‘ya’ya ko kokarin gano rashin alakarsu ga wanda ake alakanta su dashi, sai a musu gwajin Nau’in Dabi’ar Halitta, wato *Genotype Test.* Hakan na faruwa ne saboda ba abu bane da za a iya gani a zahiri, kamar siffar jiki; wajen tsawo ko gajarta ko laushi ko gautsi. Wannan Nau’in Dabi’ar Halitta (Genotype) da ke kebance mutane daga wadanda ba su ba, ita ce ke bayyana hakikanin yanayin siffa da daibi’ar mutum a zahiri. Wadannan dabi’u da siffar halitta ta zahiri, wadanda ke samo asali daga wancan Nau’in Dabi’ar Halitta ta boye, ita ake kira *Phenotype.* Wannan shi ne abin da kasidarmu ta wannan mako za ta duba, don tattaunawa kan yadda yake samuwa, da abin da ke haddasa shi, da kuma tsarin sauyawarsa.

**Kalmar *Phenotype***

A fannin ilimin kimiyyar sinadaran halitta, kalmar *Phenotype* ta samo asali ne daga wasu kalmomi guda biyu na harshen Girka (Greek). Kalmar farko ita ce kalmar *Phainein,* mai nufin “Nuna wani abu...” da kuma kalmar *Typos* da ke nufin “A kamanta.” Wadannan kalmomi biyu ne aka gwama su don samar da kalmar *Phenotype,* wadda a harshen sinadaran kimiyyar halitta ke nufin: “Nau’in dabi’ar halitta ta zahiri.” Wannan kuwa ya hada da dukkan abubuwan da ke bayyana siffar halitta da ake iya gani a fili, da wadda za a iya gani idan aka bude wani bangare na jiin dan adam. Ire-iren wadannan siffofi sun hada da: yanayin girman jiki, da tsawon hannu, da launin fatar jiki, da gajarta ko tsawon gabobin jiki, da launin idanu, da nau’in jini (Blood Group), da dabi’un mu’amala, da dabi’un zamantakewa, da yanayin fahimta, da yanayin hazaka, da kaifi ko dakushewar basira, da taushi ko laushin fatar jiki da dai sauransu abin da za a iya gani a kusa ko a nesa.

**Asali da Tarihi**

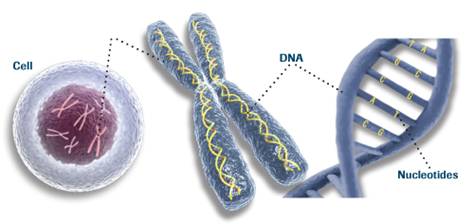
Duk da cewa fannin ilmin halitta na daga cikin dadaddun nau’ukan ilmin kimiyya, bunkasar fannin Nau’in Dabi’ar Halitta ta Zahiri bai samu ba sai bayan bincike na musamman da wani masanin fannin mai suna Wilhem Johannsen, a shekarar 1911 ya gudanar. Wannan shi ne kwararre na farko da ya fara gudanar da bincike na musamman kan wannan fanni da yadda yake samuwa. Ya gudanar da bincikensa ne kan tsarin gadon dabi’u da siffofin halitta tsakanin iyaye da zuriyarsu, da kuma yadda gadon ke kasancewa a aikace; wato boye da zahiri kenan. Wajen tabbatar da yadda ‘ya’ya ke gadon dabi’un halitta (wajen siffar tsawo da gajarta da dabi’un zuci da dabi’un halayya) ne ya gano cewa lallai akwai tasirin mahalli wajen samuwar wadannan abubuwa. Bayan shi masana da dama sun ci gaba da bincike don fadadawa tare da inganta wannan fanni ta hanyar binciken kwakwaf don kokarin tabbatar da wannan ka’ida ta ilimi.

Daga cikin shahararrun kwararru da aka sansu a wannan fanni akwai Richard Dawkins, wanda kwararren masanin ilmin kimiyya ne kuma marubuci. Dawkins dan kasar Ingila ne. Ya rubuta littattafai da dama kan fannin ilmin gadon dabi’u da siffofin halitta, wato *Genetics.* Littafin da kowa yafi sanin Dawkins dashi shi ne wanda ya rubuta kan wannan fanni, mai suna: *The Extended Genotype.* A cikin wannan littafi Dawkins ya nuna cewa, a yayin da ake bayanin tasirin mahalli wajen haddasa sauye-sauye ga halittar dan adam, ana takaituwa ne ga dabi’a ta zahiri, kuma ga wani mutum shi kadai. Wannan, a cewar Dawkins, nakasu ne ga wannan fanni, kuma shi yasa ya rubuta wancan littafi don tabbatar da wannan kuskure. Dawkins ya kawo misalai masu gamsarwa da ke nuna yadda Nau’in Dabi’ar Halitta ta Zahiri (Phenotype) ke samuwa ga wata halitta ta hanyar bayyana wata dabi’a da wata halitta daban tayi, a inda ko mahallin da wannan halitta take. Wannan littafi dai ya samu karbuwa matuka, kuma kundi ne na musamman ga duk wanda ke son karin bayani a wannan fanni na ilimi.

**Madogara**

Malaman fannin Nau’in Dabi’ar Halitta ta Zahiri sun nuna cewa wannan fanni na dogaro ga abubuwa guda uku ne. Abu na farko shi ne habbaka, ko bunkasar halitta ta zahiri. Wannan shi suke kira da suna *Development.* Abu na biyu kuma shi ne madaukan jiki (musamman na cikin jiki), wadanda suka hadu suka samar da dan adam. Wadannan sun hada da sinadaran jiki da sauran makamantarsu. Wannan bangare shi suke kira *Morphology.* Kalmar *Morphology* tana da ma’anoni a fannonin ilimi guda biyu; da fannin ilimin harshe da magana, wato *Linguistics.* Sai fannin ilimin halitta, wato *Biology.* Bayananmu sun ta’allaka ne ga bangaren ilmin halitta. Sai a kiyaye, kadan mai karatu da ya kware a fannin ilimin harsuna ya ga wannan kalma da wannan ma’ana ya dauka akwai shirme cikin abin da ake magana a kai. Sai bangare na uku, wato bangaren da ke lura da yanayin dabi’ar zamantakewa da dabi’ar halayya. Wannan shi kuma ana la’akari da shi ne wajen yanayin mu’amala tsakanin mutane. Ma’ana ba abu bane da a zahirin jikin mutum za ka gani, idan ba saninsa kayi ba. Amma kuma yana bayyana idan bukatar hakan ta taso. Misali, idan mutum mai saurin fushi ne, ba kowa ke iya ganewa ba don ya ganshi a karon farko, ko ya hange shi daga nesa. Abin nufi, don kawai ka ga mutum, ba za ka iya cewa ga dabi’arsa ba kai tsaye, muddin ba saninsa kayi ba. Wannan bangare shi suke kira *Behaviour.* Wadannan su ne bangarorin da wannan fanni na Nau’in Dabi’ar Halitta ta Zahiri ke dogaro dasu wajen tabbatar da hakikaninsa.

**Tsarin Tabbatuwa**

Don samun cikakkiyar fahimta kan ma’anar wannan fanni, zai dace mai karatu ya fahimci cewa, bangaren Nau’in dabi’ar halitta ta zahiri, kamar yadda muke gani, ba komai bane face “Fassarar” bayanan da ke cikin dabi’ar halittar kowane dan adam, wato *Genes.* Idan mai karatu bai mance ba, munyi bayani a baya cewa asalin bayanan da ke samar da hakikanin halittar mutum kamar yadda ake haifarsa, suna kunshe ne gaba dayansu a cikin kwayar halitta, wato *Cell.* Wannan kwayar halitta na dauke ne da bangarori da dama. Daga cikin bangarorin akwai Ma’adanar Bayanan Dabi’ar Halitta, wato *Chromosome* kenan.

Kowace kwayar halitta (Cell) na dauke ne da tagwayen "Ma'adanar Bayanan Dabi'ar Halitta" (wato *Chromosome)* guda 23.  Wannan ke nuna cewa a cikin jikin kowane dan adam za a samu guda 46 kenan (23 x 2 = 46).  Dukkan wadannan ma'adanar bayanan dabi'ar halitta iri daya ne na jikin mutum daya, duk da yake kowane dan adam nashi sun sha bamban da na waninsa.  Kowane dayan tagwayen "Ma'adanar Bayanan Dabi'a" kuma yana dauke ne da zaren "Madarar Bayanan Dabi'ar Halitta" da ake kira "Deoxyribonucleic Acid" ko "DNA" a takaice.  Wannan zare a siffar sarka yake, mai harde da juna. Kuma a jikin layin wannan sakakken zare ne ake da "Kwayoyin Dabi'ar Halittar" kowane dan adam.  Wadannan kwayoyin dabi'un halitta su ake kira "Genes".  Kowane dan adam yana kebantuwa ne da kwayoyin dabi'un halitta daban da suka sha bamban da na wani, wadanda ya gado su daga wajen iyayensa ko kakanninsa ko kakannin kakanninsa, har dai abin ya kai ga Annabi Adamu da Hauwa'u, amincin Allah ya tabbata a gare su.

Sannan muka ce wannan Kwayar Dabi’ar Halitta da ake kira *Gene,* ita ce ke dauke da dukkan tsarin da Allah ya zuba na halittar dan adam; daga zaman mahaifa zuwa rayuwar duniya. Idan aka haifi jariri, yakan zo da kirar jikinsa na musamman. Idan ya fara girma yanayin jikinsa na canzawa daga tsarin halittar jarirantaka zuwa tsarin yarinta, da samartaka, har zuwa tsufa. A yayin da mutum ke rayuwa ne zai rika girma – ta hanyar tsawo ko gajarta da fadin jiki da dai sauransu – zai kuma rika canzawa ta hanyar dabi’ar mu’amala, zai kuma rika fito da wasu halayya na musamman sanadiyyar zamantakewa. Sannan idan aka gwada jini ko ruwa ko wasu daga cikin sinadaran da ke cikin jikinsa, za a ga abubuwa masu yawa sun bayyana. Wadancan bayanai da ke kunshe cikin Kwayar Dabi’ar Halitta (Gene) masu dauke da bayanan da zahirinsu ya fito fili bayan haifar wannan jariri, su ake kira *Genotype.* Wato Nau’in Dabi’ar Halitta da ta kebance wani mutum na musamman. Idan kana son sanin irin naka, ka je asibiti za a maka gwaji kan haka, wato *Genotype Test.* Su kuma dabi’un da suka bayyana bayan an haifi wannan jariri, su ake kira *Phenotype,* wato Nau’in Dabi’ar Halitta na Zahiri. To amma ta yaya suke iya sauyawa daga lokaci zuwa lokaci? Ta yaya ake samun canzawar dabi’a da kuma canzawar yanayin mu’amala a tare da mutum guda?

Amsa wannan tambaya ne ke tabbatar da hakikanin ma’anar wannan fanni na *Phenotype.* Malam ilimin halitta suka ce wadannan dabi’u da siffofin halitta na zahiri da ke bayyana, babban dalilin da ke samar da su shi ne tasirin mahalli. Malaman wannan fanni suka ce bayan an haifi mutum, nan take sai a fara samun alaka tsakanin wadannan bayanan halitta da ke cikin Kwayar Dabi’ar halittarsa da kuma irin mahallin da yake rayuwa a cikinsa. Wannan nan ke tabbatar da sauyawar dabi’unsa na mu’amala, da dabi’unsa na zamantakewa, da kuma yanayin dabi’ar sinadaran da ke cikin jikinsa.

A yayin da ake wannan zamantakewa tsakanin Kwayar dabi’ar halitta da ke can cikin kwayar halittar mutum, da kuma muhallin da yake rayuwa a ciki, tasirin wannan mu’amala ne ke aikin wadannan sauye-sauye da muke gani a zahirin rayuwarmu. Ko dai na launin jiki, ko na girma ko gajarta, ko na nau’in sinadaran jiki, ko na nau’in dabi’ar zamantakewa, ko na nau’in halayya. Tasirin mahalli ne ke da alhakin wannan sauyi. Wannan tasiri ne ke daukan tsakanin kashi 20 zuwa 60 na dabi’ar halittar dan adam, a yayin da bangaren dabi’un halitta da ya gado daga kwayar dabi’ar halittar iyayensu kuma ke da alhakin samuwar tsakanin kashi 40 zuwa 80 na wannan sauyi. Nan take kwararru a fannin bincike suka ce a talakance, kowane bangare (tsakanin bangaren dabi’un asali da aka gado ta kwayar dabi’ar halitta, da kuma bangaren tasirin mahalli) yana daukan kashi 50 ne cikin dari na samar da wannan sauyi na halitta baki daya.

Babbar ka’idar kwatancen ilimi (Formular) da Malamai suka samar don samar da kyakkyar fahimta kan wannan fanni na ishara ne ga wadannan alaka. Don haka suke cewa: Nau’in Dabi’ar Halitta ta Zahiri (P) = Nau’in Dabi’ar Halitta (G) + Mahalli (E). A wani kaulin kuma suka ce: Nau’in Dabi’ar Halitta ta Zahiri (P) = Nau’in Dabi’ar Halitta (G) + Mahalli (E) + Cakuduwarsu (GE). Kwatancen farko ta nuna alakar dake tsakanin wadannan abubuwa ne guda biyu; da Nau’in Dabi’ar Halitta (Genotype) da kuma Mahalli (Environment). A kwatance na biyu kuma, an bayyana hakikanin mai sabbaba wannan sauyi ne a fili, wato cakuduwar wadannan abubuwa guda biyu.

Duk da cewa wannan ka’ida ta kwatancen ilimi a sawwake take kamar yadda kwatance ya nuna, amma kokarin tabbatar da hakan abu ne mai matukar wahala, kamar yadda masana suka nuna. Dalilinsu kuwa shi ne: duk wani abin da ya shafi Nau’in Dabi’ar Halitta (Genotype) da ke boye a kwayar halittarsa - irin su Sinadaran kuzari (Protein) da ke cikin kwayar halitta (Cell), da Nau’in jini (Blood Group) – sun shafi Nau’in Dabi’ar Halitta ta Zahiri (Phenotype) kai tsaye. Don haka, bambance tsakaninsu a aikace abu ne mai matukar wahala.

**Babbar Muhawara**

Dubi ga babbar alakar da ke haddasa samuwar Nau’in Dabi’ar Halitta ta Zahiri (Phenotype) ne ya kawo mu ga babbar muhawara, wacce aka dade ana gwagwagwa kanta tsakanin masana Fannin Zamantakewa (Sociologists) da masana fannin ilimin halitta da dabi’a (Psychologists). Dalilin kawo wannan muhawara kuwa shi ne, don a baya ko ince a farkon zamani, masana kimiyyar zamani basu amince cewa mahalli na da wata alaka kan sauyin dabi’u da siffofin halitta ba ga dan adam ko wata halitta daban. Suka ce abin da ke dauke cikin Kwayar Dabi’ar Halitta (Gene) din nan, su ne kadai ke bayyana kansu ba tare da la’akari da wasu sabubba na mahalli ba. Wannan ra’ayi an dauki tsawon lokaci ana kansa, ana kuma kare shi.

Masu kare wannan ra’ayi suka ce duk wani wanda ka gani da hazaka ta ilimi ko kwazo na aiki ko basira da hikima kan mahangar rayuwa, to daman can haka ya gado daga iyaye ko kakanninsa. Tasirin zamantakewa ko tarbiyyar iyaye ba su da wani sababi wajen canza wannan hazaka ko hikima ko kwazo da wannan yaro ya gado daga iyaye ko kakanni.

Wannan bayani ko jawabi nasu ne ya sake haifar da wata muhawara mai karfi wacce ta shahara a fagen ilimi, mai kokarin fahimtar tasirin mahalli wajen gyaruwa ko bacin tarbiyya; wajen karuwa ko raguwar hazaka; wajen karuwa ko raguwar basira; wajen karuwa ko raguwar hikima ga yaro sanadiyyar zamansa a wani mahalli na musamman, inda ake da abubuwan da ke iya sabbaba karuwa ko raguwar wadannan dabi’u. Bayyanar wannan muhawara ya dada fito da abubu fili karara a gare su, musamman ganin cewa a ka’idar binciken kimiyya addini ba ya tasiri ko kadan. Ma’ana ba a la’akari da abin da dan adam ke imani dashi kawai ba tare da wani bincike na zahiri don kokarin tabbatar da samuwar abin ko rashin samuwarsa ba. In ba haka ba, ai duk wani musulmi ya san cewa bayan tsarin kaddara da Allah ya rubuta wa halitta baki daya, akwai sabubba da ke haddasa faruwar kaddarar, ko zartar dasu.

Wannan muhawara dai, kada mu sha’afa, ita ce Muhawarar Dabi’a da Mahalli, wato: *Nature-Nurture Debate.* Tambayoyin da wannan muhawara ke yi su ne: shin, barawo, daman can haka Allah ya kaddare a matsayin barawo cikin kwayoyin halitta da dabi’unsa, ko kuma bayan zuwansa duniya ne yaci karo da matsalolin rayuwa ko abokan banza suka jefa shi cikin wannan mummunar sana’a? Shin, mashayin giya, daman can a cikin kwayoyin dabi’u da siffofin halittarsa haka Allah ya tsara shi ya zama mashayin giya, ko dai zuwansa duniya ne aka yi rashin sa’a ya harbu sanadiyyar zama da abokan banza mashaya? Shin, dan kwaya, daman can haka Allah ya tsara a kwayoyin dabi’u da siffofin halittarsa akwai nau’ukan dabi’un shan kwaya, ko dai zuwansa duniya ne aka yi rashin sa’a da mahalli har ya zama dan kwaya? Tambayoyi makamantan wadannan suna nan da yawa. Ga musulmi, amsoshin wadannan tambayoyi ba abu bane mai wahala. Amsar kuwa ita ce: Eh, duk wani mashayi, ko barawo, ko dan kwaya, duk Allah ya kaddara za su zama mashaya ko ‘yan kwaya ko barayi, amma hakan ba zai kasance ba sai da wasu sabubbu na zahiri, na zamantakewa. Wadannan sabubbu dole sai sun samu kafin wannan barawo ya kama sata, ko wancan mashayi ya kama shan giya ko wancan dan kwaya ya kama hambadar kwayoyi.

A wajen malaman kimiyya wannan ba dalili bane karbabbe, har sai an yi gwaji na zahiri, an tabbatar da hakan sannan ake amincewa. Hatta wajen amincewar ma, sai dai a alakanta maka faruwar abubuwan da zahirin sabubba, amma ba ga Allah ba. Haka abin ya kasance a bangaren wannan muhawara. An aiwatar da gwaje-gwaje tsakanin jarirai tagwaye, uwa-daya-uba-daya. Aka raba musu wurin zama da muhalli. A karshe aka gano bambancin hazaka a tsakaninsu, duk kuwa da cewa nau’in dabi’u da siffofin halittar da ke jikinsu iri daya ne; daga uwa daya uba daya. Amma an gano cewa tasirin mahallin da kowannensu ya zauna a ciki ya taimaka wajen siffata shi da wata dabi’a da dan uwansa bai samu ba sanadiyyar rashin wannan yanayi a mahallin da ya zauna. Ire-iren wadannan gwaje-gwajen kimiyya da aka gudanar ne suka dada jawo hankalin masana a bangaren halitta tare da yarda da tasirin mahalli wajen tabbatar da siffofi da dabi’un da kowane dan adam ya gado daga iyaye ko kakanninsa.

Wannan babbar muhawara mai take: *Nature-Nurture Debate* na cikin dalilan da suka dada canza tunani da tsarin binciken Malaman kimiyya kan tasirin mahalli ga siffofi da dabi’un halittar rayuka. Wannan karbuwa ce ta kai ga inganta wannan fanni na Nau’in Dabi’ar Halitta ta Zahiri, wanda kamar yadda bayanai suka gabata, alakar da ke samuwa tsakanin Nau’in Dabi’ar Halitta da Tasirin Mahalli ne suka haifar da samuwar wata siffa da dabi’a bayyananniya da ake iya gani. Akwai misalai masu yawa da za su iya kara gamsar da fahimtar mai karatu kan wannan fanni.

**Misalai**

A darasin farko da muka fara kawo, cikin gabatarwa da muka yi kan samuwa da dadewar wannan fannin ilimi a tsakanin halitta, mun kawo wasu hadisai masu nuni ga samuwar wadannan abubuwa. Hadisin farko shi ne wanda ke magana kan wani abu da ya faru tsakanin wani Sahabin Manzon Allah (tsira da amincin Allah su kara tabbata a gare shi) mai suna Al-Fazaaree, da matarsa, wacce ta haifa masa jariri baki sitik. Wannan bawan Allah dai Balarabe ne, haka ma matarsa. Don haka sai nan take hankalinsa ya tashi. Kenan, a tunaninsa ta sadu da wani bakin fata kenan ko bakin bawa, sanadiyyar haka ya mata ciki. Nan take ya dauki wannan jariri a zanen goyo ya je wajen Manzon Allah don ya nuna masa.

Sadda ya iso Manzon Allah na zaune cikin sahabbansa ne kamar yadda aka saba. Sai yace masa: “Dubi abin da ta haifa.” Yana nufin matarsa kenan. Sai Manzon Allah yace masa: “Kana da rakuma?” Yace eh. Yace babu wani mai launin ja da baki a cikinsu? Yace akwai. Yace masa ta yaya aka yi ya samu launin ja da baki, bayan iyayensa jajaye ne? Yace watakila ya jawo wata jijiya ce (daga asalin kakanninsa). Yana fadin haka sai Manzon Allah yace masa, “Hakan wannan – jariri – shi ma; ya jawo wata jijiya ce (daga asalin kakanninsa).

Abin da za mu iya fahimta a wannan lamari, bayan tabbatar da cewa lallai kowane dan adam zuriyarsa na kama ne da shi ta kowane bangare sanadiyyar dacewar kwayar dabi’ar halittarsa (Gene) da na matarsa, har wa yau, wasu lokuta kuma zuri’a na iya daukar dabi’ar halittar wani daga cikin kakanni ko dangin uba ko uwa. Hakan na samuwa ne idan aka samu haduwar Rinjayayyiyar dabi’ar halitta (Dominant Trait) kan Nakasasshiyar dabi’ar halitta (Recessive Trait). A yanayi irin wannan kuwa, dabi’ar halitta mafi rinjaye ita ce ke bayyana a zahirin halittar wanda aka haifa. Wannan shi ne abin da ya faru ga jaririn wannan sahabi. Ta yiwu a cikin kakanninsa (bangaren Uwa ko Uba) ko kakannin ita matar, akwai bakin fata. To amma wannan yanayi bai tashi bayyana ga zuri’ar wannan sahabi ba sai da aka samu Canjin Dabi’ar Halitta, wato *Gene Mutation.* Wannan wani yanayi ne da ke canja yanayin siffar halitta daga abin da aka sani zuwa wani launi ko yanayi daban, lokaci guda.

Misalai kan haka na nan birjik. Akwai mutumin da za ka samu ‘ya’yansa duk sunyi kama ne dashi, sai guda daya kadai. Ko a samu yara duk sunyi kama da iyayensu biyun, amma ga wani shi kadai, bai yi kama da kowa a gidan ba. Idan aka je aka yi gwajin Nau’in Dabi’ar Halitta (Genotype Test), za a samu na shi ya dace da na ‘yan uwansa da na mahaifansa gaba daya, amma a zahirin halitta ya sha bamban dasu ta kowane bangare. Hakan ya faru ne sanadiyyar samuwar Canjin Dabi’ar Halitta (Gene Mutation) a bangaren Uwa ko Uba. Duk da cewa ba dukkan yanayi irin wannan bane ke dacewa da canjin dabi’ar halitta. Akwai wanda tabbas za a samu asali ba dan gidan bane. Shi yanayi irin wannan kuwa akan gane hakikanin gaskiya ne ta hanyar yin gwajin Nau’in Dabi’ar Halitta (Genotype Test). Wannan ita ce kadai hanyar da ke iya tantance gaskiya. Amma muddin aka gano iri daya ne da na mahaifinsa, to sai a fahimci cewa dalilin samuwar hakan shi ne Canjin Dabi’ar Halitta a tsakanin ma’aurata. Shi yasa, kuskure ne yin gaggawar kore samuwar da ga mutum don kawai abin da aka haifa bai yi kama ta zahiri da mahaifinsa ko dayan mahaifansa ba. Wannan ke nuna mana cewa ashe ko an samu dacewa tsakanin Kwayar Dabi’ar Halittar mahaifi (Paternal Gene) da Kwayar Dabi’ar Halittar jariri ko zuri’a (Child Gene), wannan bai hana bayan an haifi jaririn, ya zo da wata kama ta halitta da ta sha bamban da na mahaifinsa. Samuwar hakan kuwa na ta’allaka ne ga yanayin mahallin da aka haifi wannan jariri, da kuma irin abin da Allah ya kaddara bawa ya kasance a cikinsa ko a kansa.

Misali na gaba kan binciken da masana suka gudanar ne. Sun nuna cewa, tagwayen jarirai masu kamaiceceniya da juna ta kowane bangare na Dabi’ar Halitta (Monozygous twins), sanadiyyar samuwarsu daga kwan halitta guda daya (Single Cell), idan aka musu gwaji za a samu Nau’in Dabi’ar Halittarsu duk iri daya ne, saboda tsabar kamaiceceniya. Haka idan aka haife su ma, ba kowa ke iya gane su ba. Wasu tagwayen ma za ka samu hatta mahaifinsu bai cika iya bambance su ba ta dadi. Wadda ke iya bambance su, in ji masana, sai Uwarsu wacce ta haife su. Me yasa? Suka ce saboda dole ne, duk yadda suka kai da kamaiceceniya, sai an samu wani bambanci a tsakaninsu.

Daga cikin misalan da suka bayar akwai bambancin zane ko tambarin hannu; ba za su taba zama iri daya ba. Haka kuma yanayin alakarsu da Uwarsu ba bazai taba zama iri daya ma. Musamman wajen bukatuwar nono, da son jiki, da saurin kuka ko rashinsa, da yanayin kallo. Wadannan ba za su taba zama daya ba. Amma ba kowa ke iya bambance su ta wadannan hanyoyi ba sai mahaifiyarsu. Me yasa? Saboda ita ce tafi kowa kusanci da su. Masana suka ce wadannan bambance-bambance da ake samu, babban abin da ke haddasa samuwarsu shi ne yanayi ko tasirin mahalli. Wanda kuma shi ne abin da wannan fanni na Nau’in Dabi’ar Halitta ta Zahiri (Phenotype) ke magana a kai. Fannin ilimin da ke lura da yadda Nau’in Dabi’ar Halitta (Genotype) ke samar da Nau’in Dabi’ar Halitta ta Zahiri (Phenotype) shi ake kira *Genotype-Phenotype Map.*