

Supplementary table S1: Potential Hb variants in each zone in *Sebia* Capillary-2 electrophoresis

Zones	Potential Hb variants
Z1	Hb Santa Ana (free alpha chain), Hb Mizuho (minor peak), Hb delta A'2, Hb alpha A2, Hb T-Cambodia, "Savaria" Hb A2 variant, "Chad" Hb A2 variant, "Arya" Hb A2 variant, "Hasharon" Hb A2 variant, "Fort de France" Hb A2 variant, "Ottawa" Hb A2 variant, "Shimonoseki" Hb A2 variant, "Stanleyville II" Hb A2 variant, "O-Indonesia" Hb A2 variant, "G-Norfolk" Hb A2 variant, "San Antonio" Hb A2 variant, "Handsworth" Hb A2 variant, "Matsue-Okie" Hb A2 variant, "Memphis" Hb A2 variant, "Q-Iran" Hb A2 variant, "G-Waimanalo" Hb A2 variant, "Russ" Hb A2 variant, "Q-India" Hb A2 variant, "Montgomery" Hb A2 variant, "Watts" Hb A2 variant, "G-Pest" Hb A2 variant, "Winnipeg" Hb A2 variant, "Queens" Hb A2 variant, "Inkster" Hb A2 variant, "Chapel Hill" Hb A2 variant, "Q-Thailand" Hb A2 variant, "Park Ridge" Hb A2 variant.
Z2	Hb C , Hb F-Hull, Hb F-Texas-I, Hb Constant Spring, Hb C-Harlem (C-Georgetown), "Boumerdes" Hb A2 variant, "Bassett" Hb A2 variant, "Tarrant" Hb A2 variant, "Manitoba I" Hb A2 variant, "St. Luke's" Hb A2 variant, "Setif" Hb A2 variant, "Sunshine Seth" Hb A2 variant, "Titusville" Hb A2 variant, "Swan River" Hb A2 variant, "Manitoba II" Hb A2 variant, "Val de Marne" Hb A2 variant
Z3	Hb A2 , Hb Chad (E-Keelung), Hb O-Arab, Hb E-Saskatoon, "Dallas" Hb A2 variant*, "Toulon" Hb A2 variant*, "Bonn" Hb A2 variant*, "Chicago" Hb A2 variant*, "Fontainebleau" Hb A2 variant*, "Hekinan" Hb A2 variant*, "Mosella" Hb A2 variant*, "Aztec" Hb A2 variant*, "Frankfurt" Hb A2 variant*, "M-Boston" Hb A2 variant*, "Owari" Hb A2 variant*, "Twin Peaks" Hb A2 variant*, "Conakry" Hb A2 variant*, "Gouda" Hb A2 variant*, "Jura" Hb A2 variant, "Nouakchott" Hb A2 variant
Z4	Hb E , Hb Seal Rock, Hb Köln (Ube-1), Hb Buenos Aires (minor peak), Hb M-Saskatoon (minor peak), Hb A2-Babinga, Hb G-Siriraj, Hb Agenogi, Hb Sabine, Hb Santa Ana, Hb Savaria, "M-Iwate" Hb A2 variant, "Wayne" Hb A2 variant (peak 1), denatured Hb C
Z5	Hb S , Hb Arya, Hb Hasharon (Sinai), Hb Dhofar (Yukuhashi), Hb Shimonoseki (Hikoshima), Hb O-Indonesia (Buginese-X), Hb Ottawa (Siam), Hb Fort de France, Hb Montgomery, Hb G-Copenhagen, Hb S-Antilles, Hb Handsworth, Hb S-Oman (peak 2), Hb Hamadan, Hb Russ, Hb Stanleyville II, "Lombard" Hb A2 variant, "Tatras" Hb A2 variant, "Cemenelum" Hb

	A2 variant, "Jackson" Hb A2 variant, "Hopkins-II" Hb A2 variant, "J-Broussais" Hb A2 variant (alpha 2), denatured Hb O-Arab
Z6	Hb D , Hb Memphis, Hb Leiden, Hb Muravera, Hb D-Bushman, Hb G-Norfolk, Hb S-Oman (peak 1), Hb Matsue-Okii, Hb Osu Christiansborg, Hb D-Punjab (D-Los Angeles), Hb G-Waimanalo (Aida), Hb Muskegon, Hb D-Ibadan, Hb Buenos Aires (minor peak), Hb Q-India, Hb Lepore (Lepore-BW), Hb Q-Iran, Hb Summer Hill, Hb G-Philadelphia, Hb D-Ouled Rabah, Hb Yaizu, Hb San Antonio, Hb Watts, Hb Ferrara, Hb Köln (Ube-1), Hb Fort Worth, Hb Korle-Bu (G-Accra), Hb G-Taipai, Hb D-Iran, Hb St. Luke's, Hb GCoushatta (G-Saskatoon), Hb Inkster, Hb Winnipeg, Hb Zürich, Hb G-Pest, Hb Queens (Ogi), Hb Setif, Hb P-Nilotic, Hb Sunshine Seth, Hb Titusville, "Le Lamentin" Hb A2 variant, "J-Meerut" Hb A2 variant, "J-Rajappen" Hb A2 variant, "J-Anatolia" Hb A2 variant, "J-Oxford" Hb A2 variant, "Ube 2" Hb A2 variant, "J-Broussais" Hb A2 variant (alpha 1), "J-Toronto" Hb A2 variant, "Mexico" Hb A2 variant, "J-Tongariki" Hb A2 variant, "Neuilly-sur-Marne" Hb A2 variant, "J-Paris-I" Hb A2 variant (alpha 2), "J-Habana" Hb A2 variant, "J-Paris-I" Hb A2 variant (alpha 1), "Wayne" Hb A2 variant (peak 2), denatured Hb E
Z7	Hb F , Hb Willamette, Hb Alabama, Hb Chapel Hill, Hb Park Ridge, Hb Porto Alegre, Hb Q-Thailand (G-Taichung), Hb Sabine, Hb Bassett, Hb Rampa, Hb G-San José, Hb Barcelona, Hb Geldrop Santa Anna, Hb Richmond, Hb Boumerdes, Hb Swan River, Hb Burke, Hb Tarrant, Hb Presbyterian, Hb Manitoba II, Hb Manitoba I, Hb Port Phillip, "J-Rovigo" Hb A2 variant, denatured Hb S, denatured Hb D-Punjab
Z8	Hb Lansing, Hb Hinsdale, Hb Ypsilanti (Ypsi - peak 1), Hb Alberta, Hb Val de Marne (Footscray), Hb Kempsey, Hb Shelby (Hb Leslie), Hb Atlanta, Hb Ypsilanti (Ypsi - peak 2), Hb Rainier, Hb Athens-GA (Waco), Hb Debrousse
Z9	Hb A , Hb Olympia, Hb Gorwihl (Hinchingsbrooke), Hb Phnom Penh*, Hb Silver Springs*, Hb La Coruna*, Hb Bougardirey-Mali*, Hb Dallas*, Hb Toulon*, Hb Austin*, Hb Bonn*, Hb Buenos Aires (Bryn Mawr, major peak)*, Hb Chicago*, Hb Okayama*, Hb Fontainebleau*, Hb Raleigh*, Hb Hekinan*, Hb Mosella*, Hb Aztec*, Hb Little Rock*, Hb Frankfurt*, Hb Bethesda*, Hb M-Boston (M-Osaka)*, Hb Brisbane (Great Lakes)*, Hb Mizuho*, Hb Grange Blanche*, Hb San Diego*, Hb M-Saskatoon (main peak)*, Hb Malmö*, Hb Minneapolis Laos*, Hb Owari*, Hb Rhode Island (Southwark)*, Hb Twin Peaks*, Hb Wood*, Hb Conakry*, Hb

	Coimbra (Ingelheim)*, Hb Linköping (Meilahti)*, Hb Templeuve*, Hb Alzette*, Hb Ty Gard*, Hb Gouda*, Hb Syracuse*, Hb Fort Dodge, Hb Camperdown, Hb Jura
Z10	Hb Nouakchott, Hb Wayne (peak 1), Hb M-Iwate (M-Kankakee), Hb Camden (Tokuchi), Hb Hope
Z11	Hb Vaasa, Hb Providence (X-Asn peak), Hb Tacoma, Hb Corsica, Hb K-Woolwich, Hb Lombard, Hb Andrew Minneapolis, Hb Fannin Lubbock, Hb Kaohsiung (New York), Hb Osler (Fort Gordon), Hb Himeji, Hb Jackson, Hb Tatra, "I (I-Texas)" Hb A2 variant
Z12	Hb Bart's , Hb Cemenelum, Hb Wayne (peak 2), Hb Hopkins-II, Hb J-Calabria (J-Bari), Hb J-Tongariki, Hb Providence (X-Asp peak), Hb J-Meerut (J-Birmingham), Hb J-Broussais (Tagawa-I - alpha 2), Hb J-Rajappen, Hb Grady (Dakar), Hb Le Lamentin, Hb J-Anatolia, Hb Hikari, Hb J-Broussais (Tagawa-I - alpha 1), Hb J-Chicago, Hb J-Toronto, Hb J-Oxford (I-Interlaken), Hb Ube-2, Hb J-Meinung (J-Bangkok), Hb Neuilly-sur-Marne, Hb Mexico (J-Paris-II), Hb J-Paris-I (J-Aljezur - alpha 1), Hb J-Habana, Hb J-Baltimore (N-New Haven), Hb J-Paris-I (J-Aljezur - alpha 2), Hb K-Ibadan
Z13	Hb N-Baltimore, Hb J-Rovigo, Hb J-Norfolk (Kagoshima), Hb J-Kaohsiung (J-Honolulu)
Z14	Hb N-Seattle
Z15	Hb I (I-Texas), Hb H

* Hidden peak